21st International Conference
on Composite Materials

21st International Conference on Composite Materials – Xi'an, China

ICCM21

PROGRAMME AND BOOK OF ABSTRACTS

20-25 August 2017 Xi'an, China

21st INTERNATIONAL CONFERENCE
ON COMPOSITE MATERIALS

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Welcome

Welcome to the 21st International Conference on Composite Materials (ICCM21) in Xi'an, China.

The ICCM, having started in 1975, is the largest conference series dedicated to composite materials. ICCM21 has adopted the motto of 'Advanced Composites: Innovation and Development', bringing together researchers, scientists and practitioners worldwide to explore the role of innovation in the development of composites, and the impact on global economy.

A rich scientific program will be offered during ICCM21, including 10 plenary lectures, 24 keynote lectures, 309 parallel oral sessions, 6 mini-oral sessions presented by over 1600 participants. It is our sincere hope that you'll enjoy the conference programme, and find the presentations delivered during ICCM21 reflect well on the vibrant and diverse nature of composites. It is expected that this conference will serve as an excellent platform for our honorable guests coming from afar, to unlock possibilities of effective international collaboration, and fuel innovation in the composites industry.

We greatly appreciate the efforts made by the ICCM21 organizing committee and dedicated volunteers to get all the detailed arrangements in order. In particular, we would like to extend thanks to the authors who submitted their excellent papers to the conference programme, and also the reviewers, who have given timely comments and pertinent feedback, which improved the quality of the papers. The full programme printed in this book includes only brief abstracts; a digital version of this programme and full proceedings can be accessed via www.ICCM21.org.

We are committed to creating an enjoyable and impressive experience for your stay in Xi'an, China. You will have convenient access to general information and updates through screens and printed posters, on the conference website or microsite. The secretariat of ICCM21 and conference volunteers will offer any assistance we can. Please feel free to contact us if you need any help.

Once again, a warm welcome to Xi'an. Having once served as the capital city of 13 dynasties in ancient times, with a history of 5,000 years and the starting point of the Silk Road, Xi'an will surely impress you with its distinctive culture when you visit its ancient City Wall, Shaanxi History Museum and Museum of the Terracotta Army.

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China National Building Material Group Corporation Ltd. (CNBM) is integrated through the restructuring of China National Building Materials Group Corporation and China National Materials Group Corporation Ltd. CNBM is a state owned enterprise under the direct administration of State-owned Assets Supervision and Administration Commission of the State Council.

The Group produces 530 million tons of cement clinker, 430 million m^3 of ready-mixed concrete, 2 billion m^2 of plasterboard, 1.78 million tons of fiberglass, and 16 GW of wind turbine blades per year, all of which rank the first in the world. The Group is also the No.1 player in the international cement engineering market and the international waste heat recovery market. The Group has 26 national scientific research and design institutes, 38,000 scientific research and development staffs, 33 national and industrial quality inspection centers, over 8,000 patents, 11 state key laboratories and technical centers, and 18 committees on national standards.

Strategically CNBM envisions becoming a world-class comprehensive building material group. Its strategic positioning is to be a leader of industrial integration, an innovator of industrial upgrade and a pioneer of international capacity cooperation. Its priority is to build six business platforms, namely a developed manufacturing platform, an international capacity cooperation platform, a platform for the development of three new industries, a national material scientific research platform, a national mining resources platform, and a financial investment and operation platform.

China National Building Material Group (CNBM), the largest building material company in the world.

With full-line services covering scientific research, manufacturing and logistics, CNBM is not only the largest comprehensive building material group in China. CNBM has been enrolled in the list of Fortune Global 500 for six consecutive years. With total assets of 550 billion Yuan, CNBM has a workforce of 250,000 employees and generates an annual income of 300 billion Yuan. The Group also owns 15 listed companies, including 2 listed abroad.

CNBM is No.1 in the following field of business in the world:

Cement: 530 million tons

Ready-mixed concrete: 430 million m^3

Fiberglass: 1.78 million tons

Plasterboard: 2 billion m^2

Wind turbine blades: 16 GW

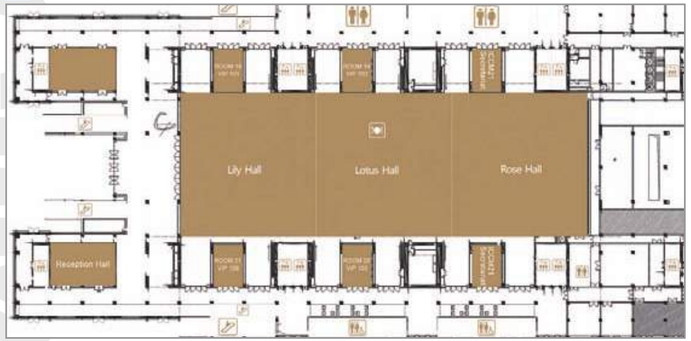
International cement engineering: more than 70% world's cement plants are constructed by CNBM.

中国建材 CNBM

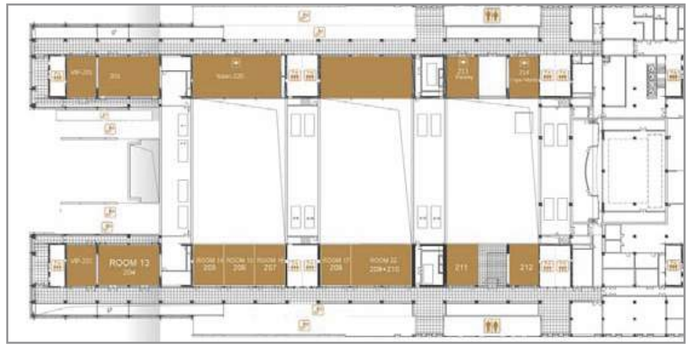
VENUE OVERVIEW

Xi'an Qujiang International Conference & Exhibition Center is a business group specialized in conferences and exhibitions located in Xi'an Qujiang New District and at the east of Shaanxi TV Station at the south end of South Chang'an Road as middle axis of Xi'an. With such surrounding scenic spots as Big Wild Goose Pagoda, Tang Paradise and Tang Sleepless City, etc. , the center enjoys well-built surrounding roads, convenient traffic and mature community in Qujiang New District, thus forming the future core area of CBD in south suburb of Xi'an. To find out more, please refer to the following link: http://www.qiceg.com/huiyien/index.asp

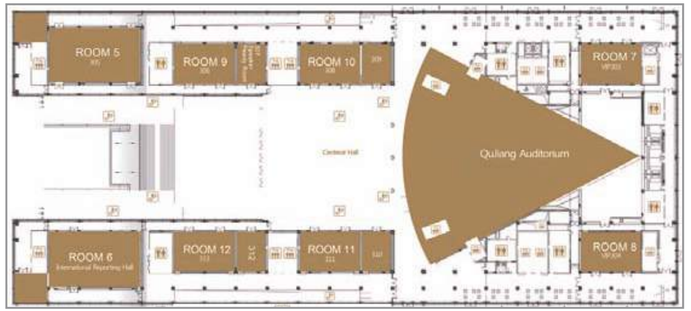
F1 Session Room18-21



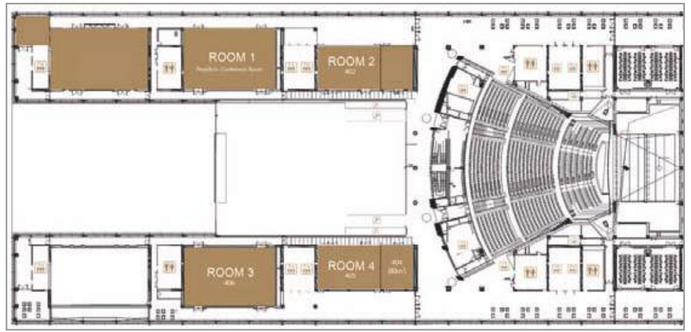
F2 Session Room13-17, Session Room 22



F3 Session Room 5-12



F4 Session Room 1-4



GENERAL INFORMATION

Registration and Information Desk Opening Hours

Onsite registration is open:

Sunday August 20, 2017	16:30-21:00
Monday August 21, 2017	07:00-18:00
Tuesday August 22, 2017	07:00-18:00
Wednesday August 23, 2017	07:00-18:00
Thursday August 24, 2017	07:00-18:00
Friday August 25, 2017	07:00-12:00

Speaker Ready Room Opening Hours

Sunday August 20, 2017	16:00-20:00
Monday August 21, 2017	07:30-17:00
Tuesday August 22, 2017	07:30-17:00
Wednesday August 23, 2017	07:30-15:00
Thursday August 24, 2017	07:30-15:00
Friday August 25, 2017	07:30-11:00

Speaker Ready Room Location

Speaker Ready Room stands at the 3rd floor Room 307. Speakers are required to upload slides to the devices at the Speaker Ready room the day before presentation.

Exhibition Opening Hours

Sunday August 20, 2017	16:00-17:00
Monday August 21, 2017	09:00-17:00
Tuesday August 22, 2017	09:00-17:00
Wednesday August 23, 2017	09:00-17:00
Thursday August 24, 2017	09:00-17:00
Friday August 25, 2017	09:00-16:00

Internet Access
Wireless internet is available throughout the conference.

Catering
Refreshments and meal bags will be provided in Lotus Hall of the 1st floor and other available rest area within the venue. Coffee break will be arranged in the third and fourth floor.

Conference Admission – Delegate Badge
No access to the ICCM21 conference venue will be permitted to any session rooms, exhibition or social events without the badge. So please wear the badge during the conference. Exhibitors badge is for exhibition areas only, and accompanying person badge is for exhibition areas, welcome reception on August 21 and the conference dinner on August 24 only.

Conference Secretariat
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Fax: +86 10 8231 7092
Website: www.iccm21.org

ICCM21 Microsite
Guests can login on the Microsite through your smartphone or PC in order to receive important updates, search for conference agenda, program, and other useful information.

Smoking Policy
Qujiang International Convention Center is a non-smoking facility.

Public Transportation
Xi'an Qujiang International Convention Center stands at the end of South Chang'an Road, the middle axis of Xi'an downtown. It can be reached by various means of public transport.

From Airport and North Railway Station
Conference Shuttle Bus: Free conference Shuttle Bus will be operated on August 20, 2017 from 10:00 a.m. to 11:30 p.m. Our colleagues and volunteers will pick up guests at the exit of Terminal 1, Terminal 2 and Terminal 3 in the airport and Xi'an North Railway Station (the high speed rail).
Taxi: It takes 50-80 minutes by taxi from the airport to the conference venue. (about ¥110-190)
Airport Shuttle Bus: The most direct and convenient shuttle bus line for guests to arrive at the venue is Qujiang Line, which runs from 7: 00 a.m. to 8:20 p.m.
Metro: Guests can also take Metro Line 2 in North Railway Station to the venue (Huizhanzhongxin Station).

Downtown Xi'an
Bus: There are dozens of buses that stop at the Convention and Exhibition Center Station.
Metro: Metro Line 2 travels from Huizhanzhongxin Station to the downtown area, south suburb and also the Northern Railway Station, the high speed railway station.

Shopping Center
There are several shopping centers surrounding Qujiang Convention Center, including Tang Dynasty All-Day Mall, and Xiaozhai Saga International Shopping Center. These shopping centers are open daily from 9:00 to 22:00.

Scenic Spots
Big Wild Goose Pagoda, Shaanxi History Museum, Qujiang Pool Relics Park, Tang Paradise and Tang Dynasty All-Day Mall etc. are all adjacent to the conference venue.

Xi'an Metropolis
Xi'an, geographically located at the heart of China, once served as the capital city of 13 dynasties in ancient times with a history of 5,000 years, including the Zhou, Qin, Han, Sui, and Tang Dynasties. Xi'an has witnessed the most glorious history of China, and now ranks as one of the top 10 tourist destinations in China with distinctive cultures. Xi'an is also the starting point of the Silk Road and the home for the Terracotta Army of Emperor Qin Shi Huang, the first emperor in Chinese history.

Social Program
Welcome Reception
The Welcome Reception will take place in Qujiang International Convention Center from 18:40-21:30, on August 21, 2017, Monday. Shuttle buses provided by the conference will travel from the venue to the hotel. Access is by badge only.

Conference Banquet
The Conference Banquet will take place in Qujiang International Convention Center from 19:00-21:30, on August 24, 2017, Thursday. Typical local foods and drinks will be served during the party, with well-prepared professional performances provided.

Exhibition

Special Booth
China National Building Materials Group Corporation (CNBM)
Aerospace Long March Arimt Technology Co., Ltd.

Standard Booth	Company Name
No. B1	Shaanxi Taihang Impedefire Polymer Limited Company
No. B2	Instron
No. B3	ICCM22 Melbourne
No. B4	ICCM23 Venice, Italy Bid
No. B5	ICCM23 Belfast, UK Bid
No. B6	Taylor & Francis Asia Pacific
No. B7	China composites info net
No. B8	The 3rd China International Congress on Composite Materials (CCCM-3), Chinese Society for Composite Materials
No. B9	EPFL-LPAC/Lausanne, Switzerland Bid
No. B10	Engineering, Chinese Academy of Engineering
No. B11	Ionbond, IHI Group
No. B12	Photron
No. B13	Xi'an Aerospace Composite Research Institute
No. B14	DOM
No. B15	Netzsch
No. B16	ESUM Technology Limited (Metravib)
No. B17	Elsevier
No. B18	Shanghai Leadgo-tech
No. B19	Metals & Materials, MDPI
No. B20	Siemens PLM Software
No. B21	Surface Measurement Systems
No. B22	OPLAN
No. B23	Kangde Composites
No. B24	Jiangsu Meilong New Materials
No. B25	Science and Technology on Thermostructural Composite Materials Laboratory, Northwestern Polytechnical University
No. B26	Center for Composite Materials and Structures, Harbin Institute of Technology
No. B27	Beihang University
No. B28	Xi'an Jiaotong Uiversity

Special thanks for invaluable support in organizing the ICCM21 in Xi'an, China:

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Grateful acknowledge from the organizing committee is extended to the following companies for the great support and participation:

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ICCM21
PROGRAMME AND BOOK OF ABSTRACTS

Industrial Needs Panel Session on Modernising Composite Regulations: New opportunities for research and development

Organised by Ole Thybo Thomsen, Janice Dulieu-Barton, Simon Quinn and Rob Stevens
University of Southampton, UK

Tuesday 22 August 2017, 15:40 until 17:40, Location: Room 22 (209)

The use of composites in aerospace and automobile design is now the norm, but they have much broader potential for use in other sectors such as in building and bridge construction, railway and rail infrastructure, as well as marine and offshore. The potential benefits of composites are well known, from lightweighting load carrying structures to more energy efficient, less wasteful and more sustainable design and installation, as well as high corrosion resistance and hence reduced maintenance.

However, for companies thinking of embracing composite materials there are many questions to be answered. Will the composite materials really deliver their promised benefits? How much will it really cost? Is there a sufficiently well-established supply chain to deliver the products? Will the industry regulator approve the design? All are very valid and important questions to answer before a widespread adoption of composites can be expected across sectors. Many of the questions can be resolved through industry demonstration projects. Typically these are part-funded by public funds to reduce the risk. However, the regulatory question is often overlooked. This was the subject of a University of Southampton study by a multi-disciplinary team that has resulted in a position paper that has recently been published (www.southampton.ac.uk/CompositesRegulations).

The position paper presents a detailed review of the existing regulatory regimes in the aerospace, automotive, construction, defence, maritime, oil and gas, rail and renewables sectors. The review represents the first comparative study of its kind, and it has underpinned the need for an alternative approach for the regulatory processes regarding the introduction of composite materials in load carrying structures across industry sectors. Though each sector has different demands on materials and their use in structures, the review highlights the fragmented nature of the current regulatory regimes. Responsibilities for developing and implementing regulations are shared by many government departments and agencies, meaning that companies have to deal with multiple authorities and testing protocols to get their new composite products to market. This is a significant barrier to innovation.

Building on the review the position paper proposes a streamlining of the regulation process for composite products. Some sectors like aerospace are leading the way in achieving this, so there is valuable experience to learn from. Realigning agencies and regulators, bringing them closer to industry, sharing information, and reducing the costs of testing are all important features of a more effective and efficient composites regulatory system. The position paper recognises the challenge of achieving a new framework model for regulations and the initial reactions from government and industry have been positive.

In the panel session a summary of the key findings of the University of Southampton study will be provided, together with short presentations from invited panellists to provide an international perspective. A panel discussion will follow, taking questions from the floor, on the future process to achieve a more flexible and efficient regulatory system and the new opportunities for research and development that this will provide.

Tuesday 22 August 2017
Time: 15:40- 17:40
Location: Room 22 (209) 2nd Floor,of Qujiang International Convention Center

航天长征睿特科技有限公司
Aerospace Long March Arimt Technology Co.,Ltd

Established in Tianjin economic and Technological Development Zone in 2011 with 90% controlling interest by Institute of aerospace materials and technology, Aerospace Long March Arimt Technology Co., Ltd is mainly engaged in the research and development of resin matrix composite materials and the development and production of composite products.

Welcome to join us in Forum on Advanced Composites and Manufacture
August 22, 2017
Time: 09:05-12:00
15:40-18:20
Location: Room 309 3rd Floor of Qujiang International Convention Center

International Textile Permeability and Compressibility Benchmark Exercises
In the benchmark exercises, a multiaxial E-glass fibre reinforcement system supplied by Saertex and a 2/2 twill woven E-glass fibre reinforcement system supplied by Hexcel will be used. The test fluid will be XIAMETER PMX-200 Silicone Fluid 100cSt.
August 21, 2017
Time: 15:50-17:50
Location: Room 209 2nd Floor,of Qujiang International Convention Center

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SCIENTIFIC PROGRAM CODES

The scientific program consists of more than three hundred sessions covering nearly every aspects of composites across. The guide below shows you how to find session/presentation using session number/ program number. Please note that you can also search for presentations through ICCM21 website or Microsite.

Oral Session

The session number is made of 4 digits: XYZZ
X = day (Monday = 1, Tuesday = 2 …)
Y = session number on the day
ZZ = room code

The program number of oral presentation is made of session number and the order of the presentation in each session:
XYZZ-VV
X = day (Monday = 1, Tuesday = 2 …)
Y = session number on the day
ZZ = room code
VV = presentation order in the session

In the printed program, the name of break-out rooms are listed in table below, and their location can be found in venue map.

Session Room No.	Corresponding Centre Room No.
01	Presidium Conference Room
02	402
03	406
04	405
05	305
06	International Reporting Hall
07	VIP 303
08	VIP 304

Session Room No.	Corresponding Centre Room No.
09	306
10	308
11	311
12	313
13	204
14	205
15	206
16	207

Session Room No.	Corresponding Centre Room No.
17	208
18	VIP101
19	VIP102
20	VIP105
21	VIP106
22	209+210

Mini-Oral and Poster Session

The Posters are on display from 9:00 on Monday 21 August until 16:30 on Thursday 24 August in designated area of Lily, Lotus and Rose Hall at the 1st Floor of Qujiang International Convention Center. All posters will have to be removed by **16:30 on Thursday 24 August.** The conference organizing committee takes no responsibility for posters after that.

The abstracts accepted for poster will also be presented at Mini Oral Presentation Sessions to be held from 9:05 -11:45 on Wednesday 23 August 2017. Each presentation will be limited to 3 slides and 3 minutes. The arrangement of mini-oral presentation will be fully integrated in the scientific program. This will be followed by Poster Exhibition and Reception in the Center Stage on the first floor where presenters are to stand by their posters to answer questions.

The poster session number is made of 5 digits: PXYZZ
P = poster
X= day (Wednesday = 3)
Y= session number on the day
ZZ = stage number for presentation (stage 1, 2, 3, 4, 5, 6)

The program number of mini-oral presentation is as follows: PXYZZ-VV
P = poster
X= day (Wednesday = 3)
Y= session number on the day
ZZ = stage number for presentation (stage 1, 2, 3, 4, 5, 6)
VV = presentation order in the session (53 presentations in stage 1-5, 23 presentations in stage 6)
Mini-oral time: Wednesday 23 August 9:05-11:45 am.

Mini-oral presentation will be held in the Lily, Lotus and Rose Hall on the first floor.

PROGRAM OVERVIEW

Dates	Time Slot	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP 101)	ROOM 19 (VIP 102)	ROOM 20 (VIP 105)	ROOM 21 (VIP 106)	ROOM 22 (209+210)
Monday 21 August	08:40-09:10	Opening Ceremony																					
	09:10-10:00	SCALA LECTURE by: Yiu-Wing Mai, University of Sydney, Australia - Personal Reflections on a Career of Composite Materials Research: A Matter of Opportunities																					
	10:15-10:50	KEYNOTE LECTURE by: 1) Fu-Kuo Chang, Stanford University, USA; 2) Debes Bhattarcharyya, University Auckland, New Zealand; 3) Dongsheng Li, Commercial Aircraft Corporation of China, China																					
	10:50-11:10	Coffee Break																					
	11:10-12:50	1101 Polymer Matrix Materials 1	1102 Metal Matrix Composites 1	1103 Fiber-reinforced Composites 1	1104 Fracture and Damage 1	1105 Nano-Composites 1	1106 Ceramic Matrix Composites 1	1107 Structural Analysis and Optimization 1	1108 Multiscale Modelling of Structures 1	1109 Bio-Composites 1	1110 Durability, Creep and Aggressive Environment 1	1111 Hybrid Composites 1	1112 Office Naval Research (ONR) Session 1	1113 Joints 1	1114 Composite Structures 1	1115 Fatigue 1	1116 Stimuli Responsiveness and Shape Reconfiguration 1	1117 Design and Manufacture for Multifunctionality 1	1118 Interfaces and Interphases 1	1119 Coupled Properties and Multi-Physics Models	1120 Digital Image 1	1121 Aerospace 1	
	12:50-13:50	Lunch																					
	13:50-14:40	PLENARY LECTURE by: Stephen Tsai, Stanford University, USA - Design of Composite Laminates																					
	14:55-15:30	KEYNOTE LECTURE by: 1) Liqun Zhang, Beijing University of Chemical Technology, China; 2) Kon-Well Wang, University of Michigan, USA; 3) Soon Hyung Hong, Korea Advanced Institute of Science and Technology, Korea																					
	15:30-15:50	Coffee Break																					
	15:50-17:10	1201 Polymer Matrix Materials 2	1202 Metal Matrix Composites 2	1203 Fiber-reinforced Composites 2	1204 Fracture and Damage 2	1205 Nano-Composites 2	1206 Ceramic Matrix Composites 2	1207 Structural Analysis and Optimization 2	1208 Multiscale Modelling of Structures 2	1209 Bio-Composites 2	1210 Durability, Creep and Aggressive Environment 2	1211 Hybrid Composites 2	1212 Office Naval Research (ONR) Session 2	1213 Joints 2	1214 Composite Structures 2	1215 Fatigue 2	1216 Stimuli Responsiveness and Shape Reconfiguration 2	1217 Design and Manufacture for Multifunctionality 2	1218 Interfaces and Interphases 2	1219 Recycling of Composites and Sustainability 1	1220 Digital Image 2	1221 Aerospace 2	Workshop: International Benchmark Exercises on Textile Permeability and Compressibility Characterization
	17:10-18:30	1301 Polymer Matrix Materials 3	1302 Metal Matrix Composites 3	1303 Fiber-reinforced Composites 3	1304 Fracture and Damage 3	1305 Nano-Composites 3	1306 Ceramic Matrix Composites 3	1307 Structural Analysis and Optimization 3	1308 Multiscale Modelling of Structures 3	1309 Bio-Composites 3	1310 Moire and Grid Based Technique	1311 Hybrid Composites 3	1312 Office Naval Research (ONR) Session 3	1313 Joints 3	1314 Composite Structures 3	1315 Fatigue 3	1316 Stimuli Responsiveness and Shape Reconfiguration 3	1317 Design and Manufacture for Multifunctionality 3	1318 Interfaces and Interphases 3	1319 Recycling of Composites and Sustainability 2	1320 Bio and Medical 1	1321 Aerospace 3	
	18:40-21:30	Welcome Reception																					
Tuesday 22 August	08:00-8:50	PLENARY LECTURE by: Tongyi Zhang, Shanghai University, China - Brief Introduction to Materials Genome Initiative and Materials Informatics																					
	09:05-10:25	2101 Polymer Matrix Materials 4	2102 Metal Matrix Composites 4	2103 Fiber-reinforced Composites 4	2104 Fracture and Damage 4	2105 Nano-Composites 4	2106 Ceramic Matrix Composites 4	2107 Structural Analysis and Optimization 4	2108 Multiscale Modelling of Structures 4	2109 Bio-Composites 4	2110 Thermography 1	2111 Hybrid Composites 4	2112 Office Naval Research (ONR) Session 4	2113 Joints 4	2114 Composite Structures 4	2115 Fatigue 4	2116 Stimuli Responsiveness and Shape Reconfiguration 4	2117 Design and Manufacture for Multifunctionality 4	2118 Interfaces and Interphases 4	2119 Recycling of Composites and Sustainability 3	2120 Bio and Medical 2	2121 Aerospace 4	
	10:25-10:50	Coffee Break																					
	10:50-11:25	KEYNOTE LECTURE by: 1) Woo Il Lee, Seoul National University, Korea; 2) Norman Wereley, University of Maryland, USA; 3) Ozden Ochoa, Texas A&M University, USA																					
	11:35-12:35	2201 Polymer Matrix Materials 5	2202 Metal Matrix Composites 5	2203 Fiber-reinforced Composites 5	2204 Fracture and Damage 5	2205 Nano-Composites 5	2206 Fiber-reinforced Composites 16	2207 Structural Analysis and Optimization 5	2208 Multiscale Modelling of Structures 5	2209 Bio-Composites 5	2210 Thermography 2	2211 Hybrid Composites 5	2212 Sandwich Structures and Materials 1	2213 Joints 5	2214 Composite Structures 5	2215 Fatigue 5	2216 Self-Healing and Bio-inspired Designs 1	2217 Design and Manufacture for Multifunctionality 5	2218 Interfaces and Interphases 5	2219 Recycling of Composites and Sustainability 4	2220 Bio and Medical 3	2221 Aerospace 5	
	12:35-13:35	Lunch																					

Dates	Time Slot	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP 101)	ROOM 19 (VIP 102)	ROOM 20 (VIP 105)	ROOM 21 (VIP 106)	ROOM 22 (209+210)
Tuesday 22 August	13:35-14:25	PLENARY LECTURE by: Tsu-Wei Chou, University of Delaware, USA - From Structural to Functional Composites: A Personal Journey																					
	14:40-15:15	KEYNOTE LECTURE by: 1) Leif Asp, Luleå University of Technology, Sweden; 2) Andy Long, The University of Nottingham, UK; 3) Alan KT Lau, Swinburne University of Technology, Australia																					
	15:15-15:40	Coffee Break																					
	15:40-17:00	2301 Polymer Matrix Materials 6	2302 Metal Matrix Composites 6	2303 Fiber-reinforced Composites 6	2304 Fracture and Damage 6	2305 Nano-Composites 6	2306 Fiber-reinforced Composites 17	2307 Structural Analysis and Optimization 6	2308 Multiscale Modelling of Structures 6	2309 Bio-Composites 6	2310 Energy Harvesting and Storage 1	2311 Hybrid Composites 6	2312 Sandwich Structures and Materials 2	2313 Joints 6	2314 Composite Structures 6	2315 Fatigue 6	2316 Self-Healing and Bio-inspired Designs 2	2317 Design and Manufacture for Multifunctionality 6	2318 Interfaces and Interphases 6	2319 Renewable Energy 1	2320 Bio and Medical 4	2321 Automotive and Rail 1	Panel Session on Composite Regulation
	17:00-18:20	2401 Polymer Matrix Materials 7	2402 Metal Matrix Composites 7	2403 Fiber-reinforced Composites 7	2404 Fracture and Damage 7	2405 Nano-Composites 7	2406 Fiber-reinforced Composites 18	2407 Structural Analysis and Optimization 7	2408 Multiscale Modelling of Structures 7	2409 Bio-Composites 7	2410 Energy Harvesting and Storage 2	2411 Hybrid Composites 7	2412 Sandwich Structures and Materials 3	2413 Joints 7	2414 Composite Structures 7	2415 Fatigue 7	2416 Self-Healing and Bio-inspired Designs 3	2417 Tribology and Wear 1	2418 Processing-Preforming Technologies 1	2419 Renewable Energy 2	2420 Bio and Medical 5	2421 Automotive and Rail 2	
	18:30-20:00	Dinner																					
Wednesday 23 August	08:00-08:50	PLENARY LECTURE by: Huiming Cheng, Institute of Metal Research, Chinese Academy of Sciences, China - Fabrication of Graphene Materials and Their Composite Applications																					
	09:05-11:45	Mini Oral Session																					Tsai Award
	11:45-12:35	Poster Exhibition and Reception																					
	12:35-13:35	Lunch and Poster Exhibition																					
	13:35-14:25	PLENARY LECTURE by: Michael Wisnom, University of Bristol, UK - Creating Composites that Fail More Gradually																					
	14:40-15:15	KEYNOTE LECTURE by: 1) Jian Lu, City University of Hong Kong, China; 2) Byung Sun Kim, Korea Institutes of Material Science, Korea; 3) Brian G. Falzon Queen's University Belfast, UK																					
	15:15-15:35	Coffee Break																					
	15:35-16:55	3101 Polymer Matrix Materials 8	3102 Metal Matrix Composites 8	3103 Fiber-reinforced Composites 8	3104 Fracture and Damage 8	3105 Nano-Composites 8	3106 Fiber-reinforced Composites 19	3107 Structural Analysis and Optimization 8	3108 Ductile and Pseudo-ductile Composites 1	3109 Textile-Based Composites 1	3110 Energy Harvesting and Storage 3	3111 Dynamic Behavior 1	3112 Sandwich Structures and Materials 4	3113 Joints 8	3114 Composite Structures 8	3115 Structural Design Criteria, Safety and Reliability	3116 Self-Healing and Bio-inspired Designs 4	3117 Tribology and Wear 2	3118 Processing-Preforming Technologies 2	3119 Additive Manufacturing 1	3120 Bio and Medical 6	3121 Aerospace 6	3122 Acoustic Meta-Composite 1
	17:00-18:20	General Assembly																					
	18:30-20:00	Dinner																					
Thursday 24 August	08:00-08:50	PLENARY LECTURE by: Ray Baughman, University of Texas at Dallas, USA - Strong, Fast, Powerful, Durable, and Cheap Polymer Fiber and Hybrid Nanofiber Yarn Artificial Muscles and Their Applications																					
	09:05-10:25	4101 Polymer Matrix Materials 9	4102 Metal Matrix Composites 9	4103 Fiber-reinforced Composites 9	4104 Fracture and Damage 9	4105 Nano-Composites 9	Forum on Lightweight Structures and Composites	4107 Structural Analysis and Optimization 9	4108 Ductile and Pseudo-ductile Composites 2	4109 Textile-Based Composites 2	4110 Energy Harvesting and Storage 4	4111 Dynamic Behavior 2	4112 Sandwich Structures and Materials 5	4113 Joints 9	4114 Actuation and Dynamic Response	4115 Processing-Manufacturing Technologies 1	4116 Self-Healing and Bio-inspired Designs 5	4117 Acoustic Meta-Composite 2	4118 Process Induced Effects 1	4119 Additive Manufacturing 2	4120 Bio and Medical 7	4121 Automotive and Rail 3	
	10:25-10:50	Coffee Break																					
	10:50-11:25	KEYNOTE LECTURE by: 1)Anthony M. Waas, University of Washington, USA; 2) Jang Kyo Kim, The Hong Kong University of Science and Technology, China; 3) Véronique Michaud, Ecole Polytechnique Fédérale de Lausanne, Switzerland																					
	11:35-12:35	4201 Polymer Matrix Materials 10	4202 Metal Matrix Composites 10	4203 Fiber-reinforced Composites 10	4204 Fracture and Damage 10	4205 Nano-Composites 10	Forum on Lightweight Structures and Composites	4207 Structural Analysis and Optimization 10	4208 Ductile and Pseudo-ductile Composites 3	4209 Textile-Based Composites 3	4210Process Modelling 1	4211 Dynamic Behavior 3	4212 Sandwich Structures and Materials 6	4213 X-Ray Computed Tomography 1	4214 Constitutive Models 1	4215 Processing-Manufacturing Technologies 2	4216 Civil Engineering	4217 Acoustic Meta-Composite 3	4218 Process Induced Effects 2	4219 Additive Manufacturing 3	4220 Fibers 1	4221 Automotive and Rail 4	

Dates	Time Slot	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP 101)	ROOM 19 (VIP 102)	ROOM 20 (VIP 105)	ROOM 21 (VIP 106)	ROOM 22 (209+210)
Thursday 24 August	12:35-13:35	Lunch																					
	13:35-14:25	PLENARY LECTURE by: Zhongmin Xue, Sinoma Science & Technology Co., Ltd, China - Composite Material Applications to Industries in China																					
	14:40-15:15	KEYNOTE LECTURE by: 1) Christopher S. Lynch, University of California, Los Angeles, USA; 2) Chiara Bisagni, Delft University of Technology, Netherlands; 3) Milo Shaffer, Imperial College London, UK																					
	15:15-15:40	Coffee Break																					
	15:40-17:00	4301 Polymer Matrix Materials 11	4302 Metal Matrix Composites 11	4303 Fiber-reinforced Composites 11	4304 Fracture and Damage 11	4305 Nano-Composites 11	Forum on Lightweight Structures and Composites	4307 Green Composites 1	4308 Ductile and Pseudo-ductile Composites 4	4309 Textile-Based Composites 4	4310 Process Modelling 2	4311 Dynamic Behavior 4	4312 Sandwich Structures and Materials 7	4313 X-Ray Computed Tomography 2	4314 Constitutive Models 2	4315 Processing-Manufacturing Technologies 3	4316 Sensing and Self-Diagnosis 1	4317 Acoustic Meta-Composite 4	4318 Process Induced Effects 3	4319 Additive Manufacturing 4	4320 Fibers 2	4321 Smart Structures 1	
	17:00-18:20	4401 Polymer Matrix Materials 12	4402 Metal Matrix Composites 12	4403 Fiber-reinforced Composites 12	4404 Fracture and Damage 12	4405 Damage Tolerance of Composites Structures 1	Forum on Lightweight Structures and Composites	4407 Green Composites 2	4408 Ductile and Pseudo-ductile Composites 5	4409 Textile-Based Composites 5	4410 Process Modelling 3	4411 Dynamic Behavior 5	4412 Sandwich Structures and Materials 8	4413 X-Ray Computed Tomography 3	4414 Constitutive Models 3	4415 Processing-Manufacturing Technologies 4	4416 Sensing and Self-Diagnosis 2	4417 Acoustic Meta-Composite 5	4418 Process Induced Effects 4	4419 Micro- and Nano- Scale Test Methods	4420 Fibers 3	4421 Smart Structures 2	
	19:00-21:30	Banquet																					
Friday 25 August	08:00-08:50	PLENARY LECTURE by: Daniel J. Inman, University of Michigan, USA - The Role of Composites in Avian Inspired Morphing Aircraft																					
	09:05-10:25	5101 Polymer Matrix Materials 13	5102 Metal Matrix Composites 13	5103 Fiber-reinforced Composites 13	5104 Dynamic Fracture 1	5105 Damage Tolerance of Composites Structures 2	5106 Fiber-reinforced Composites 20	5107 Green Composites 3	5108 Other New Testing Methods 1	5109 Textile-Based Composites 6	5110 Process Modelling 4	5111 Composite Repair 1	5112 Sandwich Structures and Materials 9	5113 Ultrasound, Acoustic Emission, and Electromagnetic waves 1	5114 Constitutive Models 4	5115 Processing-Manufacturing Technologies 5	5116 Sensing and Self-Diagnosis 3	5117 Manufacturing Up-Scaling and Automation 1	5118 Process Induced Effects 5	5119 Experimental Methods for Process Characterization 1	5120 Fibers 4	5121 Machining of Composites 1	
	10:25-10:50	Coffee Break																					
	10:50-11:25	KEYNOTE LECTURE by: 1) Zhishen Wu, Southeast University, China; 2) Yoshihiro Narita, Hokkaido University, Japan; 3) Zhengming Huang, Tongji University, China																					
	11:35-12:35	5201 Liquid Composites Moulding 1	5202 Metal Matrix Composites 14	5203 Fiber-reinforced Composites 14	5204 Dynamic Fracture 2	5205 Damage Tolerance of Composites Structures 3	5206 Fiber-reinforced Composites 21	5207 Green Composites 4	5208 Other New Testing Methods 2	5209 Textile-Based Composites 7	5210 Process Modelling 5	5211 Composite Repair 2	5212 Sandwich Structures and Materials 10	5213 Ultrasound, Acoustic Emission, and Electromagnetic waves 2	5214 Constitutive Models 5	5215 Processing-Manufacturing Technologies 6	5216 Sensing and Self-Diagnosis 4	5217 Manufacturing Up-Scaling and Automation2	5218 Offshore and Subsea 1	5219 Experimental Methods for Process Characterization 2	5220 Fibers 5	5221 Machining of Composites 2	
	12:35-13:35	Lunch																					
	13:35-14:25	PLENARY LECTURE by: HeeJune Kim, LG Hausys R&D Center, Korea - Technologies Overview for Composite Materials and Automotive Components in Korean Automotive Industry																					
	14:25-14:50	Coffee Break																					
	14:50-16:30	5301 Liquid Composites Moulding 2	5302 Metal Matrix Composites 15	5303 Fiber-reinforced Composites 15	5304 Dynamic Fracture 3	5305 Damage Tolerance of Composites Structures 4	5306	5307 Green Composites 5	5308 Other New Testing Methods 3	5309 Textile-Based Composites 8	5310 Process Modelling 6	5311 Composite Repair 3	5312 Sandwich Structures and Materials 11	5313 Ultrasound, Acoustic Emission, and Electromagnetic waves 3	5314	5315 Processing-Manufacturing Technologies 7	5316 Sensing and Self-Diagnosis 5	5317	5318 Offshore and Subsea 2	5319 Experimental Methods for Process Characterization 3	5320 Fibers 6	5321 Machining of Composites 3	
	17:00-18:30	Dinner																					

ICCM21

PROGRAMME AND BOOK OF ABSTRACTS

PLENARY LECTURES AND SPEAKERS

PLENARY LECTURES

	Time	Title	Presenter	Affiliation	Room	Chair
Monday 21 August	09:10-10:00	Personal Reflections on a Career of Composite Materials Research: A Matter of Opportunities	Yiu-Wing Mai	University of Sydney	Qujiang Auditorium	Jinsong Leng
	13:50-14:40	Design of Composite Laminates	Stephen Tsai	Stanford University	Qujiang Auditorium	Tsu-Wei Chou

	Time	Title	Presenter	Affiliation	Room	Chair
Tuesday 22 August	08:00-08:50	Brief Introduction to Materials Genome Initiative and Materials Informatics	Tongyi Zhang	Shanghai University	Qujiang Auditorium	Michael Wisnom
	13:35-14:25	From Structural to Functional Composites: A Personal Journey	Tsu-Wei Chou	University of Delaware	Qujiang Auditorium	Tongyi Zhang

	Time	Title	Presenter	Affiliation	Room	Chair
Wednesday 23 August	08:00-08:50	Fabrication of Graphene Materials and Their Composite Applications	Huiming Cheng	Institute of Metal Research, Chinese Academy of Sciences	Qujiang Auditorium	Nobuo Takeda
	13:35-14:25	Creating Composites that Fail More Gradually	Michael Wisnom	University of Bristol	Qujiang Auditorium	Huiming Cheng

	Time	Title	Presenter	Affiliation	Room	Chair
Thursday 24 August	08:00-08:50	Strong, Fast, Powerful, Durable, and Cheap Polymer Fiber and Hybrid Nanofiber Yarn Artificial Muscles and Their Applications	Ray Baughman	University of Texas at Dallas	Qujiang Auditorium	Zhong Zhang
	13:35-14:25	Composite Material Applications to Industries in China	Zhongmin Xue	Sinoma Science & Technology Co., Ltd	Qujiang Auditorium	Xiaosu Yi

	Time	Title	Presenter	Affiliation	Room	Chair
Friday 25 August	08:00-08:50	The Role of Composites in Avian Inspired Morphing Aircraft	Daniel J. Inman	University of Michigan	Qujiang Auditorium	Hua-Xin Peng
	13:35-14:25	Technologies Overview for Composite Materials and Automotive Components in Korean Automotive Industry	HeeJune Kim	LG Hausys R&D Center	Qujiang Auditorium	Laifei Cheng

Yiu-Wing Mai (Scala Lecture)

Centre for Advanced Materials Technology, University of Sydney, Australia

Professor Yiu-Wing Mai received his BSc(Eng), PhD and DSc degrees in mechanical engineering from the University of Hong Kong, SAR, China. He previously worked in the US (University of Michigan and NIST), the UK (Imperial College) and Hong Kong (CityU, HKU, HKUST and PolyU). He holds a University Chair in Mechanical Engineering at the University of Sydney. Prof Mai has made significant contributions on fracture mechanics and advanced composite materials. These include the developments of asbestos-free fibre cements, superhard machining tools coated with ceramic nanocomposites, testing protocols for essential work of fracture of polymers, and improved composites manufacturing processes, such as pultrusion, thermoforming, stitching and z-pinning. His current research is focused on polymer nanocomposites for structural (fracture, fatigue, etc.) and functional (fire retardancy, permeability, optical transparency, electrical and thermal conductivities, Li-ion battery electrodes, etc.) applications. Prof Mai received the ICF Takeo Yokobori Gold Medal (2013), UK IOM3 AA Griffith Medal (2016) and Engineers Australia Mechanical College AGM Michell Medal (2016) among others. He was elected FRS (2008), FREng (2011), FAA (2001) and FTSE (1992). He was appointed AM (2010) by the Australian Government for service to engineering.

Monday 21 August 09:10-10:00 SCALA LECTURE at Qujiang Auditorium - Personal Reflections on a Career of Composite Materials Research: A Matter of Opportunities

Ray Baughman

University of Texas at Dallas, USA

Ray Baughman became the Robert A. Welch Professor of Chemistry and Director of the NanoTech Institute at the University of Texas in Dallas in August 2001, after 31 years in industry. He is a Member of The National Academy of Engineering and The Academy of Medicine, Engineering and Science of Texas; the EU Academy of Sciences, a foreign member of the European Academy of Sciences; a Fellow of the Royal Society of Chemistry, the National Academy of Inventors, and the American Physical Society; an Academician of The Russian Academy of Natural Sciences; an honorary professor of 7 universities in China; and is on editorial or advisory boards of Science and other journals. Ray has 80 issued US patents and 415 refereed publications, with over 31,200 citations and an H-index of 79.

Thursday 24 August 08:00-8:50 at Qujiang Auditorium –Strong, Fast, Powerful, Durable, and Cheap Polymer Fiber and Hybrid Nanofiber Yarn Artificial Muscles and Their Applications

Huiming Cheng

Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences, China

Dr. Hui-Ming Cheng is Professor and Director of both Advanced Carbon Research Division of Shenyang National Laboratory for Materials Science, Institute of Metal Research, the Chinese Academy of Sciences, and the Low-Dimensional Material and Device Laboratory of the Tsinghua-Berkeley Shenzhen Institute, Tsinghua Univ. . His research activities focus on carbon nanotubes, graphene, other low-dimensional materials, energy storagmaterials, photocatalytic semiconducting materials, and bulk carbon materials. He has published over 500 papers and is recognized as a Highly Cited Researcher in both materials science and chemistry fields by Thomson Reuters. He used to be the Editor of Carbon and Editor-in-Chief of New Carbon Materials, and is now the founding Editor-in-Chief of Energy Storage Materials and Associate Editor of Science China Materials.

Wednesday 23 August 08:00-8:50 at Qujiang Auditorium - Fabrication of Graphene Materials and Their Composite Applications

Tsu-Wei Chou

University of Delaware, Newark, Delaware, USA

Dr. Tsu-Wei Chou is the Pierre S. du Pont Chair of Engineering at the University of Delaware. Dr. Chou received the Ph.D. degree in materials science from Stanford University (1969). He is the author of several books, including Microstructural Design of Fiber Composites, Cambridge University Press, England (1992). Dr. Chou is a Fellow of ASME, ASM, ASC, ACerS, TMS and AIAA, and he is a recipient of the Charles Russ Richards Memorial Award, the Worcester Reed Warner Medal and the Nadai Medal of ASME, the Distinguished Research Award and the ASC/DEStech Award in Composites of the American Society for Composites, and the Francis Alison Medal and the Medal of Excellence in Composite Materials of the University of Delaware. Dr. Chou is the Editor-in-Chief of the international journal Composites Science and Technology. He has been recognized by ISI as a “Highly Cited Researcher,” and he was named one of the top 100 materials scientists (ranked 34th) of the past decade (2000-2010) by Times Higher Education. Dr. Chou has been honored as a World Fellow by the International Committee on Composite Materials. He was recently selected to receive the 2017Albert Sauveur Achievement Award of ASM International.

Tuesday 22 August 13:35-14:25 at Qujiang Auditorium - From Structural to Functional Composites: A Personal Journey

Daniel J. Inman

University of Michigan, USA

Daniel J. Inman received his Ph.D. from Michigan State University in Mechanical Engineering in 1980 and is Chair of the Department of Aerospace Engineering at the University of Michigan, as well as the C. L. “Kelly” Johnson Collegiate Professor. Since 1980, he has published eight books (on vibration, energy harvesting, control, statics, and dynamics), eight software manuals, 20 book chapters, over 350 journal papers and 600 proceedings papers, given 62 keynote or plenary lectures, graduated 62 Ph.D. students and supervised more than 75 MS degrees. He works in the area of applying smart structures to solve aerospace engineering problems including energy harvesting, structural health monitoring, vibration suppression and morphing aircraft. He is a Fellow of AIAA, ASME, IIAV, SEM and AAM

Friday 25 August 08:00-8:50 at Qujiang Auditorium - The Role of Composites in Avian Inspired Morphing Aircraft

Hee June Kim

LG Hausys R&D Center, Korea

Dr. Kim holds a research fellow position in LG Hausys, Korea where he is charge of automotive composite materials and components development. He has a master and doctoral degrees in mechanical engineering department of Seoul National University, especially in composite manufacturing processes for high performance thermoplastic composites. After that, he spent for more than 6 years in US at the University of Delaware Center for Composite Materials as a postdoctoral fellow and research associate where he focused on manufacturing process for both thermoplastic and thermosetting composites materials which were mainly defense and aerospace related R&D projects.

Now he is LG group for cost-effective and mass producible composite materials and components for automotive industry. Dr. Kim has 32 internationally registered patents and 18 international journal papers. He was also awarded two times in 2012 and 2017 in JEC Composites Show for lightweight, economically viable and mass producible composite solutions in structural and exterior related automotive components.

Friday 25 August 13:35-14:25 at Qujiang Auditorium - Technologies Overview for Composite Materials and Automotive Components in Korean Automotive Industry

Stephen Tsai

Department of Aeronautics & Astronautics Stanford University, USA

Born in Beijing, July 6, 1929.
1961 D.Eng. in Mechanical Engineering, Yale University.
1952 B.S. in Mechanical Engineering, Yale University.
1990-Present Professor Research Emeritus, Aeronautics and Astronautics, Stanford University.
1968-1990 Director of Mechanics of Composites, Air Force Materials Laboratory.
1966-1968 Professor, Washington University.
1961-1966 Composite Materials Engineer, Ford Aeronutronic.
1952-1958 Engineer, Foster Wheeler Corporation.

Process and product development of composite materials that may lead to improved design practice and commercialization. His current interests include composite behavior as affected by static, creep and fatigue loading, and products like composite rotors for flywheel systems. Emphasis is on the design, manufacturing and evaluation of the performance and cost. Methodology and supporting software to provide safe service of 30 years under combinations of loads, temperatures and moisture. Also pioneering spreadsheet based composites design tools. His continuing projects (since 2007) include online composites design workshops, which provide intensive, live training to thousands of around the world.

Monday 21 August 13:50-14:40 at Qujiang Auditorium - Design of Composite Laminates

Michael Wisnom

Advanced Composites Centre for Innovation and Science, University of Bristol, UK

Michael Wisnom is Director of the recently established Bristol Composites Institute at the University of Bristol, which builds on ACCIS, the Advanced Composites Collaboration for Innovation and Science. He is Professor of Aerospace Structures, Director of the Rolls-Royce Composites University Technology Centre, Queens School Research Director and a member of the steering board for the UK National Composites Centre.

Prof. Wisnom is a leading international authority on the mechanics and failure of fibre reinforced composites, and Principal Investigator on the Programme Grant on High Performance Ductile Composites Technology in collaboration with Imperial College funded by the UK Engineering and Physical Sciences Research Council. He is the author of over 400 refereed journal and conference publications, and is Editor in Chief and European Editor for Applied Science and Manufacturing of Composites Part A. He is a fellow of the Royal Academy of Engineering, the Institution of Mechanical Engineers and the American Society for Composites, recipient of a Royal Society Wolfson Research Merit Award, and past president of the International Committee on Composite Materials.

Wednesday 23 August 13:35-14:25 at Qujiang Auditorium - Creating Composites that Fail More Gradually

Zhongmin Xue

Sinoma Science & Technology Co., Ltd, China

Dr. Zhongmin Xue is the Chairman of Sinoma Science & Technology Co., Ltd. (briefly Sinomatech). Dr. Xue has devoted his professional career to the composites materials for 30 years. Dr. Xue had been the President of Beijing FRP Research & Design Institute which is the first state institute of FRP/composites in China, established in 1958. He was the Chairman of Sinomatech Wind Power Blade Co., Ltd from 2007 to 2011, the company has grown to be one of leading wind turbine blade manufacturers in the world and top one in China. Since 2013, Dr. Xue has been the Chairman of Sinomatech, now the company has been one of the largest fiber composites manufacturers in China.

Dr. Xue has also significant contributions to composites academic progress in China and exchange with the world. Dr. Xue has been playing important roles in academic bodies. He is a Vice President of the Chinese Society for Composite Materials, Vice President of China Composites Industry Association, and Chairman of China FRP Society. Also Dr. Xue is the Chief Editor of the Journal of FRP/ Composites, which is one of the earliest academic publications for FRP/composites in China and established in 1974. Dr. Xue accepted a SAMPE Fellow Award in 2016. Dr. Xue received his B.Eng. in Composite Materials from the National University of Defense Technology (NUDT), China, an M.Eng. in Composite Materials and a PhD in Materials Processing Engineering from Beijing University of Aeronautics and Astronautics (BUAA), China.

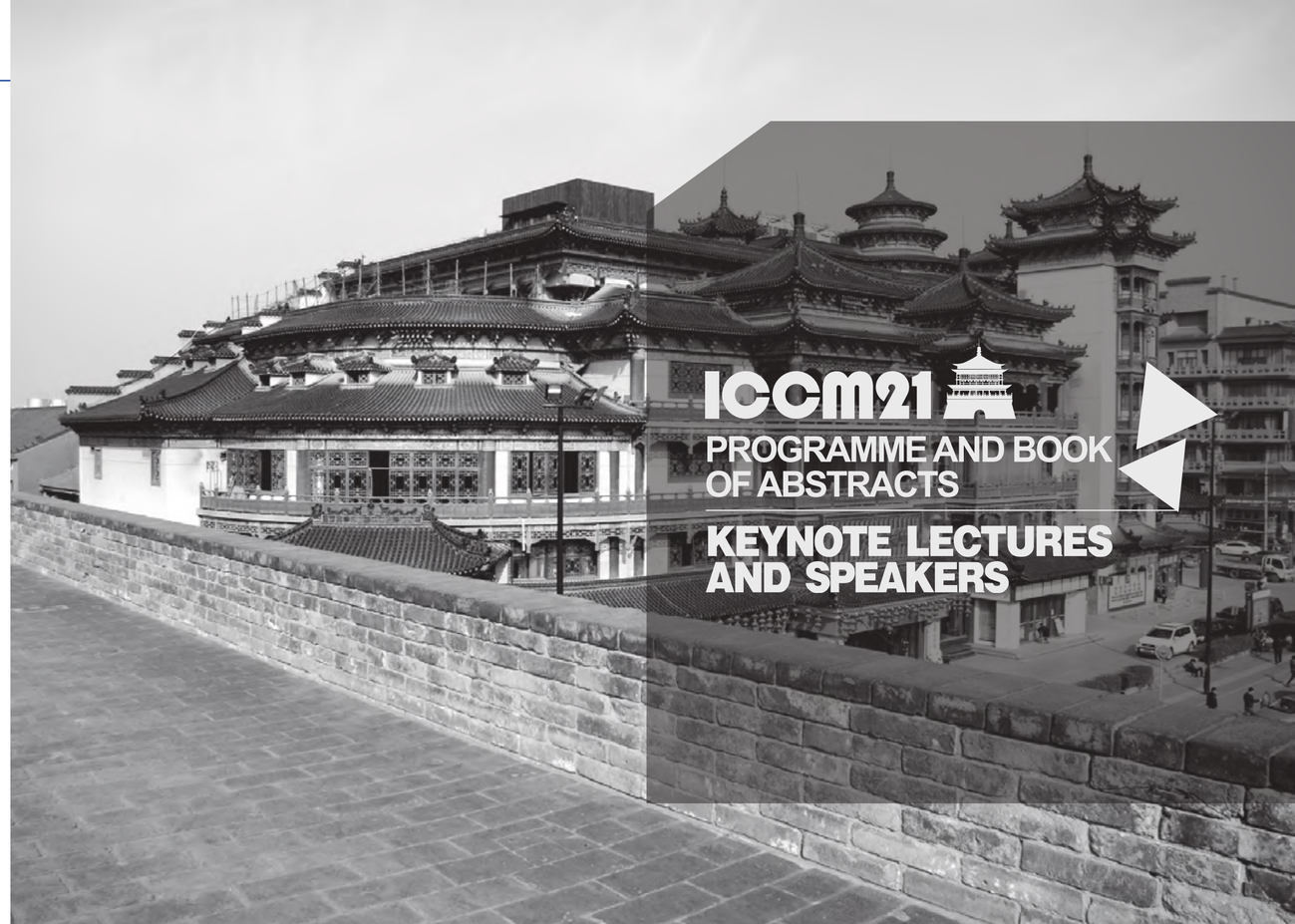
Thursday 24 August 13:35 –14:25 at Qujiang Auditorium - Composite Material Applications to Industries in China

Tongyi Zhang

Shanghai Materials Genome Institute, Shanghai University, Shanghai, China

Tong-Yi Zhang earned Master degree in 1982 and PhD in 1985, majoring in materials physics, from University of Science and Technology Beijing, China. He worked 1993-2015 at Hong Kong University of Science and Technology, as Lecturer, Associate Professor, Professor, Chair Professor, and Fang Professor of Engineering; works 2015- at Shanghai University, as founding dean of Materials Genome Institute, Shanghai University, and founding dean of Shanghai Materials Genome Institute. His research is on mechanical properties of materials. He has been a vice president of the International Congress on Fracture (ICF) since 2013 and was a vice president of The Far East and Oceanic Fracture Society 2001-2016. He was a recipient of two second prizes of the State Natural Science Award, China, and the 1988 National Award for Young Scientists, China. He became ICF Fellow in 2013, Fellow of the Hong Kong Academy of Engineering Sciences in 2012, member of Chinese Academy of Sciences in 2011, Senior Research Fellow of Croucher Foundation, Hong Kong, in 2003, Fellow of ASM International, USA, in 2001. He is Associate Editor-in-Chief of Science China Technological Sciences (2013 –) and the Fracture and Continuum Mechanics Subject-Editor of the journal, Theoretical and Applied Fracture Mechanics (2013 –).

Tuesday 22 August 08:00-8:50 at Qujiang Auditorium - Brief Introduction to Materials Genome Initiative and Materials Informatics



KEYNOTE LECTURES

	Time	Title	Presenter	Affiliation	Room	Chair
Monday 21 August	10:15-10:50	Multifunctional Composites for Fly-by-Feel Autonomous Electric Vehicles	Fu-Kuo Chang	Stanford University	Qujiang Auditorium	Lin Ye
	10:15-10:50	Flammability of Natural Fibre-Reinforced Polymeric Composites	Debes Bhattarcharyya	University Auckland	Lily Hall	Leif Asp
	10:15-10:50	Composite Related Research Activities in COMAC R&T Center	Dongsheng Li	Commercial Aircraft Corporation of China	Rose Hall	Limin Zhou
	14:55-15:30	Progress in Multi-Scaled Structure and Related Properties of Elastomer Nanocomposites Explored by Molecular Dynamics Simulation and Experimental Approaches	Liqun Zhang	Beijing University of Chemical Technology	Qujiang Auditorium	Murray Scott
	14:55-15:30	Inspired by Nature – Adaptive Multifunctional Modular Metastructures	Kon-Well Wang	University of Michigan	Lily Hall	Norman Wereley
	14:55-15:30	Fabrication Processes and Properties of Carbon Nanomaterials Filled Nanocomposites	Soon Hyung Hong	Korea Advanced Institute of Science and Technology	Rose Hall	Pascal Hubert

	Time	Title	Presenter	Affiliation	Room	Chair
Tuesday 22 August	10:50-11:25	Modeling of Thermoplastic Composites Manufacturing Processes Reinforced with Continuous Fibers	Woo Il Lee	Seoul National University	Qujiang Auditorium	Fu-Kuo Chang
	10:50-11:25	Muscular Compliance in Bioinspired Soft Robots	Norman Wereley	University of Maryland	Lily Hall	Christopher S. Lynch
	10:50-11:25	A Snapshot into the Evolution of Manufacturing, Characterization, Modeling Efforts to Tailor Function-Performance Strategy in Composites	Ozden Ochoa	Texas A&M University	Rose Hall	Paul Smith
	14:40-15:15	Structural Battery Composites – Roles of Constituents and Device Architecture	Leif Asp	Chalmers University of Technology	Qujiang Auditorium	Liqun Zhang
	14:40-15:15	Multi-Scale Modelling of Processing and Performance for Textile Composites	Andy Long	The University of Nottingham	Lily Hall	Anoush Poursartip
	14:40-15:15	Nanocomposites at Extreme (Space) Environment	Alan KT Lau	Swinburne University of Technology	Rose Hall	Debes Bhattarcharyya

	Time	Title	Presenter	Affiliation	Room	Chair
Wednesday 23 August	14:40-15:15	Recent Development of Metallic Nanocomposites for Structural Applications	Jian Lu	City University of Hong Kong	Qujiang Auditorium	Ole Thybo Thomsen
	14:40-15:15	Multiscale Hybrid Composites Reinforced with Interfacecontrolled Carbon Nanomaterials for Multifunctional Applications	Byung Sun Kim	Korea Institutes of Material Science	Lily Hall	Chun Wang
	14:40-15:15	Assessing and Improving the Crashworthiness of Composite Transportation Structures: Challenges and Opportunities	Brian G. Falzon	Queen's University Belfast	Rose Hall	Andy Long

	Time	Title	Presenter	Affiliation	Room	Chair
Thursday 24 August	10:50-11:25	Computational Modeling for Manufacturing and Certification of Future Aerostructures	Anthony M. Waas	University of Washington	Qujiang Auditorium	Woo Il Lee
	10:50-11:25	Highly-Aligned 2D and Cellular Interconnected 3D Graphene/Polymer Composites with Exceptional Multi-Functional Properties	Jang Kyo Kim	The Hong Kong University of Science and Technology	Lily Hall	Brian G. Falzon
	10:50-11:25	Additional Solid Phases in Textile Preforms for Liquid Composite Molding: Influence on Permeability and Capillary Effects	Véronique Michaud	Ecole Polytechnique Fédérale de Lausanne	Rose Hall	Chiara Bisagni
	14:40-15:15	Smart Materials and Structures: From Morphing Aircraft to Nanoscale Magnetoelectricity	Christopher S. Lynch	University of California, Los Angeles	Qujiang Auditorium	Anthony M. Waas
	14:40-15:15	Static and Fatigue Study of Aircraft Composite Structures in the Post-Buckling Field	Chiara Bisagni	Delft University of Technology	Lily Hall	Paul Lagace
	14:40-15:15	Hierarchical Composite Materials: Structural and Multifunctional Opportunities	Milo Shaffer	Imperial College London	Rose Hall	Matthew Jevons

	Time	Title	Presenter	Affiliation	Room	Chair
Friday 25 Augustt	10:50-11:25	Advancement of FRP Composites and Structural Innovation	Zhishen Wu	Southeast University	Qujiang Auditorium	Adrian Mouritz
	10:50-11:25	Vibration and Buckling Analysis of Composite Panels with Consideration of Optimization	Yoshihiro Narita	Hokkaido University	Lily Hall	Masaki Hojo
	10:50-11:25	Failures of Composites by Micromechanics Approach	Zhengming Huang	Tongji University	Rose Hall	Hao Wang

Leif Asp

Chalmers University of Technology, Sweden

Dr Leif Asp, Chaired professor in Lightweight composite materials and structures at the Department of Industrial and Materials Sciences, Chalmers university of technology, Sweden. Professor Asp's research is focused on efficient design methodologies for carbon fibre composite aircraft and automotive applications and on development of novel multifunctional composites. The research builds on 25 years' experience in damage tolerance modelling, design and certification methods for aircraft composite structures.

Professor Asp is the current Senior Vice President of the International Committee on Composite Materials (ICCM) and former President of the European Society of Composite Materials (ESCM). Dr Asp is a member of the Editorial board of six international scientific journals, among these Composites Science and Technology. Before joining Chalmers full time in year 2015, Dr Asp had different positions at the Aeronautical Research Institute of Sweden (FFA) and Swerea SICOMP. He also held a position as adjunct professor at Luleå university of technology since 2004. In year 2014 Dr Asp was elected Fellow of the Royal Swedish Academy of Engineering Sciences – the oldest academy of engineering sciences in the World.

Tuesday 22 August 14:40-15:15 at Qujiang Auditorium: Structural Battery Composites – Roles of Constituents and Device Architecture

Chiara Bisagni

Delft University of Technology, The Netherlands

Chiara Bisagni is Full Professor and Chair of the section of Aerospace Structures and Computational Mechanicsat the Faculty of Aerospace Engineering of Delft University of Technology in the Netherlands. She received her Ph.D. in Aerospace Engineering at the Politecnico di Milano in Italy, where she then became Assistant and later Associate Professor in the Department of Aerospace Engineering. Before joining Delft in January 2015, she was Full Professor at the University of California San Diego in the US. Her research topics are aerospace composite structures, and in particular static and dynamic buckling, impact, crashworthiness, damage propagation and fatigue. Her approach combines experimental activities, as well as analytical and numerical techniques for design, analysis and optimization. Chiara Bisagni received several awards, including an Amelia Earhart Fellowship, a Marie Curie Research Training Grant from the European Commission, a Young Researcher Fellowship from MIT, a Fulbright Grant, and she is Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA). She is Associate Editor of AIAA Journal, and member of the Editorial Board of the Journal of Sandwich Structures and Materials and of the International Journal of Crashworthiness. In 2015 she was elected Executive Council Member of the International Committee on Composite Materials.

Thursday 24 August 14:40 -15:15 at Lily Hall - Static and Fatigue Study of Aircraft Composite Structures in the Post-Buckling Field

Brian G. Falzon

Queen's University Belfast, UK

Professor Falzon graduated from the University of Sydney with a BSc in Physics and Pure Mathematics, a first-class honours degree in Aeronautical Engineering and a PhD in Advanced Composite Aerostructures. He joined Imperial College London as a postdoctoral research fellow in 1996, was appointed to a Lectureship in 2000, a Senior Lectureship in 2005 and Reader in 2007. In 2008, Prof Falzon took up the Inaugural Chair of Aerospace Engineering at Monash University where he was the Head of the Aerospace Engineering Programme, Director of Research and Deputy Head of the Department of Mechanical and Aerospace Engineering. In 2013 he joined Queen's University Belfast as the Royal Academy of Engineering – Bombardier Chair in Aerospace Composites, where he is also the Director of the Advanced Composites Research Group. In 2015 he assumed the role of Head of the School of Mechanical and Aerospace Engineering. Prof Falzon is a Chartered Engineer and Fellow of the Royal Aeronautical Society. He is internationally renowned for his work on advanced composite structures and in 2008 was awarded the George Taylor Prize, by the RAeS, for the best paper published on aircraft structures. In 2009 he was honoured with an Australian Leadership Award in recognition of his contribution to issues of national importance and demonstrated leadership in his field. Prof Falzon is Associate Editor of The Aeronautical Journal and on the editorial boards of Applied Composite Materials and Advances in Aircraft and Spacecraft Science, An International Journal.

Wednesday 23 August 14:40-15:15 at Rose Hall - Assessing and Improving the Crashworthiness of Composite Transportation Structures: Challenges and Opportunities

Debes Bhattarcharyya

University Auckland, New Zealand

Professor Debes Bhattacharyya is a Distinguished Professor in the Department of Mechanical Engineering and has been the founding Director of the Centre for Advanced Composite Materials at the University of Auckland. In 2016, he was felicitated as the Dr A P J Abdul Kalam Professor by SRM University in Chennai, India. He also holds an Adjunct Professor position at Washington State University, Pullman, USA. Professor Bhattacharyya was the Head of Mechanical Engineering Department from 1999 to early 2005. His research interest includes the mechanics and manufacturing of composite materials. He has held visiting positions at various universities in Australia, Canada, Germany, Hong Kong and the US, and has been awarded a number of international awards. He has delivered > 65 keynote/plenary/ invited lectures at international conferences. He is currently the Editor (2) and Associate Editor (1) of three international journals and has served/is serving on the Editorial Advisory Boards of eight journals. Prof. Bhattacharyya has more than 450 scientific/technical publications including several edited/authored books and a number of book chapters. He has successfully implemented several international patents. He is a Fellow of the Royal Society, NZ and a Distinguished Fellow of the Institution of Professional Engineers NZ (IPENZ). He is a life member of ASME. For his international academic achievements he has been awarded an honorary 'Doctor of Engineering' (honoris causa) by the University of Southern Queensland, Australia. In 2012, he was awarded by IPENZ the Supreme Technical (John Cranko) Award for his professional contributions.

Monday 21 August 10:15-10:50 at Lily Hall- Flammability of Natural Fibre-Reinforced Polymeric Composites

Fu-Kuo Chang

Stanford University, USA

Dr. Fu-Kuo Chang is a Professor in the Department of Aeronautics and Astronautics at Stanford University. His primary research interest is in the areas of multi-functional materials and intelligent structures with particular emphases on structural health monitoring, self-sensing diagnostics, intelligent sensor networks, and multifunctional energy storage composites for transportation vehicles as well as safety-critical assets. He has been a recipient of many scientific awards, among them the Structural Health Monitoring (SHM) Lifetime Achievement Award, IWSHM by Boeing Company (2004), and Life-Time Achievement Award, SPIE NDE/SHM (2010). He is the Editor-in-Chief of Int. J. of Structural Health Monitoring. He is also a Fellow of AIAA and ASME.

Monday 21 August 10:15-10:50 at Qujiang Auditorium: Multifunctional Composites for Fly-by-Feel Autonomous Electric Vehicles

Soon Hyung Hong

Korea Advanced Institute of Science and Technology, Korea

Prof. Hong completed his Ph.D. in Dept. of Materials Science and Engineering at Northwestern University in 1984. After R&D experience at Stanford University as a research associate, he joined Korea Advanced Institute of Science and Technology (KAIST) as a professor in 1986, where he has been directing research and education on nanocrystalline materials and nanocomposites. Prof. Hong has published 205 international journal papers and registered 140 patents mainly in areas of nanocrystalline materials and nanocomposites. Prof. Hong had served as a Managing Director of the Office of Strategic R&D Planning (OSP) in the Ministry of Knowledge Economy (MKE), Director for Basic Science and Engineering in National Research Foundation (NRF) of Korea, Presidents of the Korea Society for Composite Materials (KSCM) and the Korean Powder Metallurgy Institute (KPMI), and the Director of KAIST Institute for the NanoCentury (KINC). He currently is acting as members of the Korea Academy of Science and Technology (KAST) and the National Academy of Engineering of Korea (NAEK).

Monday 21 August 14:55-15:30 at Rose Hall: Fabrication Processes and Properties of Carbon Nanomaterials Filled

Zhengming Huang

Tongji University, China

Zheng-Ming Huang obtained his PhD from National University of Singapore in 1999. He was awarded a Yangtze River distinguished professor at Tongji university by the Ministry of Education of China in 2002. He has created a unified elasto-plastic constitutive theory, Bridging Model, for composites, which is unique from a viewpoint of four aspects, i.e., closed-form expression, high accuracy, versatile applicability, and consistency from two to three dimensions. He has found that the homogenized stresses in the fiber and matrix of a composite obtained by a micromechanics theory must be converted into true values before a failure detection on the composite can be made only in terms of the original fiber and matrix properties measured independently, and has established the routine to achieve the conversion. He is the author of 3 books, 6 book chapters, more than 160 peer-reviewed journal papers, and 19 patents. One of his papers has got a citation of more than 5,000 times world-widely, one of the highest citations gained in China.

Friday 25 August 10:50-11:25 at Rose Hall - Failures of Composites by Micromechanics Approach

Byung Sun Kim

Korea Institutes of Material Science, Korea

Dr. Byung Sun Kim has been researching at the Composites Research Division (CRD) of Korea Institute of Materials Science (KIMS) since 1991. He is a Professor in Advance Materials Department, Korea University of Science & Technology (UST) since 2012, and, also, is a Professor in Mechanical Engineering, Changwon National University since 2015. Between '10 and '16, he was a Director of Global Research Laboratory (GRL) program between CCM of Univ. of Delaware and CRC of KIMS on "Advanced Hybrid Micro/ nanocomposites for Structural and Multifunctional Applications". He received his Ph.D. from Dept. of Mechanical & Aerospace Engineering from Missouri University of Science & Technology. Between '00 and '03, he was a Visiting Scholar at ME Dept., MIT (Massachusetts Institute of Technology). In 2007, he was awarded of Korean Presidential Commendation for excellence in research into the structural design and processing of Composite Materials. He was the president of Korean Society for Composite Materials (2012- 2013) and was an Executive Council Member of International Committee on Composite Materials (ICCM) (2013-2015).

Wednesday 23 August 14:40-15:15 at Lily Hall - Multiscale Hybrid Composites Reinforced with Interfacecontrolled Carbon

Woo Il Lee

Seoul National University, Korea

Professor Woo Il Lee received his education from Seoul National University (B.S. in 1976 and M.S. in 1978) and the University of Michigan (Ph.D. in 1983). He joined Seoul National University in 1987 where he is a full professor in the Department of Mechanical and Aerospace Engineering. He served various administrative positions at the university such as the Department Chairman, the Dean of Engineering and the Vice President of Research. He was the President of Korean Society for Composite Materials and the Chairman of the Organizing Committee of ICCM-18 held in Jeju Island, Korea in 2011. He is serving as the Asian regional editor of Journal of Composite Materials and Vice President of ICCM (Region 2). He is a member of Korea Academy of Science and Technology and a fellow of American Society of Mechanical Engineers. His research interests include analysis and modeling of composites manufacturing processes and polymer molding processes.

Tuesday 22 August 10:50-11:25 at Qujiang Auditorium: Modeling of Thermoplastic Composites Manufacturing Processes Reinforced with Continuous Fibers

Jang Kyo Kim

Hong Kong University of Science and Technology, Hong Kong, China

Prof. Kim is currently a Chair Professor at Hong Kong University of Science and Technology (HKUST) and directs the Finetex-HKUST R & D Center and the Advanced Engineering Materials Facilities. Kim's research is centered on advanced materials, ranging from fiber-reinforced composites to nanocomposites containing graphene and carbon nanotubes, and to nanostructured materials for energy storage devices and multi-functional applications. Kim has written over 300 refereed journal papers with over 11,000 citations (by WoS) and 3 research monographs on fiber composites, nanocomposites and graphene thin films; and edited 8 books and holds 7 patents. He has been serving as the Editor of Composites Part A and as the Associate Editor of Aerospace Science and Technology in addition to editorial board members of another 12 journals. He is a fellow of RSC and HKIE.

Thursday 24 August 10:50-11:25 at Lily Hall - Highly-Aligned 2D and Cellular Interconnected 3D Graphene/Polymer Composites with Exceptional Multi-Functional Properties

Alan KT Lau

Swinburne University of Technology, Australia

Professor Lau received his Bachelor and Master degrees of Engineering in Aerospace Engineering from the Royal Melbourne Institute of Technology (RMIT University, Australia) in 1996 and 1997,respectively.Within that period, he also worked for General Aviation Maintenance Pty Ltd, Australia, as an Engineer Trainee, and for the Corporative Research Centre for Advanced Composite Structures(CRC-ACS)Australia, as a Research Assistant designing a repair scheme for composite performs. Afterward, he received his Doctor of Philosophy (PhD) from The Hong Kong Polytechnic University in 2001. Thereafter, he was appointed Assistant Professor in 2002 and promoted to Associate Professor and Professor in 2005 and 2010, respectively. In 2015, he was appointed as Alex Wong/Gigi Wong Professor in Product Design Engineering and Associate Dean (Industrial Relation) in the Faculty of Engineering, PolyU. Currently, he is Pro-Vice-Chancellor (Research Performance and Development) of Swinburne University of Technology, Australia to look after its future research and ranking strategies. Professor Lau has received numerous research and teaching awards since 2002.This year, he has been elected as Fellow of the European Academy of Science and Arts. To date only three academics in Australia have received this honour. He has also been elected as International Vice President of The Institution of Mechanical Engineers(IMechE)and appointed as Independent Non-executive Director of Kingsflair International (Holdings) Limited.

Tuesday 22 August 14:40-15:15 at Rose Hall - Nanocomposites at Extreme (Space) Environment

Dongsheng Li

Commercial Aircraft Corporation of China, China

Dr. Dongsheng Li, Acting President of Beijing Aeronautical Science and Technology Research Institute of COMAC, Fellow of Royal Aeronautical Society of the UK. Dr. obtained his PhD from Bristol University in the UK. He worked for Airbus in Europe for many years with technical and management responsibilities. He has been Industrial Ph.D. supervisors for Imperial College, Bristol University and Bath University in the UK. He has also worked as Vice President of Shanghai Aircraft Design and Research Institute of COMAC. Dr. Li has many years of experience in industry and academia in both China and Europe. He is widely known as an expert in composite aircraft structures with more than 70 publications.

Monday 21 August 10:15-10:50 at Rose Hall- Composite Related Research Activities in COMACR&T Center

Andy Long

The University of Nottingham, UK

Professor Andy Long is Pro-Vice-Chancellor for the Faculty of Engineering at the University of Nottingham, having previously served as Dean and as Associate Dean for Research. He is also Director of the EPSRC Future Composites Manufacturing Hub, leading basic and applied research in composites manufacturing for the UK academic community. He has worked for over 25 years on design and manufacture of advanced polymer composite materials, focusing on simulation of composites manufacturing processes, development of materials characterisation techniques for composites processing, and predictive modelling of the processing and performance of textile composites. The latter is best illustrated by Nottingham's "TexGen" open source code for modelling of textile composite unit cells, which underpins much of the modelling work at Nottingham and is used widely by many other groups around the world. Andy has led a number of collaborative research council (EPSRC), UK government and industry funded projects on polymer composites, with a career portfolio of over £55million including £33million as Principal Investigator. His research has involved collaboration with a large number of industry partners, in particular from the aerospace and automotive sectors.

Tuesday 22 August 14:40-15:15 at Lily Hall: Multi-Scale Modelling of Processing and Performance for Textile Composites

Christopher S. Lynch

University of California, Los Angeles, USA

Professor Christopher S. Lynch completed his Ph.D. while working full time at a small company in Santa Barbara, CA developing instrumentation systems for shock wave measurements. He joined UCSB as a Post Doc where he worked on fracture mechanics of electric field coupled materials. In 1995 he joined the faculty of Mechanical Engineering at Georgia Tech where he focused his research on smart materials and structures while advancing to the rank of Professor and Associate Chair of the Woodruff School. He moved to UCLA in 2007 where he continued his research and was the first Director of the new Master of Science Online Engineering degree program, now ranked #1 by US News and World Report. He currently serves as Chairman of the Department of Mechanical and Aerospace Engineering in the Henry Samueli School of Engineering and Applied Science.

Thursday 24 August 14:40-15:15 at Qujiang Auditorium- Smart Materials and Structures: From Morphing Aircraft to Nanoscale Magnetoelectricity

Yoshihiro Narita

Hokkaido University, Japan

Dr. Narita has been Professor in Mechanical Engineering at Faculty of Engineering, Hokkaido University, Sapporo, Japan until the retirement in March, 2017. He is now an academic advisor at Hasanuddin University in Makassar, Indonesia in JICA (Japan International Cooperation Agency) Project. His research interests cover analytical and computational aspects in solid mechanics and structural optimization. He is Honorary member of JSME and Fellow of JSCM, and has been a long time Editor-in-Chief in English journals in JSME, Associate editor in Applied Mechanics Reviews in ASME and Editorial Board member in Composite Structures (Elsevior). He has published more than 130 refereed research papers, 120 international conference proceedings, 10 book chapters and other form of reports. He is also interested in engineering education and international cooperation in higher education and research through his experiences as Director of European Office of Hokkaido University and the present position at one university in ASEAN countries.

Friday 25 August 10:50-11:25 at Lily Hall: Vibration and Buckling Analysis of Composite Panels with Consideration of Optimization

Jian Lu

City University of Hong Kong, China

Prof. Jian Lu is Chair Professor of Mechanical Engineering; Vice President (R&T) at the City University of Hong Kong. He obtained the Dip. Ing., and Doctoral degree from University of Technology of Compiegne in 1984 and 1986 respectively. From 1986 to 1994, he was appointed as Senior Research Engineer at the CETIM. In 1994, he was appointed as Professor; Head of Department of Mechanical Systems Engineering and Director of Mechanical Systems and Concurrent Engineering Laboratory jointly supported by French Ministry of Education and CNRS) at University of Technology of Troyes, France. From 2005 to 2010, he was Chair Professor and Head of Department of Mechanical Engineering at the Hong Kong Polytechnic University. He has published more than 350 SCI journal papers (Science, Nature Materials, Materials Today, Advanced Materials, Nature Communications, PRL, JMPS, Acta Mat.). He was elected as an Academician of the National Academy of Technologies of France in 2011.

Wednesday 23 August 14:40-15:15 at Qujiang Auditorium - Recent Development of Metallic Nanocomposites for Structural Applications

Véronique Michaud

Ecole Polytechnique Fédérale de Lausanne, Switzerland

Véronique Michaud is currently Associate Professor and head of the Laboratory for Processing of Advanced Composites, and director of the Materials Science and Engineering Section of the Ecole Polytechnique Fédérale de Lausanne, in Switzerland. She graduated in 1987 from Ecole des Mines in Paris with an engineering degree, in 1991 from MIT with a PhD in Materials Engineering, and obtained a Research Habilitation from INPG in France in 1994. After a post-doctoral research stay at MIT, she spent 3 years at Ecole Centrale in Paris for teaching and research in the Laboratory for Materials, Structures and Soils Mechanics, before joining EPFL in 1997. Her fields of research are fundamentals of composite materials processing, as well as smart materials and structures including self-healing, shape and vibration control and tailored damping.

Thursday 24 August 10:50 -11:25 at Rose Hall - Additional Solid Phases in Textile Preforms for Liquid Composite Molding: Influence on Permeability and Capillary Effects

Ozden Ochoa

Texas A&M University, USA

Dr. OZDEN OCHOA, Fellow of the American Society of Mechanical Engineers, Fellow of the American Society for Composites and World Fellow of ICCM, is Professor Emerita and TEES Research Professor in the Department of Mechanical Engineering at Texas A&M University. Her research focus on computational and experimental mechanics of composites in aerospace, offshore, automotive and medical applications have culminated in over 200 publications and one book. In addition to her academic commitments, Dr. Ochoa had the privilege of serving at DOD research laboratories; as the Associate Director for Science & Technology at ARL, interim Director of Aerospace Sciences and Materials Directorate at AFOSR, as Composites - ST at the Materials and Manufacturing Directorate at AFRL and as a Program Manager at AFOSR building the portfolio for mechanics of composites. She has served on review boards of numerous journals, national and international agencies including NATO Science for Peace Projects. Among her many honors are the ASTM D30 Wayne Stinchcomb Memorial Award, American Society for Composites-Destech Award in Composites; American Society of Mechanical Engineers Dedicated Service Award; Texas A&M University International Excellence Award.

Tuesday 22 August 10:50-11:25 at Rose Hall: A Snapshot into the Evolution of Manufacturing, Characterization, Modeling Efforts to Tailor Function-Performance Strategy in Composites

Milo Shaffer

Imperial College London, UK

Milo Shaffer is Professor of Materials Chemistry at Imperial College London, and co-Director of the London Centre for Nanotechnology. He has extensive experience of carbon and inorganic nanomaterials synthesis, modification, characterization, and application, particularly for nanocomposite and hierarchical systems. Key applications are in structural composites, electrochemical electrodes, and functional thin films. MS completed his PhD and a Research Fellowship at the University of Cambridge, and has previously worked as a materials technology consultant in the areas of new technology development and exploitation. He has filed around thirty patents/applications, many of which have been licensed commercially. He has published well over 160 peer-reviewed papers with a total of over 11,000 citations, h-Index 50. He was awarded the Royal Society of Chemistry (RSC) Meldola medal in 2005, a prestigious EPSRC Leadership Fellowship in 2008, and RSC Corday-Morgan medal in 2014. He sits editorial boards of Nanocomposites, Materials Today Chemistry, & International Materials Reviews, and has helped to organise a number of international nano-related meetings, including several of the Nanotube 'XX series, a Faraday Discussion on Advanced Carbon, and the CNP-COMP meetings.

Thursday 24 August 14:40-15:15 at Lily Hall - Hierarchical Composite Materials: Structural and Multifunctional Opportunities

Norman Wereley

University of Maryland, USA

Dr. Wereley's research interests are in dynamics and control of smart structures applied to helicopters, robotics, as well as aerospace and automotive systems. He also has a strong focus on active and passive vibration isolation, shock mitigation (especially occupant protection systems), and actuation systems. Dr. Wereley has published over 190 journal articles, 16 book chapters, and over 250 conference articles. Dr. Wereley is an inventor on thirteen patents and over a dozen patents pending. Dr. Wereley is Editor of the Journal of Intelligent Material Systems and Structures and associate editor of Smart Materials and Structures and AIAA Journal. He was the Chair of the 2013 SPIE Symposium on Smart Structures/NDE. Dr. Wereley is the recipient of several awards including AIAA National Capital Section Engineer of the Year (2009), AIAA Sustained Service Award (2011), the AHS Harry T. Jensen Award (2011), and the ASME Adaptive Structures and Materials Systems Best Paper Award in Structural Dynamics and Control (2004, 2012). Dr. Wereley is also the recipient of the ASME Adaptive Structures and Material Systems Prize (2012), and the SPIE Lifetime Achievement Award in Smart Structures and Materials (2013). Dr. Wereley is a Fellow of AIAA, AHS, ASME, SPIE, and the Institute of Physics.

Tuesday 22 August 10:50-11:25 at Lily Hall - Muscular Compliance in Bioinspired Soft Robots

Zhishen Wu

Southeast University, China

Zhishen WU is a professor at Southeast University in China and Ibaraki University in Japan. He received BS and MS from Southeast University, in 1983 and 1986 respectively and his PhD from Nagoya University, Japan in 1990. His research interests include FRP composite technologies, advanced basalt fibers, sensor technologies, structural health/risk/disaster monitoring, control and management, andsustainable infrastructure. He has published 8 books and over 600 papers in refereed journals and international conference proceedings including over 60 keynote or invited papers, among which over 150 journal papers and 30 keynote or invited papers are related to FRP. He also holds over 60 authorized patents. Although about half of his research papers have been published in Japanese or Chinese journals, his publications in English have also received wide citations, e.g. his total citation in Scopus is over 4000 times. He was awarded the JSCE Research Award by the Japan Society of Civil Engineering in 1990, the JSCM Technology Award from the Japan Society for Composite Materials in 2005, and 2009 SHM Person of the Year Award from the International Journal of Structural Health Monitoring and related organizations, National Prize for Progress in Science and Technology of China in 2012 and IIFC medal from International Institute of FRP in Construction in 2016 etc.

Friday 25 August 10:50 -11:25 at Qujiang Auditorium - Advancement of FRP Composites and Structural Innovation

Anthony M. Waas

University of Washington, USA

Professor Anthony M. Waas is the Boeing Egtvedt Endowed Chair Professor in the William E. Boeing Department of Aeronautics and Astronautics at the University of Washington, Seattle. Professor Waas's research interests are: computational modeling of lightweight composite structures, Automated manufacturability, 3D printing in aerospace, damage tolerance of composites & mechanics of textile composites. Professor Waas was the Felix Pawlowski Collegiate Chair Professor of Aerospace Engineering and Director, Composite Structures Laboratory at the University of Michigan, from 1998 to 2014. Professor Waas is a Fellow of the American Institute of Aeronautics and Astronautics (AIAA), the American Society of Mechanical Engineering (ASME), and the American Academy of Mechanics (AAM). He is a recipient of several best paper awards, the 2016 AIAA SDM award, the AAM Jr. Research Award, the ASC Outstanding Researcher Award, and several distinguished awards from the University of Michigan. He received the AIAA-ASC James H. Starnes, jr. Award, 2017, for seminal contributions to composite structures and materials and for mentoring students and other young professionals. Professor Waas obtained his B.Sc in Aeronautics with First Class Honors from Imperial College, London, 1982, the MS and Ph.D in Aeronautics and Applied Mathematics (minor) from Caltech, 1983 and 1988, respectively.

Thursday 24 August 10:50-11:25 at Qujiang Auditorium - Computational Modeling for Manufacturing and Certification of Future Aerostructures

Kon-Well Wang

University of Michigan, USA

Kon-Well Wang is the Stephen P. Timoshenko Professor and Tim Manganello/BorgWarner Department Chair of Mechanical Engineering at the University of Michigan. He received his Ph.D. degree from the University of California at Berkeley in 1985, worked at the General Motors Research Labs as a Senior Research Engineer, and started his academic career at the Pennsylvania State University in 1988. During his Penn State years, Professor Wang has served as the William E. Diefenderfer Chaired Professor in Mechanical Engineering, Director of the Structural Dynamics & Controls Lab, Associate Director of the Vertical Lift Research Center of Excellence, and Group Leader for the Center for Acoustics & Vibration. Dr. Wang joined the University of Michigan in 2008. Professor Wang's main technical interests are in adaptive structural systems and structural dynamics & control. He has received numerous recognitions for his accomplishments; such as the SPIE Smart Structures and Materials Lifetime Achievement Award, the ASME Adaptive Structures and Materials Systems Award, the ASME N.O. Myklestad Award, the ASME Rudolf Kalman Best Paper Award, the ASME Adaptive Structures and Material Systems Best Paper Awards, the NASA Tech Brief Award, and the SAE Ralph Teetor Award. He is a Fellow of the ASME, AAAS, and IOP. Professor Wang has been the Chief Editor for the ASME Journal of Vibration and Acoustics. He is currently an Associate Editor for the Journal of Intelligent Material Systems and Structures and an Editorial Advisory Board Member for the Journal of Sound and Vibration.

Monday 21 August 14:55-15:30 at Lily Hall: Inspired by Nature – Adaptive Multifunctional Modular Metastructures

Liqun Zhang

Beijing University of Chemical Technology, China

Prof Liqun Zhang, Dean of College of Materials Science and Engineering of Beijing University of Chemical Technology. Yangtze river scholars Distinguished Professor, National Outstanding Youth Fund winner, Chief Scientist of National 973 Project, Director of Engineering Research Center of Elastomer Materials on Energy Conservation and Resources, Ministry of Education. He has published over 400 international papers. His papers have been cited by peers in a positive manner for over 6026 times (Web of Science) with an H-index of 40. He was chosen to be in the list of the most cited Chinese researchers of Elsevier in 2014 and 2015. He is a (co-)author of 8 books (chapters) and has given over 80plenary/keynote/invited lectures in international conferences. He and his team members have filed 160 Chinese patents. He has received many high reputed scientific awards from relative Association, Society, Ministry and Committee of China including prestigious"9th China Youth Scientific Award" in 2012, "National Invention Award" in 2008 and in 2015, seven provincial and ministerial level awards. In 2012, he received Spark-Thomas Award from ACS Rubber Division, and Asia Research Award from Society of Chemical Engineering of Japan. In 2014, he got the Morand Lambla Award from International Polymer Processing Society, which was due to his important contributions to elastomeric polymer science and technology.

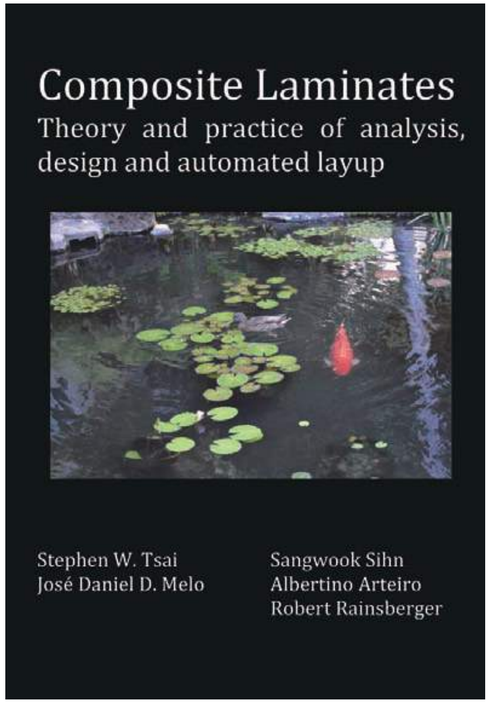
Monday 21 August 14:55-15:30 at Qujiang Auditorium- Progress in Multi-Scaled Structure and Related Properties of Elastomer Nanocomposites Explored by Molecular Dynamics Simulation and Experimental Approaches

Acknowledgement

New book by Professor Stephen Tsai

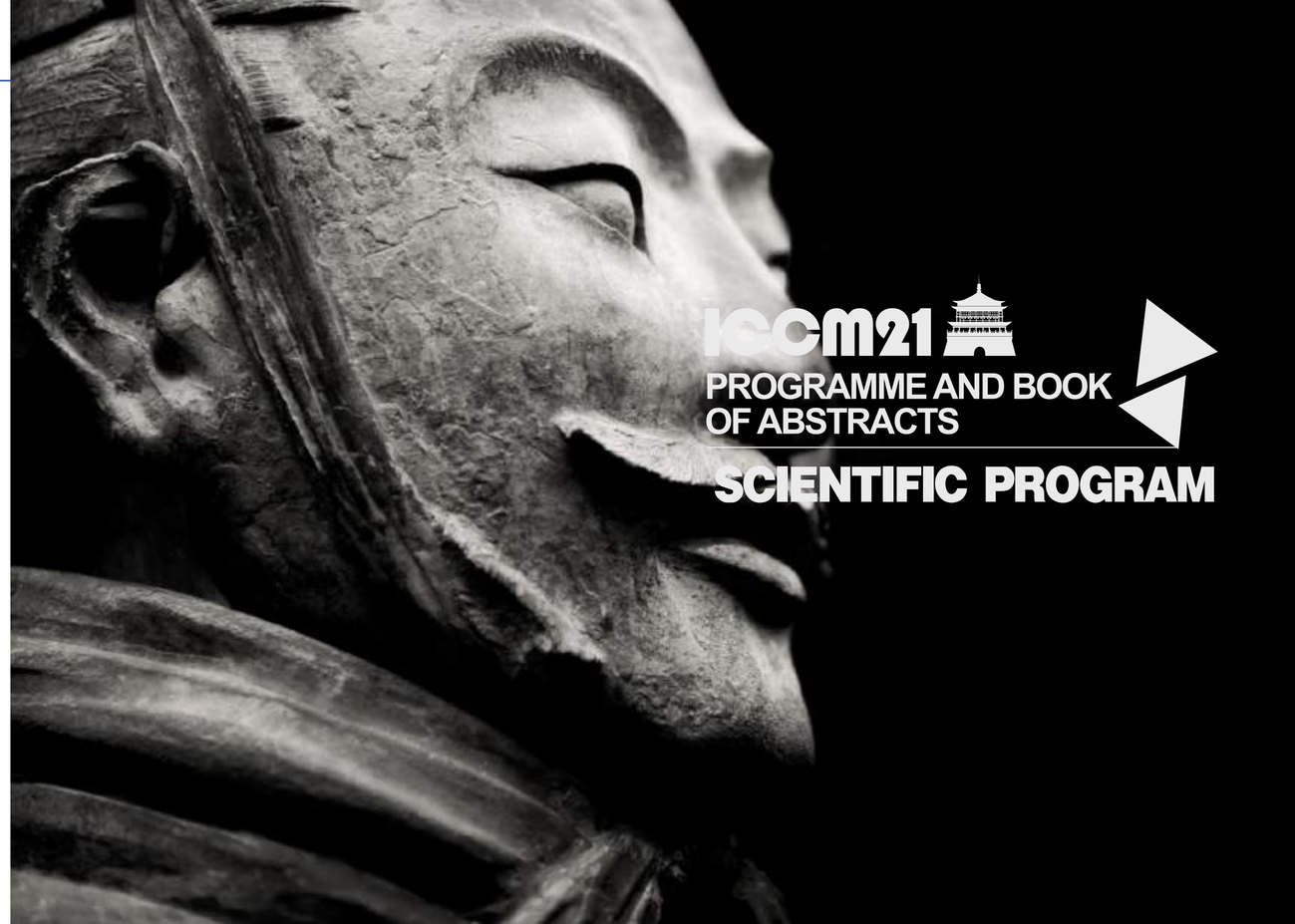
The organizing committee of ICCM21 would like to express gratitude to Professor Stephen Tsai for sharing his new book Composite Laminates with all ICCM21 guests, which can be found in the USB Flash Disk that delivered to every guest.

Materials of this book come from authentic and highly regarded sources. In this book, a different approach for the design of composites laminates is adopted, and tools for design and testing are provided for students to master the subject matter at the end of each chapter. These tools including the laminate search engines will be passed out to all interested guests.



Special Gratitude

Our Special gratitude goes to Professor Jang Kyo Kim, Hong Kong University of Science and Technology, for his generous donation of 1000 USD to the ICCM conference, which Prof. Kim received from the journal of Composites Part A for "Most Highly Cited Award".



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1106	Ceramic Matrix Composites 1	11:10-12:50, Aug 21, 2017	Laifei Cheng	Xinghong Zhang
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4212	Sandwich Structures and Materials 6	11:35-12:35, Aug 24, 2017	Zhongwei Guan	
4213	X-Ray Computed Tomography 1	11:35-12:35, Aug 24, 2017	Michael Jerabek	Qinghua Wang
4214	Constitutive Models 1	11:35-12:35, Aug 24, 2017	Qingping Sun	Qingsheng Yang
4215	Processing-Manufacturing Technologies 2	11:35-12:35, Aug 24, 2017	Klaus Drechesler	Gangadhara Prusty
4216	Civil Engineering 1	11:35-12:35, Aug 24, 2017	Yuris Dzenis	
4217	Acoustic Meta-Composite 2	11:35-12:35, Aug 24, 2017	Guoliang Huang	Xiaoming Zhou
4218	Process Induced Effects 2	11:35-12:35, Aug 24, 2017	Maciej Wysocki	
4219	Additive Manufacturing 3	11:35-12:35, Aug 24, 2017	Xiaoyong Tian	
4220	Fibers 1	11:35-12:35, Aug 24, 2017	Liwei Wang	Chenchen Zhu
4221	Automotive and Rail 4	11:35-12:35, Aug 24, 2017	Xinran (Sharon) Xiao	Jun Xu
4301	Polymer Matrix Materials 11	15:40-17:00, Aug 24, 2017	Guoping Du	
4302	Metal Matrix Composites 11	15:40-17:00, Aug 24, 2017	Masashi Yoshida	Daolun Chen
4303	Fiber-reinforced Composites 11	15:40-17:00, Aug 24, 2017	Zhongwei Guan	Ning Hu
4304	Fracture and Damage 11	15:40-17:00, Aug 24, 2017	Christopher Harvey	Simon Wang
4305	Nano-Composites 11	15:40-17:00, Aug 24, 2017	Ian Kinloch	
4307	Green Composites 1	15:40-17:00, Aug 24, 2017	Debes Bhattacharyya	John Summerscales
4308	Ductile and Pseudo-ductile Composites 4	15:40-17:00, Aug 24, 2017	Alexander Bismarck	
4309	Textile-Based Composites 4	15:40-17:00, Aug 24, 2017	John Whitcomb	Valter Carvelli
4310	Process Modelling 2	15:40-17:00, Aug 24, 2017	Byung Sun Kim	
4311	Dynamic Behavior 4	15:40-17:00, Aug 24, 2017	Zhanli Liu	
4312	Sandwich Structures and Materials 7	15:40-17:00, Aug 24, 2017	Christian Berggreen	Zhongwei Guan
4313	X-Ray Computed Tomography 2	15:40-17:00, Aug 24, 2017	Qinghua Wang	
4314	Constitutive Models 2	15:40-17:00, Aug 24, 2017	Qingping Sun	

Session Code	Session Title	Time Slot	Session Chair	Session Co-chair
4315	Processing-Manufacturing Technologies 3	15:40-17:00, Aug 24, 2017	Paolo Ermanni	John Summerscales
4316	Sensing and Self-Diagnosis 1	15:40-17:00, Aug 24, 2017	Xinlin Qing	Jayantha Ananda Epaarachchi
4317	Acoustic Meta-Composite 3	15:40-17:00, Aug 24, 2017	Yuesheng Wang	Xiaoning Liu
4318	Process Induced Effects 3	15:40-17:00, Aug 24, 2017	Richard Butler	
4319	Additive Manufacturing 4	15:40-17:00, Aug 24, 2017	Jaehwan Kim	
4320	Fibers 2	15:40-17:00, Aug 24, 2017	Pengcheng Ma	Yuris Dzenis
4321	Smart Structures 1	15:40-17:00, Aug 24, 2017	Arief Yudhanto	Liwu Liu
4401	Polymer Matrix Materials 12	17:00-18:20, Aug 24, 2017	Guoping Du	
4402	Metal Matrix Composites 12	17:00-18:20, Aug 24, 2017	Daolun Chen	Masashi Yoshida
4403	Fiber-reinforced Composites 12	17:00-18:20, Aug 24, 2017	Ning Hu	Zhongwei Guan
4404	Fracture and Damage 12	17:00-18:20, Aug 24, 2017	Christopher Harvey	Simon Wang
4405	Damage Tolerance of Composites Structures 1	17:00-18:20, Aug 24, 2017	Pedro Camanho	Ivana Partridge
4407	Green Composites 2	17:00-18:20, Aug 24, 2017	John Summerscales	
4408	Ductile and Pseudo-ductile Composites 5	17:00-18:20, Aug 24, 2017	Paul Robinson	
4409	Textile-Based Composites 5	17:00-18:20, Aug 24, 2017	Frank Ko	Philippe Boisse
4410	Process Modelling 3	17:00-18:20, Aug 24, 2017	Jesper Hattel	
4411	Dynamic Behavior 5	17:00-18:20, Aug 24, 2017	Theophane Courtois	
4412	Sandwich Structures and Materials 8	17:00-18:20, Aug 24, 2017	Christian Berggreen	
4413	X-Ray Computed Tomography 3	17:00-18:20, Aug 24, 2017	Qinghua Wang	Michael Jerabek
4414	Constitutive Models 3	17:00-18:20, Aug 24, 2017	Qingsheng Yang	Yanju Liu
4415	Processing-Manufacturing Technologies 4	17:00-18:20, Aug 24, 2017	António Torres Marques	Byung Chul Kim
4416	Sensing and Self-Diagnosis 2	17:00-18:20, Aug 24, 2017	Zhichun Zhang	Jayantha Ananda Epaarachchi
4417	Acoustic Meta-Composite 4	17:00-18:20, Aug 24, 2017	Zhihai Xiang	Jun Yang
4418	Process Induced Effects 4	17:00-18:20, Aug 24, 2017	Samuel Erland	
4419	Micro- and Nano- Scale Test Methods	17:00-18:20, Aug 24, 2017	Fei Deng	
4420	Fibers 3	17:00-18:20, Aug 24, 2017	Kap-Seung Yang	Pengcheng Ma
4421	Smart Structures 2	17:00-18:20, Aug 24, 2017	Gilles Lubineau	Xiaobo Gong
5101	Polymer Matrix Materials 13	09:05-10:25, Aug 25, 2017	Jun Liu	
5102	Metal Matrix Composites 13	09:05-10:25, Aug 25, 2017	Daolun Chen	
5103	Fiber-reinforced Composites 13	09:05-10:25, Aug 25, 2017	Zixing Lu	
5104	Dynamic Fracture 1	09:05-10:25, Aug 25, 2017	Matteo Filippi	

Session Code	Session Title	Time Slot	Session Chair	Session Co-chair
5105	Damage Tolerance of Composites Structures 2	09:05-10:25, Aug 25, 2017	Pedro Camanho	Ivana Partridge
5106	Fiber-reinforced Composites 20	09:05-10:25, Aug 25, 2017	Larissa Gorbatikh	
5107	Green Composites 3	09:05-10:25, Aug 25, 2017	Hao Wang	
5108	Other New Testing Methods 1	09:05-10:25, Aug 25, 2017	Zhanwei Liu	Zhiyong Wang
5109	Textile-Based Composites 6	09:05-10:25, Aug 25, 2017	Cagri Ayranci	
5110	Process Modelling 4	09:05-10:25, Aug 25, 2017	Shuai Chen	
5111	Composite Repair 1	09:05-10:25, Aug 25, 2017	John J Wang	
5112	Sandwich Structures and Materials 9	09:05-10:25, Aug 25, 2017	Qinghua Qin	Guoxing Lu
5113	Ultrasound, Acoustic Emission, and Electromagnetic waves 1	09:05-10:25, Aug 25, 2017	Yoji Okabe	
5114	Constitutive Models 4	09:05-10:25, Aug 25, 2017	Yanju Liu	Qingsheng Yang
5115	Processing-Manufacturing Technologies 5	09:05-10:25, Aug 25, 2017	Kevin Potter	John Summerscales
5116	Sensing and Self-Diagnosis 3	09:05-10:25, Aug 25, 2017	Jayantha Ananda Epaarachchi	Xinlin Qing
5117	Acoustic Meta-Composite 5	09:05-10:25, Aug 25, 2017	Weiqiu Chen	Gengkai Hu
5118	Process Induced Effects 5	09:05-10:25, Aug 25, 2017	Andy Rhead	
5119	Experimental Methods for Process Characterization 1	09:05-10:25, Aug 25, 2017	Min Li	
5120	Fibers 4	09:05-10:25, Aug 25, 2017	Chenchen Zhu	Liwei Wang
5121	Machining of Composites 1	09:05-10:25, Aug 25, 2017	Bin Niu	Luís Miguel P. Durão
5201	Liquid Composites Moulding 1	11:35-12:35, Aug 25, 2017	Chris Rudd	
5202	Metal Matrix Composites 14	11:35-12:35, Aug 25, 2017	Daolun Chen	
5203	Fiber-reinforced Composites 14	11:35-12:35, Aug 25, 2017	David Kraus	Moniruddoza Ashir
5204	Dynamic Fracture 2	11:35-12:35, Aug 25, 2017	Jian Wang	
5205	Damage Tolerance of Composites Structures 3	11:35-12:35, Aug 25, 2017	Ivana Partridge	Pedro Camanho
5206	Fiber-reinforced Composites 21	11:35-12:35, Aug 25, 2017	Larissa Gorbatikh	
5207	Green Composites 4	11:35-12:35, Aug 25, 2017	Hao Wang	
5208	Other New Testing Methods 2	11:35-12:35, Aug 25, 2017	Zhiyong Wang	Ruixiang Bai
5209	Textile-Based Composites 7	11:35-12:35, Aug 25, 2017	Cagri Ayranci	
5210	Process Modelling 5	11:35-12:35, Aug 25, 2017	Thomas Neumeyer	
5211	Composite Repair 2	11:35-12:35, Aug 25, 2017	John J Wang	
5212	Sandwich Structures and Materials 10	11:35-12:35, Aug 25, 2017	Qinghua Qin	
5213	Ultrasound, Acoustic Emission, and Electromagnetic waves 2	11:35-12:35, Aug 25, 2017	Yoji Okabe	
5214	Constitutive Models 5	11:35-12:35, Aug 25, 2017	Qingsheng Yang	
5215	Processing-Manufacturing Technologies 6	11:35-12:35, Aug 25, 2017	Asami Nakai	Gangadhara Prusty

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PROGRAMME AND BOOK
OF ABSTRACTS

Session Code	Session Title	Time Slot	Session Chair	Session Co-chair
5216	Sensing and Self-Diagnosis 4	11:35-12:35, Aug 25, 2017	Yang He	Jayantha Ananda Epaarachchi
5217	Manufacturing Up-Scaling and Automation 1	11:35-12:35, Aug 25, 2017	Takashi Ishikawa	
5218	Offshore and Subsea 1	11:35-12:35, Aug 25, 2017	Kok Hoong Leong	
5219	Experimental Methods for Process Characterization 2	11:35-12:35, Aug 25, 2017	David Becker	
5220	Fibers 5	11:35-12:35, Aug 25, 2017	Xuming Xie	Dawei Zhang
5221	Machining of Composites 2	11:35-12:35, Aug 25, 2017	Hitesh Sharma	Luís Miguel P. Durão
5301	Liquid Composites Moulding 2	15:40-17:20, Aug 25, 2017	Norberto Feito Sánchez	
5302	Metal Matrix Composites 15	15:40-17:20, Aug 25, 2017	Daolun Chen	
5303	Fiber-reinforced Composites 15	15:40-17:20, Aug 25, 2017	Ning Hu	
5304	Dynamic Fracture 3	15:40-17:20, Aug 25, 2017	Jian Wang	
5305	Damage Tolerance of Composites Structures 4	15:40-17:20, Aug 25, 2017	Pedro Camanho	
5307	Green Composites 5	15:40-17:20, Aug 25, 2017	John Summerscales	
5308	Other New Testing Methods 3	15:40-17:20, Aug 25, 2017	Meisam Jalalvan	Yongmao Pei
5309	Textile-Based Composites 8	15:40-17:20, Aug 25, 2017	Cagri Ayranci	
5310	Process Modelling 6	15:40-17:20, Aug 25, 2017	Mukul Shukla	
5311	Composite Repair 3	15:40-17:20, Aug 25, 2017	John J Wang	
5312	Sandwich Structures and Materials 11	15:40-17:20, Aug 25, 2017	Guoxing Lu	
5313	Ultrasound, Acoustic Emission, and Electromagnetic waves 3	15:40-17:20, Aug 25, 2017	Yoji Okabe	
5315	Processing-Manufacturing Technologies 7	15:40-17:20, Aug 25, 2017	Rehan Umer	Byung Chul Kim
5316	Sensing and Self-Diagnosis 5	15:40-17:20, Aug 25, 2017	Jayantha Ananda Epaarachchi	Xinlin Qing
5317	Manufacturing Up-Scaling and Automation 2	15:40-17:20, Aug 25, 2017	Neil Reynolds	
5318	Offshore and Subsea 2	15:40-17:20, Aug 25, 2017	Andreas Echtermeyer	Sandeep Namdeo
5319	Experimental Methods for Process Characterization 3	15:40-17:20, Aug 25, 2017	Igor Tsukrov	
5320	Fibers 6	15:40-17:20, Aug 25, 2017	Dawei Zhang	Xuming Xie
5321	Machining of Composites 3	15:40-17:20, Aug 25, 2017	Chong Zhang	Fritz Klocke

Monday 21 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
08:40	Opening Ceremony										
09:10	SCALA LECTURE at Qujiang Auditorium: **PERSONAL REFLECTIONS ON A CAREER OF COMPOSITE MATERIALS RESEARCH: A MATTER OF OPPORTUNITIES** Yiu-Wing Mai, University of Sydney, Australia										
10:15	KEYNOTE at Qujiang Auditorium: **MULTIFUNCTIONAL COMPOSITES FOR FLY-BY-FEEL AUTONOMOUS ELECTRIC VEHICLES** Fu-Kuo Chang, Stanford University, USA KEYNOTE at Lily Hall: **FLAMMABILITY OF NATURAL FIBRE-REINFORCED POLYMERIC COMPOSITES** Debes Bhattacharyya, University Auckland, New Zealand KEYNOTE at Rose Hall: **COMPOSITE RELATED RESEARCH ACTIVITIES IN COMAC R&T CENTER** Dongsheng Li, Commercial Aircraft Corporation of China, China										
10:50	Coffee Break										
11:10	1101 Polymer Matrix Materials 1	1102 Metal Matrix Composites 1	1103 Fiber-reinforced Composites 1	1104 Fracture and Damage 1	1105 Nano-Composites 1	1106 Ceramic Matrix Composites 1	1107 Structural Analysis and Optimization 1	1108 Multiscale Modelling of Structures 1	1109 Bio-Composites 1	1110 Durability, Creep and Aggressive Environment 1	1111 Hybrid Composites 1
11:10	1101-1 **NEW THERMOSETTING COMPOSITES USING GRAPHENE (INVITED TALK)** *Ma Li (University of South Australia)* Cost-effective, electrically conductive graphene platelets were surface modified by compound with with epoxy resins to produce composites which demonstrate various degrees of toughness improvement and percolation thresholds of electrical conductivity.	1102-1 **EFFECT OF REINFORCEMENT PHASE IN SiCp/AZ31 COMPOSITE ON MAG COATING GROWTH** *Wenbin Xue, Run Liu, Qingzhen Zhu (Beijing Normal University)*	1103-1 **DEVELOP HIGH TEMPERATURE GLASS FIBRE/PEKK PREPREG** *Nassier Almtiri (University of Liverpool, University of technology), Robert Birch, (University of Liverpool), Zhongwei Guan (University of Liverpool, Chengdu University)* This paper presents manufacturing processes of glass fibre/PEKK prepreg. Also, mechanical properties of GF/PEKK laminates were assessed.	1104-1 **ENHANCED IN-PLANE FRACTURE BEHAVIOUR OF NOTCHED CFRP REINFORCED WITH "KILOMETRE-LONG" CARBON NANOTUBE FIBRES (Invited Talk)** *T. F. Tay, A. Mikhalchan, M. Ridha (National University of Singapore)* This talk will present recent work in locally embedding so-called kilometer-long carbon nanotube (CNT) fibers in conventional autoclave-cured carbon fiber reinforced plastics (CFRP) to enhance the in-plane fracture toughness and failure strain of notched composites.	1105-1 **HOT DEFORMATION AND PROCESSING MAP OF A CNT-REINFORCED ALUMINUM COMPOSITE** *F.Mokdad (Ryerson University), Z. Y. Liu, D. R. Ni, B. L. Xiao, Z. Y. Ma (Chinese Academy of Sciences), D.L.Chen (University of Alberta)* This work was aimed at identifying the microstructural features, predominant texture components, hot compression behavior, and processing maps of a CNT-reinforced aluminum matrix composite via EBSD, XRD and compression tests. Details will be presented at the conference.	1106-1 **AN OVERVIEW ON THE INTERFACIAL INTERACTIONS BETWEEN CNTS AND THE POLYMER MATRIX (INVITED TALK)** *Hui Mei, Laifei Cheng, Litong Zhang (Northwestern Polytechnical University)*	1107-1 **DEVELOPMENT OF A STRUCTURAL OPTIMISATION METHODOLOGY FOR USE IN THE DESIGN OF A COMPOSITE SEMI-TRAILER CHASSIS (INVITED TALK)** *Joel Galos, Dr. Michael Sutcliffe (University of Cambridge)* A finite element study investigates various materials and structural options including composite beams or decking which can allow reduction of weight in a road freight trailer. A graphical selection procedure is used to identify the key constraints and appropriate design solutions.	1108-1 **STATIC AND DYNAMIC FOLDING OF THREE-DIMENSIONAL ELASTIC MATERIALS** *Davide Bigoni, Panos A. Gourgiotis (University of Trento)* Folding of a three-dimensional elastic continuum is analyzed from a theoretical point of view for Cosserat material, to explaing chevron formation in natural rocks.	1109-1 **TOUGHENING MECHANISMS IN A NATURAL COMPOSITE: A CROSSED-LAMELLAR STRUCTURE (INVITED TALK)** *T. F. Tay, A. Mikhalchan, M. Ridha (National University of Singapore)* This talk will present recent work in locally embedding so-called kilometer-long carbon nanotube (CNT) fibers in conventional autoclave-cured carbon fiber reinforced plastics (CFRP) to enhance the in-plane fracture toughness and failure strain of notched composites.	1110-1 **STUDY OF DAMAGE CHARACTERISTICS IN COMPOSITE STRUCTURES FROM SIMULATED LIGHTNING STRIKES** *Gang Zhou (Loughborough University), James Golding (Loughborough University), Xujin Bao (Loughborough University), Weiwei Sun (C-Power (Technology) Ltd)* This paper investigated experimentally Joule heating and kinetic shock waves in carbon/epoxy and E-glass/epoxy laminates, the direct effects of simulated lightning strikes. We found that resin sublimation, degradation and fibre tufting were dominant in the carbon/epoxy laminates with little penetration into the laminates and that the damage characteristics of the E-glass/epoxy laminates were dominated by extensive delamination due entirely to shock waves with little sign of Joule heating.	1111-1 **AN APPROACH FOR THE SYSTEMATIC DEVELOPMENT OF PROGRESSIVE LIGHT WEIGHT SPRING ELEMENT CONCEPTS IN VEHICLE CONSTRUCTIONS** *Michael Knorre, Robert Brandt (University of Siegen)* The work shows up a systematic approach for the development of light weight spring elements respecting a variety of boundary conditions in form of a defined bearing movement. The discussion of the results is based on analytical calculations and with the aim to create a progressive beam characteristic.
11:30	1101-2 **PROPERTY AND MORPHOLOGY STUDY OF AN EPOXY RESIN MODIFIED WITH ETBN** *Yuefang Li, Kang Peng, Zhi Wu (Institute of Electronic Engineering, Chinease Academy of Engineering Physics)* This work investigated the effects of ETBN content on thermal properties, tensile behaviors, cohesive and adhesive fracture toughness, and phase morphologies of diethanolamine-cured epoxy resin, and attempts were made to correlate them.	1102-2 **MECHANICAL PROPERTY OF Al,Nip/Al ALLOY COMPOSITE BY INFILTRATION AND REACTION METHOD** *Yongbum Choi, Zhefeng Xu, Kenjiro Sugio, Kazuhiro Matsugi, Gen Sasaki (Hiroshima University)* Optimization of manufacturing process of Al3Ni intermetallic-compounds-reinforced metal matrix composite by using of the infiltration and reaction method.	1103-2 **HIERARCHICAL AND STATISTICAL ANALYSIS ON THE TENSILE STRENGTH OF SUPERCONDUCTING WIRE** *Zhi-Yang Wang , Hua-Dong Yong, You-he Zhou. (Lanzhou University)* In this paper, we study the strength distribution of filament bundles in the superconducting wire. A hierarchical model is extended to analyze the stochastic strength of Bi2212 wire composite approximately.	1104-2 **THE DELAMINATION GROWTH IN FMLS UNDER FATIGUE LOAD BASED ON DIC METHOD** *WenBo Sun, YuE Ma (Northwestern Polytechnical University)* This paper designed several samples with different notch sizes and performed the delamination growth in different fatigue loadings. Based on DIC method, the shapes and sizes of delamination and crack lengths were calculated.	1105-2 **THE MECHANICS OF REINFORCEMENT IN POLYMER-BASED NANOCOMPOSITES (INVITED TALK)** *Robert J Young, Lan A. Kinloch, Suhao Li, Dimitros G. Papageorgiou (The University of Manchester)*	1106-2 **SYNERGISTIC EFFECTS OF LOADING SEQUENCE AND INTERFACE WEAR ON DAMAGE EVOLUTION IN FIBER REINFORCED CERAMIC-MATRIX COMPOSITES** *Li Longbiao (Nanjing University of Aeronautics and Astronautics)* The synergistic effects of loading sequence and interface wear on the damage evolution in fiber-reinforced ceramic-matrix composites(CMCs) have been investigated. The effects of stress levels, matrix crack spacing, fiber volume fraction on the damage evolution of CMCs have been analysed.	1107-2 **BUCKLING ANALYSIS OF VARIABLE ANGLE TOW COMPOSITE PLATES WITH ONE CIRCULAR DELAMINATION** *Zhangming Wu (Cardiff University), Xiaodong Chen (Tongji University), Paul M. Weaver (University of Bristol)* This research studies the compressive buckling behaviour of VAT composite panels with a circular embedded delamination The mechanism of taking advantages of varying orientation fibers to suppress the buckling resistance reduction of VAT panels induced by the delamination is investigated.	1108-2 **EXPERIMENTAL PROOF FOR THE CLOAKING OF FLEXURAL VIBRATIONS IN A STRUCTURED PLATE** *D.Misseroni (University of Trento)* An elastic invisibility cloak embedded in a mechanical lattice is designed, realized and validated by means of both FE simulations and physical experiments. The elastic lattice cloak, implemented experimentally, shows high efficiency.	1109-2 **REGENERATIVE AND BIO-BASED MATERIALS FOR SHEET MOLDING COMPOUNDS (SMC)** *Florian Gortner, Peter Mitschang (Institute for Composite Materials)* This paper deals with the replacement of conventional fiber materials for Sheet Molding Compound (SMC) by bio-based fiber materials. By replacing the conventional fillers, the processability of the semi-finished product could be obtained, mechanical properties were almost the same while density of the resin paste could be reduced by 18%.	1110-2 **EFFECTS OF HYGROTHERMAL HISTORY ON THE STRUCTURAL PERFORMANCE OF AEROSPACE COMPOSITE MATERIALS: PRELIMINARY EXPERIMENTS AND MASS DIFFUSION MODELS** *Kevin C.Y. Chau (University of Bristol), Giacomo Canale (Rolls-Royce plc), Luiz Kawashita (University of Bristol)* An investigation on structural and diffusion properties of composite laminates subjected to hygrothermal cycles: experiments, inspection, and modelling.	1111-2 **DEVELOPMENT AND CHARACTERIZATION OF A COMPOSITE MATERIAL MADE UP BY GLASS FIBER REINFORCED PLASTICS AND HIGH STRENGTH STEEL** *A.Busch, R.Brandt (University of Siegen)* An intrinsic hybrid made up by GFRP and a high strength steel has been developed. Double cantilever beam tests (mode I) and shear tests (mode II) are conducted in order to characterize the interface. Finally the bearing strength of a multilayer hybrid laminate has been tested by means of a pull-out test.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	ROOM 22 (209+210)
Opening Ceremony										
SCALA LECTURE at Qujiang Auditorium: **PERSONAL REFLECTIONS ON A CAREER OF COMPOSITE MATERIALS RESEARCH: A MATTER OF OPPORTUNITIES** Yiu-Wing Mai, University of Sydney, Australia										
KEYNOTE at Qujiang Auditorium: **MULTIFUNCTIONAL COMPOSITES FOR FLY-BY-FEEL AUTONOMOUS ELECTRIC VEHICLES** Fu-Kuo Chang, Stanford University, USA KEYNOTE at Lily Hall: **FLAMMABILITY OF NATURAL FIBRE-REINFORCED POLYMERIC COMPOSITES** Debes Bhattacharyya, University Auckland, New Zealand KEYNOTE at Rose Hall: **COMPOSITE RELATED RESEARCH ACTIVITIES IN COMAC R&T CENTER** Dongsheng Li, Commercial Aircraft Corporation of China, China										
Coffee Break										
1112 Office Naval Research (ONR) Session 1	1113 Joints 1	1114 Composite Structures 1	1115 Fatigue 1	1116 Stimuli Responsiveness and Shape Reconfiguration 1	1117 Design and Manufacture for Multifunctionality 1	1118 Interfaces and Interphases 1	1119 Coupled Properties and Multi-Physics Models	1120 Digital Image 1	1121 Aerospace 1	
1112-1 **INTERNAL DEFORMATION OF A SANDWICH PLATE MAPPED BY DIGITAL VOLUMETRIC SPECKLE PHOTOGRAPHY (INVITED TALK)** *Lingtao Mao, Haizhou Liu (China University of Mining & Technology), Fu-pen Chiang (Stony Brook University)* The internal deformations of a sandwich plate under three-point bending were obained by using Digital Volumetric Speckle Photography combined with Micro focus X-ray Computed Tomography.	1113-1 **ANALYSES ON FORMED BOLTED JOINTS FOR THICK-WALLED CFRP IN WIND POWER INDUSTRY** *Florian Schimmer, Nicole Motsch, Joachim Hausmann (Institute for Verbundwerkstoffe GmbH), Michael Magin (University of Applied Sciences), Marcel Bucker (Schafer MWN GmbH)* Within this paper the results of experimental investigations on an innovative formed bolted load introduction for a thick-walled, mainly torque loaded CFRP drive shaft are presented. Thereby, a fail-safe damage mechanism and comparable mechanical properties compared to a conventional and more costly drilled bolted joint are identified.	1114-1 **DEVELOPMENTOF LIGHTWEIGHT CORRUGATED CYLINDER FOR SATELLITE PRIMARY STRUCTURE (INVITED TALK)** *Gao Feng, Ma Haiquan, Wang Han, Han Mingfen(BeiJing Institute of Spacecraft System Engineering), Li Yu, Chen Weigiang (Beijing Satellite Manufacturing Factory)* Lightweight corrugated shell cylinder which is the primary structure of a typical communication satellite platform, was developed based on novel composite system BHMO/BS4. Mu lti-objective optimization was performed and structural weight reduction was achieved. The full-size corrugated shell cylinder was manufactured and qualified by static test and sine-vibration test. The test data shows that the cylinder met various technical requirements successfully.	1115-1 **DAMAGE INITIATION AND EVOLUTION IN COMPOSITE LAMINATES UNDER CYCLIC LOADING: A DAMAGE-BASED MODELLING FRAMEWORK (INVITED TALK)** *Quaresimin M., Carraro P. A. (University of Padova)* The paper illustrates, briefly, the fatigue design strategy, based on the physics of the damage evolution, under development by the Composite Group at DTG-University of Padova. After a brief introduction, examples of damage mechanisms at the microscopic scale are presented and the procedures for the quantitative description of these mechanisms are illustrated.	1116-1 **4D PRINTING OF POLY(LACTIC ACID)-BASED SHAPE MEMORY POLYMERS AND SHAPE MEMORY NANOCOMPOSITES (INVITED TALK)** *Hongqu Wei, Qiwei Zhang, Yongtao Yao, Liwu Liu, Yanju Liu, Jinsong Leng (Harbin Institute of Technology)*	1117-1 **Understanding STRUCTURAL RECONSTITUTION IN POLYMERIC MATERIALS TO ACHIEVE IN-SITU PROPERTY CONTROL (INVITED TALK)** *M. Heili, A. Bielawski, K. Sebeck, M. Aldridge, J. Kieffer (University of Michigan, Ann Arbor)* Polymer structures displaced from equilibrium, either as a result of undergoing polymerization and cross-linking reactions that result in network structure where its constituents initially end up slightly removed from their ground state configuration, or when subjecting fully cured networks to elastic strains, tend to reconstitute so as to optimize molecular packing and maximize non-boning interactions (minimize their potential energy), which in turn results in an enhanced capacity for elastic energy storage.	1118-1 **INTERLEAVED THERMOSETTING COMPOSITES FOR IN-MOULD COATING AND MANUFACTURING OF THICK COMPOSITE STRUCTURES WITH IMPROVED FRACTURE TOUGHNESS (INVITED TALK)** *S. –R. Shamsuddin (Imperial College London), A. Bismarck (Imperial College London, University of Vienna)*	1119-1 **THERMODYNAMICS AND INSTABILITY OF DIELECTRIC ELASTOMER (INVITED TALK)** *LW. Liu, YJ. Liu (Department of Astronautical Science and Mechanics, Harbin Institute of Technology, Harbin, China), JS. Leng (Centre for Composite Materials and Structures, Harbin Institute of Technology,Harbin, China)*	1120-1 **VISUALIZATION OF STRAIN CONCENTRATIONS IN COMPOSITES USING ADVANCED IMAGE PROCESSING TECHNIQUES (INVITED TALK)** *Q. Wang (National Institute of Advanced Industrial Science and Technology Japan), Y. Tanaka (National Institute of Advanced Industrial Science and Technology Japan), S. Ri (National Institute of Advanced Industrial Science and Technology Japan), M. Koyama (Kyushu University)* The crack occurrence locations of Ti-6Al-4V alloys were successfully predicted from the microscale strain concentrations using DIC and Moiré methods complementarily.	1121-1 **OPTIMIZATION OF COMPOSITE MATERIAL DE-ICING COMPONENT FOR HELICOPTER ROTOR** *Long Chen, Yidu Zhang, Qiong Wu (Beihang University)* An optimization for helicopter rotor composite material de-icing component based on numerical simulation was proposed, and the heat transfer of the de-icing component was researched considering the the influence of external flow filed.	
1112-2 **FLUID-STRUCTURE INTERACTION OF COMPOSITE STRUCTURES UNDER IMPACT LOADING** *Young W. Kwon (Dept. of Mechanical & Aerospace EngineeringNaval Postgraduate School)* This paper studied fluid-structure interaction (FSI) of composite structures. A new numerical technique was presented to solve the FSI problems.	1113-2 **ANALYTICAL MODELING FOR STRESS DISTRIBUTION OF INTERFERENCE FIT MULTI-PIN JOINTS** *Tao Wu , (Northwestern Polytechnical University)*	1114-2 **AUTO-FRETTAGE PROCESS ANALYSIS OF COMPOSITE PRESSURE VESSELS** *Jinming Zhang, Jinxi Wang, Lei Zu (Wuhan University of Technology)* The winding parameters and the composite layup of CNG pressure vessel were determined based on the winding principle and FEM analysis. The influence of the application of the auto-frettage pressure on the stress level of the metal liner was evaluated.	1115-2 **FATIGUE LIFE PREDICTION OF COMPOSITE LAMINATES BASED ON MASTER FATIGUE CURVE** *Song Zhou, Yi Sun, Xiaojie Chen (Harbin Institute of Technology)* Fatigue life of braided composite laminates could be predicted sucessfully by the master fatigue curve method in our paper.	1116-2 **THERMO-MECHANICAL PROPERTIES OF 2.5D ANGLE-INTERLOCK WOVEN SHAPE MEMORY POLYMER COMPOSITES** *Huixu Sun, Yun Tang, Yanming Liu (Nanjing University of Aeronautics and Astronautics)* Thermo-mechanical properties of 2.5D angle-interlock woven shape memory polymer composites (SMPCS) are investigated by a multi-scale strategy in the paper. The shape memory behavior along the warp direction in small strain region is also analyzed on the basis of the viscoelastic properties of the composites.	1117-2 **MORPHING WINGS FOR HARVESTING AND STORING SOLAR ENERGY IN MIXED-MODE UNMANNED AIR VEHICLES (INVITED TALK)** *Alex Holness, Lena D. Johnso, Hugh A. Bruck (Department of Mechanical Engineering University of Maryland, College Park, MD 20742 Email),Satyandra K. Gupta (Aerospace and Mechanical Engineering University of Southern California)*	1118-2 **EVAPORATION-INDUCED SURFACE MODIFICATION OF PBO FIBER AND INVESTIGATION ITS UV RESISTANCE** *Peng Zhu, Limin Bao (Shinshu University)* A simple, mild and novel surface coating method for PBO fibers is proposed. The surface morphology and roughness of treated PBO fibers were changed, in addition, the UV resistance of treated PBO fibers was increased.	1119-2 **NONLINEAR NUMERICAL ANALYSIS ON LIGHTNING STRIKE ABLATION DAMAGE OF CARBON FIBER/EPOXY COMPOSITE** *Qi Dong, Guoshun Wan, Yuxi Jia (Shandong University)*	1120-2 **THREE DIMENSIONAL SHAPE RECOVERY RATIO FOR A SHAPE MEMORY COMPOSITE HINGE** *Q. Wang, S. Ri (Research Institute for Measurement and Analytical Instrumentation, National Institute of Advanced Industrial Science and Technology), Y. Tanaka (Research Center for Structural Materials, National Institute for Materials Science), M. Koyama (Kyushu University)*	1121-2 **SUBSONIC FLUTTER EMULATION OF COMPOSITE LAMINATE USING A FEW CONCENTRATED FORCES** *Kailash Dhital, Jae-Hung Han (KAIST)* The concept of ground flutter simulation test is introduced to emulate the flutter of a composite laminate plates. The plate is subjected to a few concentrated forces equivalent to aerodynamic forces to obtain close coupling between structure response and aerodynamics forces while obtaining a response to observe flutter.	

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Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
11:50	1101-3 **PROPERTIES OF QUARTZ FABRICS REINFORCED CYANATE ESTER RESIN COMPOSITES PRODUCED BY RTM PROCESSING** *Guo Yalin, Zhang Xiaohu, Cui Hong, Liao Yingqiang, Gao Kezhou, Zhang Shixie, Jing Kuan, Deng Jie, Cheng Mingu (Xi'an Aerospace Composites Research Institute)* The properties of quartz fabrics reinforced cyanate ester resin composites produced by RTM processing is discussed. The radar radome with the same materials and processing is made and the wave transmit test of the radome is carried out.	1102-3 **BIOINSPIRED STRATEGY FOR MULTIFUNCTIONAL GRAPHENE-COPPER MATRIX NANOCOMPOSITES** *Qing-Bang Xiong, Mu Cao, Zhangju Tan, Genlian Fan, Qiang Guo, Zhigiang Li, Di Zhang (Shanghai Jiao Tong University)*	1103-3 **A STUDY OF TRANSVERSE CRACK FORMATION IN FIBER-REINFORCED COMPOSITES BY GROWTH OF FIBER-MATRIX DEBONDS (INVITED TALK)** *Linqi Zhuang (Texas A&M University), Ramesh Talreja (Texas A&M University), Lulea University of Technology), Andreas Puguts (Lulea University of Technology), Janis Varna (Lulea University of Technology)* In the present paper, kinkin of fiber/matrix interfacial debond under transverse tension was investigated numerically and the effects of inter-fiber spacing on the kinking process was also studied.	1104-3 **MULTI-SCALE MODELING ON THE IMPACT BEHAVIOR OF TRIAXIALLY BRAIDED COMPOSITE** *Zhengang Zhao, Chao Zhang, Yulong Li (Northwestern Polytechnical University)* The impact resistance of ±60° triaxially braided composite is analyzed by using mulvi-scale models through the finite element method.	1105-3 **THERMAL, MECHANICAL AND SHAPE MEMORY PROPERTIES** *Hongqiu Wei (Harbin Institute of Technology)*	1106-3 **CHARACTERIZATION, MECHINICAL, THERMAL AND ABLATIVE PROPERTIES OF CERAMIC MODIFIED PHENOLIC RESIN AEROGELS SYNTHSIZED BY AMBIENT PRESSURE DRYING** *Jun Zhang (Harbin Institute of Technology), Rongying Yin (Harbin Aircraft industry (Group) Co. Ltd), Hairang Cheng (Harbin Institute of Technology), Changqing Hong (Harbin Institute of Technology), Xinghong Zhang (Harbin Institute of Technology)* In short summary, in my paper, novel phenolic resin/ silica (PR-SiO2) hybrid aerogels and lightweight carbon fabric reinforced composite are fabricated by sol-gel polymerization process with high thermal stability, good mechanical properties, low thermal conductivity as well as good ablation ability.	1107-3 **A NEW HYBRID CONCEPT FOR CFRP PEDICLE SCREWS: FINITE ELEMENT ANALYSIS** *Y. N. Becker, N. Motsch, J. Hausmann (Institute for Composite Materials (IVW) GmbH)* A new concept of a composite pedicle screw is analyzed by the method of finite elements. The effect of the variation of geometric and mechanical properties on the pullout behavior is studied.	1108-3 **EXTENDED MULTISCALE FINITE ELEMENT METHOD FOR GEOMETRICALLY NONLINEAR ANALYSIS OF THIN COMPOSITE PLATES ON BENDING PROBLEMS** *Mingfa Ren, Jie Cong (Dalian University of Technology)* An efficient multiscale finite element method is developed for geometrically nonlinear analysis of thin composite plates on bending problems.	1109-3 **NUMERICAL INTERPRETATION OF FULLY BIO-RESORBABLE GLASS FIBRE REINFORCED COMPOSITES** *Xi Gao (University of Nottingham Ningbo China), Menghao Chen (University of Nottingham), Xiaogang Yang (University of Nottingham Ningbo China), Lee T.Harper, Ifty Ahmed (University of Nottingham), Jiawa Lu (University of Nottingham Ningbo China)* Bio-resorbable composites are of great significance in application of bio-medical devices, the paper provides a numerical method to investigate the mechanical properties of bio-resorbable composites.	1110-3 **LONG TERM CREEP BEHAVIOR OF A SHORT CARBON FIBER REINFORCED PEEK AT HIGH TEMPERATURE** *Sylvain Corvellom (Université de Toulouse, LIEBHERR), Florentin Berthet (Université de Toulouse), Frédéric Lachaud (Université de Toulouse), Claude Rossignol (LIEBHERR)*	1111-3 **HYBRIDISATION OF CFRP WITH ENDLESS METAL FIBRES FOR MULTIFUNCTIONAL STRUCTURES** *Hannemann, Benedikt (Institute for Composite Materials (IVW GmbH)); Schmeer, Sebastian (Institute for Composite Materials (IVW GmbH)); Breuer, Ulf Paul (Institute for Composite Materials (IVW GmbH)); Backe, Sebastian (University of Kaiserslautern); Balle, Frank (University of Kaiserslautern)* The presentation covers investigations on a steel-carbon-fibre hybrid composite with improved electrical and mechanical performance. A novel NDT method for hybrid composite materials is introduced.
12:10	1101-4 **CONDUCTING POLYMER/CARBON NANOPARTICLE THERMOELECTRIC COMPOSITES** *Xiaojiang Cheng (Qingdao University of Science and Technology, Chinese Academy of Sciences) Xin Wang (Qingdao University of Science and Technology), Guangming Chen (Chinese Academy of Sciences)* Thermoelectric composites based on conducting polymers and carbon nanotubes were prepared, and the mechanism to the enhanced thermoelectric performance was discussed.	1102-4 **WORKPIECE SIZE EFFECTS ON RESIDUAL STRESS IN METAL MATRIX COMPOSITES AFTER FSW** *X.X. Zhang, B.L. Xiao, Z.Y. Ma (Chinese Academy of Sciences)* The macroscopic and microscopic residual stresses in metal matrix composites after friction stir welding were studied via multiscale modeling. We found the sizes of workpiece have significant effects on the residual stresses.	1103-4 **CHARACTERIZATION OF THE INTERFACIAL BONDING AT SOLID/ MELT INTERFACES IN MULTIPHASE CARBON FIBRE REINFORCED THERMOPLASTIC COMPOSITES** *M. Ali Arvand (Queen's University Belfast, Northern Ireland Advanced Composite and Engineering (NIACE)), Brian G. Falzon (Queen's University Belfast, Northern Ireland Advanced Composite and Engineering (NIACE))*	1104-4 **ENHANCEMENT OF FRACTURE RESISTANCE BY MULTIPLE CRACKS IN LAYERED STRUCTURES UNDER MODE I AND MIX MODE LOADING** *Stergios Goutianos, Bent F. Sørensen (University of Denmark)* An alternative approach is presented to increase the fracture resistance of layered structures. Weak layers are introduced next to a damage prone area, resulting in multiple delaminations and thus in increased fracture resistance.	1105-4 **TENSILE MECHANISMS OF INDIVIDUAL JUNCTIONS ASSEMBLED BY TWO CARBON NANOTUBES** *Chao Wang (Harbin Institute of Technology), Yushun Zhao (Harbin Institute of Technology), Xiaodong He (Harbin Institute of Technology), Liyong Tong (The University of Sydney), Quantian Luo (The University of Sydney), Yibin Li (Harbin Institute of Technology), Qiang Song (Northwestern Polytechnical University), Xiaoqing Lv (Harbin Institute of Technology), Yuanyuan Shang (Harbin Institute of Technology), Qingyu Peng (Harbin Institute of Technology), Jianjun Li (Harbin Institute of Technology)*	1106-4 **SOLID SOLUTION FORMATION, PRESSURELESS DENSIFICATION, AND PROPERTIES OF TA0.8HF0.2C-BASED COMPOSITES** *Buhao Zhang, Jie Yin, Xueqian Liu, Zhengren Huang (Chinese Academy of Sciences)* Ta0.8Hf0.2C ceramics, with outstanding properties, were pressurelessly sintered via in-situ solid solution and introduction of SiC secondary-phase. The relationship between solid solution and densification was investigated deeply through microstructure tailoring.	1107-4 **THEORETICAL ANALYSIS ON CFRTP OPTIMAL STRUCTURE SUBJECTED TO BENDING LOAD AND THE INFLUENCE OF OUT-OF-PLANE SHEAR MODULUS** *Ryusuke Shida , Jun Takahashi (The University of Tokyo)* In this study, optimum variable thickness of simple supported beam was theoretically obtained by solving the calculus of variations. Through the parametric study, it was observed that out-of-plane shear modulus influenced the minimum thickness of optimum variable structure.	1108-4 **A MULTISCALE MODEL FOR THE PREDICTION OF FATIGUE CRACK GROWTH BEHAVIORS OF POLYMER NANOCOMPOSITES** *Maenghyo Cho, Hyunseong Shin (Seoul National University)*	1109-4 **HOW IS HUMAN HAIR PRODUCED BY SCALP HAIR FOLLICLES? BIOMECHANICAL AND STRUCTURAL INVESTIGATION OF A NANOCOMPOSITE.** *T. Bornschlogl, L. Bildstein , S. Thibaut, R. Santoprete , F. Fait, G. S. Luengo (L'Oréal Research & Innovation), J. Doucet (Paris-Sud University), B. A. Bernard, N. Baghdadli (L'Oréal Research & Innovation)* In this research three parameters for Fused Filament Fabrication: layer height, pattern geometry and infill density were examined at three variable settings for building test parts. The Taguchi's method and full factor design were used for determining the optimum parameters that affect the output characteristic responses i.e., Young Modulus and Yield stress of ABS and PLA thermoplastic materials.	1110-4 **INTERFACIAL CRACKING BETWEEN AN EPOXY-BASED COMPOSITE COATING AND A RIGID SUBSTRATE UNDER THERMAL LOADING** *Helezi Zhou (Hangzhou University Science and Technology & The University of Sydney), Hong-Yuan Liu (The University of Sydney), Huamin Zhou, Yun Zhang (Hangzhou University Science and Technology), Xusheng Du (Jinan University), Dong Yan, Haitao Wang (Hangzhou University Science and Technology), Yiu-Wing Mai (The University of Sydney)* Finite element analyses were conducted to understand the effects of some parameters on the epoxy-based composite coating/substrate interfacial crack subjected to thermal and hygroscopic stresses.	1111-4 **THE SHOT PEEN FORMING OF FIBER METAL LAMINATES BASED ON THE AL-LI ALLOY** *Huaguan Li (Nanjing Institute of Technology), Wei Zhang (Xi'an Aircraft Industry Company LTD), Wei Jiang (Xi'an Aircraft Industry Company LTD), Yunzhong Guo (Nanjing University of Aeronautics and Astronautics), Xuelong Fu (Nanjing University of Aeronautics and Astronautics), Jie Tao (Nanjing University of Aeronautics and Astronautics)* The feasibility research on shot peen forming of the novel fiber metal laminates based on aluminum-lithium alloy (NFMLs) was investigated to seek a desired forming method.

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11:50	1112-3 **STATISTICAL LONG TERM CREEP FAILURE TIME OF UNIDIRECTIONAL CFRP** *Yasushi Miyano , Masayuki Nakada (Kanazawa Institute of Technology)*	1113-3 **AN INVESTIGATION ON BEARING FATIGUE OF INTERFERENCE-FIT BOLTED COMPOSITE JOINTS** *Wei Jingchao, Chai Yanan, Yang Yu, Chi Jian (Aircraft Strength Research Institute of China)* In this paper the experimental investigations are conducted in order to study the fatigue properties of interference-fit bolted composite joints, with considering the factors of the types of bolts, the sizes of interference fit, different materials of laps, and stacking sequences of main laminates.	1114-3 **ASSESSING DELAMINATION INITIATION FROM FIBER AND MATRIX PROPERTIES** *Zheng-Ming Huang*, Jia-Jie Gui (Tongji University)* This paper predicts the initiation of laminate delamination through analyzing the stresses of the matrix, which is determined by the bridging model.	1115-3 **CRACK PROPAGATION AT A SHARP NOTCH IN PA-GF 30 CHARACTERIZED WITH X-RAY TECHNIQUES** *Volker Trappe, Stefan Hickmann, Andreas Kupsch, Bernd R Muller, Rene Laqua (BAM Bundesanstalt für Materialforschung und –prüfung), Matthias De Monte (Robert Bosch GmbH)* This paper presents investigations on injection moulded specimens with a sharp centre notch made of PA-GF35. The fibre orientation distribution, as well as the micro- and macro-cracking in the material around the sharp crack, were visualized by means of X-ray-absorption and refraction effects.	1116-3 **EVALUATING THE TEMPERATURE AND GLASS FIBRE REINFORCEMENT EFFECTS ON THE DAMPING PROPERTIES OF THE SHAPE MEMORY POLYMERS** *Wessam Al Azzawi (University of Southern Queensland, Dyala University), J.A. Epaarachchi (University of Southern Queensland), Jinsong Leng (Harbin institute of technology)* Dynamic mechanical analysis has shown that shape memory polymers (SMPs) have promising damping characteristics that give them significance in control the structural noise and vibration by just control the SMP temperature. This research aims to investigate the damping properties of the Styrene base SMP and its woven glass fibre composites under different temperatures.	1117-3 **MULTISCALE METACOMPOSITES INCORPORATING CARBON NANOTUBE-FERROMAGNETIC MICROWIRE HYBRID FIBERS** *D. Esalevz, F.X. Qin, H. Wang, H.X.Peng (Zhejiang University)* On this research, we aim to solve the issue of inefficient absorption tunability of microwire metacomposite materials by manipulating the local properties of individual microwires wires incorporating nano-sized structures with multifunctional capabilities such as carbon nanotubes (CNT).	1118-3 **INFLUENCE OF INTERPHASE CHARACTERISTICS ON SHORT FIBER PLASTIC COMPOSITES** *Marc Schöneich, Anna Sambale, Markus Stommel (TU Dortmund University)* The presented work is focused on the influence of the fiber-matrix interphase in short fiber reinforced thermoplastics. Therefore, this contribution aims for a systematic understanding of the interphase in order to obtain the influence of its local properties regarding the impact on the macroscale composite behavior.	1119-3 **MODELLING OF LIGHTNING STRIKE DAMAGE OF CFRP LAMINATES WITH PYROLYSIS GAS EXPLOSION** *Kunkun Fu (The University of Sydney), Lin Ye (The University of Sydney), Li Chang (The University of Sydney), Chunhui Yang (Western Sydney University)* This work aims to develop a systematic finite element model to predict lightning explosion damage in CFRP laminates with protections. The FE model addresses the failure behaviours such as intra-laminar damage and inter-laminar delamination of the CFRP laminates.	1120-3 **A COMPARISON OF THE USE OF 3D DIC AND THERMOGRAPHY IN DETERMINING THE SIZE AND GROWTH OF DELAMINATIONS IN WOVEN GFRP EPOXY LAMINATES** *O. Z. Ajmal (University of Surrey), A. D. Crocombe (University of Surrey), M. R. L. Gower (National Physical Laboratory UK), D. A. Jesson (University of Surrey), S. L. Ogin (University of Surrey)* Delaminations grown in transparent milled-slot GFRP specimens have been monitored using three different NDE techniques: 3D Digitial Image Correlation (DIC), lock-in thermography and pulse thermography. The delamination sizes determined from these techniques have been compared with visual observations of the delamination growth.	1121-3 **EFFECTS OF COMPRESSION-SHEARING LOAD ON STABILITY OF CONFIGURED COMPOSITE PANELS** *JifengXu (Beijing Aeronautical Science & Technology Research Institute), Tianliang Qin (Beijing Aeronautical Science & Technology Research Institute), Lei Peng (Beijing Aeronautical Science & Technology Research Institute), Caoning Su (Beijing Aeronautical Science & Technology Research Institute), Mufeng Duan (Beijing Aeronautical Science & Technology Research Institute), Lingwei Yang (Beijing Aeronautical Science & Technology Research Institute), Yanan Chai (China Aircraft Strength Research Institute)*	
12:10	1112-4 **EVALUATING THE BLAST PERFORMANCE OF SANDWICH STRUCTURES WITH NOVEL CARBON AND GLASS CONSTRUCTION** *Emily Rolfea, Mark Kellya, Hari Arorab , Paul A. Hoopera , John P. Deara (Imperial College London)* Naval vessels undergo a spectrum of loading from static to dynamic due to wave slamming, impact and blast loads. Experiments investigating the performance of composite sandwich panels with hybrid carbon- and glass-fibre skins under static and impact loading are the focus of the research presented in this paper.	1113-4 **THE PROPAGATION PROPERTY OF MICRO-VIBRATION WAVE AT JUNCTION STRUCTURES OF COMPOSITE HONEYCOMB PLATES** *Peilei Xu, Zhengong Zhou, Shidong Pan, Tianzhen Liu (Harbin Institute of Technology)* In this paper the distribution of energy in the connection structure of honeycomb plates was investigated.	1114-4 **MECHANICAL BEHAVIORS OF THREE-DIMENSIONAL HIERARCHICAL LATTICE TRUSS STRUCTURES** *Jian Xiong, Qiangian Wu, Ying Gao, Xingyu Wei (Harbin Institute of Technology)*	1115-4 **LIFE AND RELIABILITY ANALYSIS OF C/ SIC CERAMIC MATRIX COMPOSITE PANELS SUBJECTED TO COMBINED THERMAL-ACOUSTIC LOADINGS** *Yuli Zhang, Yi Sun, Xiaojie Chen, Yizhi Liu, Jingran Ge, Song Zhou (Harbin Institute of Technology)*	1116-4 **LEARNING FROM THE EARWIG WING: A BIOINSPIRED APPROACH TOWARDS FAST MORPHING STRUCTURES USING MULTISTABILITY (INVITED TALK)** *Dr. Jakob Faber (ETH Zürich), Prof. Dr. André R. Studart (ETH Zürich), Prof. Dr. Andres F. Arrieta (Purdue University)* Bistable laminates can change curvature, but bistable folding structures can do about anything. A bioinspired approach.	1117-4 **MANUFACTURING OF MULTIFUNCTIONAL SOFT COMPOSITES WITH INTEGRATED PROXIMITY AND TACTILE SENSING** *Nikolaus Correll (University of Colorado, Robotic Materials Inc)* Manufacturing of smart composites that integrate sensing, computation, and communication via over-molding.	1118-4 **ESTIMATION OF CARBON FIBER/ EPOXY INTERFACIAL NORMAL STRENGTH AND INTERFACIAL SHEAR STRENGTH BY FIBER BUNDLE TESTS** *Guocheng Qi (Beihang University), Yalin Yu (Beihang University), Shanyi Du (Harbin Institute of Technology)* This work concentrates on evaluating the carbon fiber/ epoxy interfacial normal strength and interfacial shear strength by transverse fiber bundle tensile test and 45 degree fiber bundle tensile test, respectively. Both experiment and multiscale modelling based on the generalized methods of cells (GMC) were employed in the research.	1119-4 **STRUCTURAL MECHANIC APPROACH FOR PREDICTION OF ELECTRICAL CONDUCTIVITY OF GLASS FIBRE REINFORCED COMPOSITE WITH CNT-MODIFIED EPOXY MATRIX** *Andrey Aniskevich, Olesia Starkova (University of Latvia)* The electrical conductivity of GFRP cross-ply laminates with CNT-modified epoxy matrix was studied experimentally and modelled. Damage detection in GFRP with electrically conductive matrix was realized measuring the voltage distribution of the samples.	1120-4 **DEVELOPING A CAI TEST FIXTURE FOR CONSISTENT TESTING OF COMPOSITES AT REDUCED TEMPERATURE** *W.O.S. Bailey, T.D. Bostock, D.A. Crump, J.M. Dulieu-Barton, S. Quinn, A.F. Robinson (University of Southampton)* An approach is described that allows the application of digital image correlation (DIC) to CAI tests on thin composite plates with barely visible impact damage (BVID) at room and reduced temperatures. The overall aim is to use DIC to identify strain changes that indicate damage has occurred.	1121-4 **CONCEPTUAL DESIGN OF BRAIDED PREFORMS FOR THE MANUFACTURING OF COMPOSITE LUGS IN AEROSTRUCTURES** *Elena Stinkova (The University of Nottingham), Bintuan Wang (AVIC Xi'an Aircraft Design and Research Institute), Ji Yang (AVIC Xi'an Aircraft Design and Research Institute), Jun Chen (AVIC Xi'an Aircraft Design and Research Institute), Shuguang Li (The University of Nottingham)* This paper re-examines the Tsai-Wu criterion from the perspective of rationality and a rationalised version of it has been obtained as a consequence which irons out the empiricism of it on one hand and defines its applicability on a rational basis on the other hand.	

Monday 21 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
12:30	1101-5 **BORON NITRIDE NANOSHEET (BNNS) FILLED PMMA NANOFIBERS AS FILLER FOR COMPOSITES** *Tuğrul Seyhan* (Anadolu University) The damping and mechanical properties of carbon nanotubes reinforced ultrafine-grained aluminum alloy fabricated by flake powder metallurgy and subsequent cold rolling was studied. The simultaneous increase of damping capacity and mechanical properties by cold rolling is attributed to the increasing dislocation density that can relaxation at ambient temperature and strain hardening effect in ultrafine-grained matrix.	1102-5 **MECHANICAL AND DAMPING PROPERTIES OF COLD-ROLLED CNT/ AL COMPOSITES** *Genlian Fan, Zhiqiang Li, Zhangxi Tan, Qiang Guo, Dingbang Xiong, Yishi Su, Di Zhang* (Shanghai Jiao Tong University) Although the free edge effect has been thoroughly studied for composites idealized as a collection of homogeneous orthotropic layers, there have been no detailed studies of the effects of heterogeneity at the fiber matrix scale on the free edge stresses. A finite element code designed for high performance computing enabled detailed modeling that showed how this microscale heterogeneity affects the predicted stress distributions near the free edge.	1103-5 **THE EFFECT OF HETEROGENEITY AT THE FIBER/ MATRIX SCALE ON PREDICTED FREE EDGE STRESSES FOR A [0/90] S LAMINATED COMPOSITE** *M. Keith Ballard, John D. Whitcomb* (Texas A&M University, Department of Aerospace Engineering) Although the free edge effect has been thoroughly studied for composites idealized as a collection of homogeneous orthotropic layers, there have been no detailed studies of the effects of heterogeneity at the fiber matrix scale on the free edge stresses. A finite element code designed for high performance computing enabled detailed modeling that showed how this microscale heterogeneity affects the predicted stress distributions near the free edge.	1104-5 **PROGRESSIVE DAMAGE ANALYSIS OF COMPOSITE LAMINATES WITH BIG CUTOUTS** *Pengcheng Chu, Jianlin Chen, Zheng Li* (Peking University)	1105-5 **EFFECT OF CARBON NANOTUBE ALIGNMENT AND LENGTH ON THE ELECTRICAL CONDUCTIVITY AND PIEZORESISTIVITY OF CNT/PMMA COMPOSITES** *G. Ventura , J. Cob, A. May-Pat , A.I. Oliva , F. Avilés* (Centro de Investigación Científica de Yucatán A.C., Unidad de Materiales) *A.I. Oliva-Avilés* (Universidad Anáhuac Mayab) The effect of multiwall carbon nanotube (MWCNT) length on the electrical properties of MWCNT/polymer composites is evaluated. MWCNT were systematically shortened by the assistance of ultrasonic agitation and the electrical conductivity was higher for composites with longer MWCNTs.	1106-5 **THE MECHANICAL PROPERTIES OF ZRB2-SIC-GRAPHITE COMPOSITE UNDER THERMO/ MECHANICAL/ OXYGENIC ENVIRONMENT** *Xinxing Han, Weihua Xie, Chenghai Xu, Songhe Meng* (Harbin Institute of Technology) The mechanical properties of ZrB2-SiC-Graphite composite under thermo/ mechanical/oxygenic environment.	1107-5 **MECHANICAL PROPERTIES OF 3D RE-ENTRANT AUXETIC CELLULAR STRUCTURES** *Xin-Tao Wang, Xiao-Wen Li, Li Ma* (Harbin Institute of Technology) Analytical model of 3D re-entrant auxetic cellular structure has been established based on energy method. The effects of the struts overlapping at the joints as well as axial deformation are taken into consideration for the modeling to make it applicable when the struts are relative stubby.	1108-5 **A MULTISCALE MODEL FOR MODAL ANALYSIS OF COMPOSITE STRUCTURES WITH BOLTED JOINTS** *Z. Zhang* (Tongji University)*,*(The Hong Kong Polytechnic University), *Y. Xiao, Y. Z. Shen* (Tongji University), *Z.Q. Su* (The Hong Kong Polytechnic University) In this study, a multiscale finite element(FE) model, involving in surface roughness of contact interfaces, is developed by using thin-layer interfaces to model dynamic responses of a bolted composite joint.	1109-5 **INFLUENCE OF MANUFACTURING PROCESS, DAMAGE REPAIR AND MOISTURE CONTENT ON LOW VELOCITY IMPACT PROPERTIES OF COMINGLED WOVEN FLAX/PP COMPOSITES** *Imed Derbali , Svetlana Tereshina , Lauren Guillaumat* (Ecole Nationale Supérieur d'Arts et Métiers), *Pierre Quagzre* (Ecole Nationale d'Ingénieurs de Tarbes) In this research three parameters for Fused Filament Fabrication: layer height, pattern geometry and infill density were examined at three variable settings for building test parts. The Taguch's method and full factor design were used for determining the optimum parameters that affect the output characteristic responses i.e., Young Modulus and Yield stress of ABS and PLA thermoplastic materials.		
12:50	Lunch										
13:50	PLENARY LECTURE at Qujiang Auditorium: **DESIGN OF COMPOSITE LAMINATES** Stephen Tsai, Stanford University, USA										
14:55	KEYNOTE at Qujiang Auditorium: **Progress in Multi-Scaled Structure and Related Properties of Elastomer Nanocomposites Explored by Molecular Dynamics Simulation and Experimental Approaches** *Liqun Zhang*, Beijing University of Chemical Technology, China KEYNOTE at Lily Hall: **Inspired by Nature-Adaptive Multifunctional Modular Metastructures**,Kon-Well Wang, University of Michigan, USA KEYNOTE at Rose Hall: **Fabrication Processes and Properties of Carbon Nanomaterials Filled Nanocomposites** Soon Hyung Hong, Korea Advanced Institute of Science and Technology, Korea										
15:30	Coffee Break										
15:50	1201 Polymer Matrix Materials 2	1202 Metal Matrix Composites 2	1203 Fiber-reinforced Composites 2	1204 Fracture and Damage 2	1205 Nano-Composites 2	1206 Ceramic Matrix Composites 2	1207 Structural Analysis and Optimization 2	1208 Multiscale Modelling of Structures 2	1209 Bio-Composites 2	1210 Durability, Creep and Aggressive Environment 2	1211 Hybrid Composites 2
15:50	1201-1 **CHARACTERIZATION OF THE DIELECTRIC PROPERTIES OF UNIDIRECTIONAL ARAMID EPOXY COMPOSITES AT VARYING TEMPERATURES BY RECTANGULAR WAVEGUIDE METHOD** *XY. Xu, BM. Zhang, K. Liu, M. Bai, DW. Liu* (Beihang University) Rectangular waveguide method was modified to satisfy the dielectric measurements of fiber reinforced composites at varying temperatures. The dielectric properties of unidirectional aramid/ epoxy composites were characterized and analyzed.	1202-1 **RECONSTRUCTURAL REFINEMENT AND ENHANCEMENT OF MECHANICAL PROPERTIES OF AL (2014) – SIC COMPOSITES BY EQUAL CHANNEL ANGULAR PRESSING** *A. Suresh Babu, R. Jayaprasath* (Anna University), *S. Dhanasekaran* (Combat Vehicles Research & Development Establishment, DRDO), *K. Shanmuga Sundaram* (Anna University) The major aim of this work is to refine the Microstructure of Al (2014) - SiC Metal Matrix Composites fabricated by Stir Casting (primary processing method) with variation in percentage of Nickel coated SiC, through secondary processing method i.e Equal Channel Angular Pressing (ECAP) in order to improve the properties of Stir Cast samples.	1203-1 **A CRITICAL ASSESSMENT ON THE PREDICTABILITY OF 12 MICROMECHANICS MODELS FOR STIFFNESS AND STRENGTH OF UD COMPOSITES** *Zheng-Ming Huang, Chun-Chun Zhang* (School of Aerospace Engineering & Applied Mechanics, Key Laboratory of the Ministry of Education for Advanced Civil Engineering Materials) In this paper we can know that any micromechanics model can not only predict the stiffness of a composites ,but also is applicable to the prediction of a composite strength.	1204-1 **AN EXTENDED COHESIVE DAMAGE MODEL FOR EFFICIENT PREDICTION OF MULTI-DELAMINATION IN SANDWICH COMPOSITES** *X.Li, J.Chen* (University of Portsmouth)	1205-1 **SIMILARITIES AND DIFFERENCES OF EPOXY RESIN NANOCOMPOSITES WITH CNTS AND BNNTS** *Jingwen Guan, Yadienka Martinez-Rubi, Behnam Ashrafi, Michael B. Jakubinek, Keun Su Kim, Kurtis Laqua, Meysam Rahmat, Steven Walker, Dean Ruth, Mark Plunkett, Christopher T. Kingston, Benoit Simard* (National Research Council Canada) Similarity and difference of CNT and BNNT epoxy nanocomposites.	1206-1 **CROSSLINKING DEGREE CONTROLLED STRUCTURAL EVOLUTIONS IN AMORPHOUS SiCN CERAMICS** *Songhe Meng, Jiahong Niu, Hua Jin, Jingjing Li, Yongdong Yu* (Harbin Institute of Technology) This paper is focused on the crosslinking degree controlled structural evolution and then the electrical resistivity variation in polymer-derived amorphous SiCN ceramics.	1207-1 **THICK PLY VERSUS THIN PLY COMPOSITE LAMINATE STIFFENED PANEL BUCKLING AND POST-BUCKLING BEHAVIOR** *Thais B. C. Braz (Federal University of Minas Gerais), Carlos A. Cimini Jr. (Federal University of Minas Gerais), Per Wennhage (Royal Institute of Technology), Dan Zenkert (Royal Institute of Technology), Tonny Nyman (Royal Institute of Technology, SAAB AB)*	1208-1 **EFFECT OF LOADING CONDITIONS ON MECHANICAL BEHAVIOR OF NAFION MEMBRANE** *K. Kawanishi, I. Riku, K. Mimura* (Osaka Prefecture University) Comparison between the periodic loading condition and the LJ flat wall loading condition.	1209-1 **A MULTISCALE STOCHASTIC APPROACH FOR THE STUDY OF THE NONLINEAR TENSILE BEHAVIOUR OF PLAIN FIBRE COMPOSITES** *A. Del Masto, F. Trivaudey, J. Gauchard, Y. Gervet, V.Placet, L. Boubakar* (University Bourgogne Franche-Comte) This work proposes to investigate the mechanisms that underlie the complex mechanical behaviour of plant fibre composites using a numerical approach based on a multiscale stochastic modelling. The unidirectional composite ply is modelled via a representative elementary volume (RVE), which consists of a non-twisted yarn impregnated with epoxy matrix.	1210-1 **ACCELERATED CHARACTERIZATION OF VISCOELASTIC RELAXATION IN BOLTED COMPOSITE JOINTS** *Ying Chu, Qinmin Pan* (Harbin Institute of Technology) In this article, we realized the movement of a "bio-inspired miniature boat" at varieties of interfaces (e.g., gas-liquid interface or liquid-liquid interface) by Marangoni effect.	1211-1 **A RFI PROCESSING OF MULTI-SCALE REINFORCEMENT FOR SURFACE PROTECTION OF CFRP** *Ren Wang, Yugang Duan, Jingjing Zhang, Xueling Yao* (Xi'an Jiaotong University) This paper reports the development of a resin film infusion method achieving a protective surface by the accumulation of functional nanofiller on the composite surface.

Time	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	ROOM 22 (209+210)
12:30	1112-5 **PREDICTION OF STRAIN RATE SENSITIVITY OF POLYMERS BY INTEGRAL TRANSFORM OF DMA DATA** *Steven Eric Zeltmann, Chrys Koomson , Nikhil Gupta* (New York University) The paper presents a method to calculate elastic properties of polymers at various strain rates from dynamic mechanical analysis data. The method is validated with results from various thermoplastics, thermosets and particulate composites.		1114-5 **DISTRIBUTED STRIAN MEASUREMENT USING FIBER OPTICS IN HIGH PERFORMANCE COMPOSITE HYDROFOILS** *Phyo Thu Maung, B. Gangadhara Prusty, Sascha Ringer* (UNSW), *Giru Raijan, Enbang Li* (Engineering University of Wollongong), *Andrew W. Phillips , Nigel St John* (Defence Science and Technology Group)	1115-5 **AN INVESTIGATION ON FATIGUE DELAMINATION GROWTH IN MULTIDIRECTIONAL COMPOSITE LAMINATES** *Liaqun Yao, Yi Sun, Licheng Guo* (Harbin Institute of Technology) Mode I fatigue delamination with fibre bridging in multidirectional composite laminates was experimentally investigated. And a modified Paris relation was developed to determine fatigue delamiantion behavior.	1116-5 **DESIGNING PATTERN-TRANSFORMING METAMATERIALS FOR SOFT ACTUATORS** *Yuzhen Chen* (University of California, Los Angeles), *Dian Yang* (Harvard University), *George M. Whitesides* (Harvard University), *Zhigang Suo* (Harvard University), *Lihua Jin* (University of California, Los Angeles) We design a mechanical metamaterial that can buckle and undergo a pattern transformation under a critical external pressure. By exploring the design space, we show that this mechanical metamaterial can be actuated at different critical pressures and achieve different transformation strains, which provides a new strategy for designing soft actuators.	1117-5 **LARGE-SCALE SYNTHESIS AND CONNECTIONS ADJUSTMENT OF THE CARBON NANOTUBE FOAMS** *Han Wang* (Beihang University), *Min Li* (Beihang University), *Weibang Lu* (Suzhou Institute of Nano-Tech and Nano-Bionics), *Yizhou Gu* (Beihang University), *Shaokai Wang* (Beihang University), *Qingwen Li* (Suzhou Institute of Nano-Tech and Nano-Bionics), *Zuoguang Zhang* (Beihang University) In this paper, the floating catalyst chemical vapour deposition method directly growing with AC welding is used to produce large quantity high stable CNT foams that are close to meter scale. This pure-welded CNT foam shows remarkable elastic recoverability on both tensile and compressive strains, and could keep their electrical resistances almost unchanged during stretching, compressing and bending.	1118-5 **AMINO FUNCTIONALISATION OF CARBON NANOTUBE WEBS FOR ACHIEVING HIGH STRUCTURAL PERFORMANCE OF MULTIFUNCTIONAL NANO-ENHANCED HIERARCHICAL COMPOSITES** *Andrew Nasset* (Queen's University Belfast), *Brian G. Falzon* (Queen's University Belfast), *Stephen C. Hawkins* (Queen's University Belfast, Monash University) Carbon nanotube web assemblies were amino functionalised in a gas-phase reaction in order to promote bonding with epoxy matrices without disturbing their overall structure. Mode I interlaminar fracture toughness tests were conducted to assess performance.	1119-5 **MICROSTRUCTURAL ORIGIN OF CYCLICAL STRAIN-DEPENDENT RESISTANCE IN CARBON NANOTUBE CONDUCTORS** *Lihua Jin* (University of California, Los Angeles), *Alex Chortos* (Stanford University), *Feifei Lian* (Stanford University), *Eric Pop* (Stanford University), *Christian Linder* (Stanford University), *Zhenan Bao* (Stanford University), *Wei Cai* (Stanford University) When stretchable carbon nanotube thin film conductors go through a stretching and unloading cycle, the resistance-strain curve is hysteretic. Through numerical simulations, analytical models, and experiments, we identify the microstructural origin of the resistance-strain hysteresis.	1120-5 **DETERMINATION OF THE SHEAR MODULUS OF WOOD BY USING PROPORTION OF LATEWOOD** *Tzu-Yu Kuo, Wei-Chung Wang* (National Tsing Hua University)	1121-5 **LOAD BEARING BEHAVIOR OF JOINTS STRUCTURE OF CARBON FIBER/ EPOXY COMPOSITE BEAM UNDER FOUR-POINT BENDING** *Fa Zhang, Xing Li, Shaohua Ji, Tiexing Liu* (Beijing Aeronautical Science & Technology Research Institute of COMAC) This paper investigates the load behavior and failure characteristics of composite beam with joint structure under four-point bending load using experimental and numerical methods. From the FE results, the load distribution of multi-bolt mechanical joints and load transfer path in the butt-joint area are discussed deeply.	
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15:30	Coffee Break										
15:50	1212 Office Naval Research (ONR) Session 2	1213 Joints 2	1214 Composite Structures 2	1215 Fatigue 2	1216 Stimuli Responsiveness and Shape Reconfiguration 2	1217 Design and Manufacture for Multifunctionality 2	1218 Interfaces and Interphases 2	1219 Recycling of Composites and Sustainability 1	1220 Digital Image 2	1221 Aerospace 2	
15:50	1212-1 **CRUSHING BEHAVIOR AND ENERGY ABSORPTION OF PVC FOAM: AN ANISOTROPIC VISCO-ELASTIC-PLASTIC-DAMAGE MODEL** *Michelle S. Hoo Fatt, Anish J. Jacob, Xiaolong Tong, Arturo Machado-Reyes* (The University of Akron) Experiments to determine the tri-axial hysteresis behavior of Divinycell PVC H100 foam are described. Results are used to develop a viscoelastic-viscoplastic-damage constitutive model that can be used to predict the crushing behavior and energy absorption of the foam core of a composite sandwich panel.	1213-1 **FAILURE ANALYSIS OF ULTRA-THIN CHOPPED CARBON FIBER TAPE REINFORCED THERMOPLASTIC IN DOUBLE-SHEAR TESTS** *L. Meng, I. Obsawa, J. Takahashi* (The University of Tokyo) In this research, a parametric study considering the effects of geometric ratios, joining method and torque were conducted to identify the failure characteristics of mechanically fastened UT-CTT.	1214-1 **A NUMERICAL STUDY ON A COMPOSITE SANDWICH PANEL UNDER OBLIQUE IMPACT** *Yuan Chen* (Hunan University)(University of Sydney),*Xu Han, Shuqian Hou* (Hunan University),*Kunkun Fu,Lin Ye* (University of Sydney) A novel concept for jointing composites to metals in lightweight, hybrid structures is presented. The concept employs interlocking morphology, formed on the surfaces of male and female adherends which are coupled with a layer of adhesive. Herein, the concept it explored through finite element analysis, incorporating damage in the composite material and the adhesive.	1215-1 **FATIGUE BEHAVIOR OF MULTIFUNCTIONAL CFRP LAMINATES AND INTRINSIC CAPABILITIES FOR DAMAGE MONITORING** *Racke, Sebastian (University of Kaiserslautern); Hannemann, Benedikt (Institute for Composite Materials (IVW GmbH)); Ballo, Frank (University of Kaiserslautern); Schmeer, Sebastian (IVW GmbH); Breuer, Ulf Paul (IVW GmbH)* The talk focuses on the fatigue behavior of a new hybrid composite reinforced with metal- and carbon fibres in comparison to a conventional CFRP laminate.	1216-1 **LIGHT-ACTUATED REVERSIBLE SHAPE MEMORY EFFECT OF A POLYMER COMPOSITE** *Wenbing Li, Yanju Liu, Jinsong Leng* (Harbin Institute of Technology) Shape memory polymer (SMP) can be stimulated by light. This SMP was synthesized and the light-actuated performances are evaluated.	1217-1 **BISTABLE COMPOSITE LAMINATES FOR DIRECT AND ACTUATED DEFORMATION** *Oliver J. Myers1 (Clemson University; 244 Fluor Daniel Building, Clemson, SC 29631), Georges Fadel (Clemson University; 202 Fluor Daniel Building, Clemson, SC 29631)* This presentation looks at forced and piezoelectrically actuated bi-stable composite laminates.	1218-1 **EFFECT OF SIZING AGENT ON THE INTERFACIAL ADHESION OF CARBON FIBER-REINFORCED POLYAMIDE 6 COMPOSITES** *Tao Zhang, Yueqing Zhao, Hongfu Li, Boming Zhang* (Beihang University) Polyurethane sizing agents prepared in this paper remarkably improved the interfacial adhesion between sized carbon fiber and matrix polyamide 6.	1219-1 **DEGRADATION EFFECTS OF A CLOSED-LOOP RECYCLING PROCESS FOR ENGINEERING THERMOPLASTICS** *Rhys J. Tapper (University of Bristol), Tapper, Marco L, Longana, Hana Yu, Ian Hamerton, Kevin D. Potter*	1220-1 **COMPOSITE MATERIAL PROPERTIES CHARACTERIZATION USING DIGITAL IMAGE CORRELATION AND FINITE ELEMENT MODEL UPDATING: UNCERTAINTY ANALYSIS** *He Tiffen (Beijing Institute of Technology), Liu Liu (Beijing Institute of Technology), Makeev Andrew (University of Texas at Arlington)* Polyurethane sizing agents prepared in this paper remarkably improved the interfacial adhesion between sized carbon fiber and matrix polyamide 6.	1221-1 **EXPERIMENTAL AND NUMERICAL INVESTIGATION ON SHEARING STABILITY OF CURVED STIFFENED COMPOSITE PANELS** *Tianliang Qin , Lei Peng* (Beijing Aeronautical Science & Technology Research Institute), *Bo Ma* (Beijing Aeronautical Science & Technology Research Institute), *Zizi Lu* (Beijing Aeronautical Science & Technology Research Institute), *Chaobo Xin* (Beijing Aeronautical Science & Technology Research Institute), *Yanan Chai* (China Aircraft Strength Research Institute), *Jifeng Xu* (Beijing Aeronautical Science & Technology Research Institute)	**Workshop: International Benchmark Exercises on Textile Permeability and Compressibility Characterization**

Monday 21 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
16:10	1201-2 **CORRELATION OF THE CURE DEGREE OF AN EPOXY RESIN WITH THE DIELECTRIC PROPERTIES** *M.Sc. Anke Eggers, M.Sc. Dilmurat Abliz, Prof. Dr.-Ing. Gerhard Ziegmann, Prof. Dr.-Ing. Dieter Meiners (Clausthal University of Technology)* The complicated multiscaled a nd multilayered microstructure s of the SCISC composite fu el cladding tube for PWR wer e investigated.	1202-2 **PREPARATION AND PROPERTY OF NANO-SiCP/ A356 COMPOSITES SYNTHESIZED WITH A NEW PROCESS** *Dr.Yuan, Kun Hu, Shulin Lv, Qi Gao, Shusen Wu (Huazhong University of Science and Technology)*	1203-2 **STUDY ON COLD-THERMAL AGING OF CARBON FIBER COMPOSITES FOR WIND TURBINE BLADES** *Kang Shaofu (Ningxia University)* A significant weakening often appears at the interface of fiber-reinforced polymer composites during the hygrothermal ageing. It effects the moisture uptake kinetics and also the reduction of mechanical properties. The study leads to the conclusion that the higher temperature during hygrothermal ageing not only increases the moisture uptake rate but it may also modify the local stress threshold required for delamination nucleation. The less value of ILSS for the almost same level of absorbed moisture at higher temperature could be attributed to the pronounced degradative effect of temeprature. the interfacial adhesion in the carbon/ epoxy is more effected by hygrothermal ageing at higher conditioning temperature and for more exposure time.	1204-2 **THE EFFECT OF RANDOMNESS AT THE MICRO-SCALE ON FAILURE OF COMPOSITES** *Soraia Pimenta, Joël Henry, James Finley (Imperial College London)* We investigate how failure of hybrid aligned discontinuous composites is affected by the presence of weak regions in the microstructure. Using a virtual testing framework, we show that, by reducing the stochastic variability of the microstructure and of micromechanical properties, it is possible to increase the strength of composites by over 20%.	1205-2 **POROUS PDMS/ CNFS COMPOSITES FOR STRETCHABLE STRAIN SENSORS** *Shuying Wu (University of New South Wales), Anil R. Ravindran (RMIT University), Raj B. Ladani (RMIT University), Adrian P. Mouritz (RMIT University), Chun H. Wang (University of New South Wales)*	1206-2 **MULTISCALED AND MULTILAYERED STRUCTURES OF THE SiC/ SiC COMPOSITE NUCLEAR FUEL CLADDING TUBES** *Chen Bo, Liu Chuanxin, Li Xiaogang, Cheng Laifei, Zhang Litong (Northwestern Polytechnical University)* The complicated multiscaled a nd multilayered microstructure s of the SiC/SiC composite fu el cladding tube for PWR wer e investigated.	1207-2 **TOPOLOGY OPTIMIZATION OF A ZERO POISSON'S RATIO HONEYCOMB STRUCTURE FOR LIGHTER WEIGHT** *Jian Huang, Ouhua Zhang, Jinsong Leng (Harbin Institute of Technology)* In this work, we present the multi-stiffness topology optimization of the zero Poisson's ratio cellular structures to minimize the weight with stiffness constraints for morphing skin applications using the popular solid isotropic microstructure with penalty (SIMP) method.	1208-2 **PREDICTING THE EFFECT OF TEMPERATURE ON MATRIX CRACKING IN THERMOSET COMPOSITES USING A STRAIN INVARIANT APPROACH** *Akhila Mukkavilli, Garth Pearce, Naveem T. Chowdhury, Alan Crosky (UNSW Sydney)*	1209-2 **NANOCELLULOSE REINFORCED BIO-POLYURETHANE FOAMS AS CORE IN SANDWICH COMPOSITE PANELS (INVITED TALK)** *Nikolina Frisk, Mohini Sain, Kristina Oksman (Lulea University of Technology, Faculty of Forestry University of Toronto)* The addition of small amount of cellulose nanofibers to biobased polyurethane based foams is leading to a foam which have similar properties as commercial rigid PU foams but with lower density and improved properties for the final sandwich laminate.	1210-2 **ENVIRONMENTAL EFFECTS ON THE BENDING CREEP OF ANGLE-PLY LAMINATED COMPOSITES** *Maozhou Meng (University of Derby), Liurong Le (University of Derby), Steve Grove (Plymouth University)* This paper investigates the bending creep of carbon fibre reinforced epoxy composites with or without exposure to moisture ingress.	1211-2 **INFLUENCE OF PROCESSING TEMPERATURES ON THE DEFLECTION OF HYBRID-METAL-CARBON COMPOSITES MADE BY RESIN TRANSFER MOULDING** *Patrick Hergian, Julia Reiter, Steffen Sketzer, Ewald Fauster, Ralf Schledjewski (Montanuniversität Leoben)* This work shows the impact of the resin heating temperature and the mould temperature on the deformation of hybrid metal carbon plates made by resin transfer moulding.
16:30	1201-3 **DEVELOPMENT OF A NOVEL POLYMER METAL COMPOSITE FOR BRAZING APPLICATIONS** *Tamara Florian (Clausthal University of Technology), Gerhard Ziegmann (Clausthal Centre of Material Technology)* In this research the development and production of composite preforms, made of polymeric matrix and aluminum based braze powders is presented, accompanied material modeling and process simulation.	1202-3 **MICROSTRUCTURE AND MECHANICAL PROPERTIES OF TiB+TiC REINFORCED TITANIUM BY ECAP** *Yuanfei Han, Juan Xiang, Juviao Li, Jianwei Mao, Liqiang Wang, Weijie Lu (Shanghai Jiao Tong University)* ECAP of TiB fibers and TiC particles reinforced titanium matrix composite was successfully carried out up to 4 ECAP passes.	1203-3 **MICROMECHANICAL STRENGTH PREDICTION OF NOTCHED LAMINATES** *Jiang-Bo Yang, Zheng-Ming Huang (Tongji University)*	1204-3 **DELAMINATION ARREST FEATURES IN AIRCRAFT COMPOSITE STRUCTURES UNDER STATIC AND FATIGUE LOADING** *Luke I. Richard, Kuen Y. Lin (University of Washington)* Fasteners utilized in composites have the ability to be employed as crack arrest features in addition to load transfer. Under static and fatigue loading, these features have been found to provide good delamination arrest capability.	1205-3 **GROWTH MODEL OF A CARBON BASED 3D STRUCTURE (AEROGRAPHITE) AND ELECTRICAL/ MECHANICAL PROPERTIES OF COMPOSITES** *T. Marx, S. Garlof, J. Timmermann (Hamburg University of Technology), D. Smazna, R. Adelung (University of Kiel), K. Schulte, B. Fiedler (Hamburg University of Technology)* Aerographite is a 3D interconnected carbon structure that can be used to improve electrical and mechanical properties of polymer nanocomposites (PNCs). For this purpose it is important to understand the growth mechanism, which is analyzed with interrupted synthesis and a CFD simulation.	1206-3 **SYNTHESIS AND CHARACTERIZATION OF ULTRALONG SI3N4 NANOBELTS WITH UNIQUE OPTICAL AND FLEXIBLE NANOMECHANICAL PROPERTIES** *Shun Dong, Ping Hu, Xinghong Zhang (Harbin Institute of Technology)* Several millimeters long Si3N4 nanobelts with flexible nanomechanical and unique photoluminescence properties were successfully synthesized via an effective method with the raw materials of graphite, nanosilicon and nanosilica, which were controlled by an alumina-assisted vapor-liquid-solid growth mechanism.	1207-3 **IMPROVING COMPOSITE LAMINATES THROUGH BIOMIMICRY** *J.L. Liu, B.C. Tan (National University of Singapore)* This paper shows the observations of damage pattern of composite plate with helicoidal configuration which lead to the explanations of its high load bearing capacity.	1208-3 **A NOVEL MULTISCALE METHOD FOR MECHANICAL PROPERTIES OF STATISTICALLY INHOMOGENEOUS MATERIALS** *Zhigang Yang (Harbin Institute of Technology), Junzhi Cui (Chinese Academy of Sciences, Beijing), Yi Sun (Harbin Institute of Technology)* The work is aimed to find a novel multiscale method to predict mechanical performance of statistically inhomogeneous core-shell materials. As for these kinds of materials, the sophisticated microscopic information of inclusions, including their shape, size, orientation, spatial distribution, volume fraction and so on, leads to changes of the macroscopicmechanical properties.	1209-3 **DESIGN AND DEVELOPMENT OF 100% BIO-BASED HIGH-GRADE HEMP/ EPOXY COMPOSITES** *Camille François , Vincent Placet , Sylvie Pouchet (University of Burgundy-Franche-Comté), Pierre Quagne (Laboratoire Génie de Production (LGP)), Joseph Samec (Stockholm University), Sari Rautiainen (Stockholm University), Yves Gaillard , Gilles Boni , Stéphane Fontaine (University of Burgundy-Franche-Comté), Lucie Fournier (Institut de Recherche de Chimie Paris (IRCP)), Carine Robert (Institut de Recherche de Chimie Paris (IRCP)), Christophe M. Thomas (Institut de Recherche de Chimie Paris (IRCP))* This study focuses on the development of 100% bio-based high-grade composites. Bio-based epoxy thermosets and hemp slivers are processed and characterized by different technologies.	1210-3 **BENDING CREEP BEHAVIOR OF A CARBON FIBER/ EPOXY COMPOSITE TUBE** *Zengqin Yang(School of Aerospace, Xi'an Jiaotong University, Xi'an 710049, China), Hui Wang (State Key Laboratory of Metal Matrix Composites, Shanghai Jiao Tong University, Shanghai 200040, P.R.China), Yi Ma, Zhenwei Shao, Fujin Shang, and Demen Hou (School of Aerospace, Xi'an Jiaotong University, Xi'an 710049, China)*	1211-3 **EFFECTS OF ELECTROPHORETICALLY DEPOSITED GRAPHENE OXIDE ON THE SURFACE OF TA2 ON THE BONDING STRENGTH OF TIPEEK** *Yunfei Lv, Lei Pan, Zengmin Zheng, Aamir Ali, Nipon Roy (Nanjing University of Aeronautics and Astronautics)* The GO was deposited on the surface of Ti sheet to reinforce the joint adhesive strength of Ti/ PEEK.The deposition was realized by the anodic electrophoretic deposition method in the aqueous dispersions of GO.

Time	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	ROOM 22 (209+210)
16:10	1212-2 **Effect of Seawater Absorption on the Explosive Blast Resistance of Carbon Fibre Laminates** *A.Gargano, K. Pingkarawat(RMIT University), V.Pickerd(Defence Science & Technology Group), M.Ibrahim(RMIT University&(Defence Science & Technology Group), A.P. Mouritz(RMIT University)*	1213-2 **THE INFLUENCE OF A5083 SURFACE TREATMENTS ON THE BONDING PERFORMANCE of A5083 /epoxy** *Aidi Zhang, Lei Pan (Nanjing University of Aeronautics and Astronautics)* Anodic oxidation, sandblasting and silanization treatment for the surface of AA5083 aluminum alloy can improve the interface bonding strength of cryogenic adhesives and AA5083 aluminum alloy sheet.	1214-2 **INITIAL POST-BUCKLING BEHAVIOURS OF COMPOSITE SHALLOW SHELLS AND PLATES** *Jiayi Yan, Shuguang Li (University of Nottingham), Guofan Zhang, Shifui Duan (AVIC Aircraft Strength Research Institute)*	1215-2 **DETERMINATION OF THE FATIGUE LIMIT FOR CARBON/ EPOXY COMPOSITES WITH A CENTRE HOLE THROUGH SELF HEATING METHODOLOGY** *Deepika Sudevan (Indian Institute of Technology Madras (Ecole Centrale de Nantes), Laurent Gornet (Ecole Centrale de Nantes), Patrick Rozycki (Ecole Centrale de Nantes)* The article reports the limit of high cycle fatigue for woven carbon fiber epoxy composite specimens with a hole of 6 mm diameter at its centre using the relatively new self-heating methodology.The robustness of an innovative "peak-temperature point" approach under the self-heating methodology is also presented.	1216-2 **4D ADDITIVE MANUFACTURING OF STRUCTURAL COMPOSITES WITH PROGRAMD STIMULI-RESPONSE** *R.S. Trask, A.B. Baker , T.M. Llewellyn-Jones (University of Bath)* This paper describes our four-dimensional (4D) printing of composite architectures. We have created a unique manufacturing method where 3D printing, ultrasonic alignment and active multifunctional materials construct printed architectures that can be switched between multiple configurations via an environmental stimulus. This study will specifically examine the role of optimisation of the fibres, resin and resultant composite to create programmable, predictable and repeatable self-shaping components.	1217-2 **CARBON FIBER PREPREG COMPOSITE LAMINATES CURED VIA CONDUCTIVE CURING USING NANOENGINEERED NANOCOMPOSITE HEATERS** *Jeonyoon Lee (Massachusetts Institute of Technology), Frederick Daso, (Massachusetts Institute of Technology), Seth S. Kessler (Metis Design Corporation), Brian L. Wardle (Massachusetts Institute of Technology)* The newly-developed out-of-oven manufacturing technique comprised of carbon nanotube network enables highly efficient curing of prepreg with in situ cure status monitoring ability.	1218-2 **INVESTIGATING THE USE OF CHITOSAN AS COUPLING AGENT TO IMPROVE THE INTERFACIAL PROPERTIES OF PHOSPHATE GLASS FIBRE/ POLYCAPROLACTONE COMPOSITES** *Chao Tan , Ifty Ahmed Andrew J. Parsons (The University of Nottingham), Chenkai Zhu (The University of Nottingham Ningbo China), Junxiao Zhang (The University of Nottingham Ningbo China), Chris D. Rudd (The University of Nottingham Ningbo China. The University of Nottingham), Xiaoling Liu (The University of Nottingham Ningbo China)* This paper reported the use of chitosan as a coupling agent to improve the interfacial properties of phosphate glass fibres/polycaprolactone composites. The investigation was performed mainly via fragmentation test and XPS.	1219-2 **THE HIGH PERFORMANCE DISCONTINUOUS FIBRE (HIPERDIF) METHOD FOR THE REMANUFACTURING OF MIXED LENGTH RECLAIMED CARBON FIBRES** *Marco L. Longana, HaNa Yu, Kevin D. Potter (University of Bristol)* The ability of the High Performance Discontinuous Fibre (HiPerDiF) Method to simultaneously process reclaimed carbon fibres with different length and to remanufacture them into high performance recycled composite materials is demonstrated.	1220-2 **MULTIPLE VOXEL FOR COMPUTING THE COMPOSITE BEHAVIOR WITH SPECTRAL METHOD** *Bing Wang , Guo-dong Fang(Harbin Institute of Technology) , Jun Liang(Harbin Institute of Technology , Beijing Institute of Technology)* Composites with complex structure can be discretized into a set of regular grids. Spectral method based on Fast Founier Transforms by directly using real microstructure images can avoid meshing geometry and assembling stiffness matrix.	1221-2 **ENERGY-ABSORBING CHARACTERISTICS ANALYSIS OF COMPOSITE THIN-WALLED SQUARE TUBES USING MULTI-LAYERED SHELL MODELLING TECHNIQUE** *Jiang Xie, Xuehan Zhang, Congyao Ma, Haolei Mou, Zhenyu Feng (Civil Aviation University of China)* The energy-absorbing characteristics of carbon/ epoxy square tubes, subjected to quasi-static axial compression, were experimentally investigated. Single layer shell modelling technique and multi-layer shell modelling technique were developed in order to simulate experimental crush test on the square tube.	**Workshop: International Benchmark Exercises on Textile Permeability and Compressibility Characterization**
16:30	1212-3 **IMPROVING THE BLAST DAMAGE RESISTANCE OF COMPOSITES USING THREE-DIMENSION WOVEN TEXTILES** *A. Gargano (RMIT University) & RWTH Aachen University), K. Pingkarawat, A.P. Mouritz (RMIT University)* High explosive blast damage resistance is demonstrated using three-dimensional woven textile composites. The effect of increasing the volume content of woven z-binder yarns on the damage to textile composites caused by explosive blasts is investigated.	1213-3 **A NONLINEAR ELASTIC-PLASTIC CONSTITUTIVE MODEL FOR THE COMPOSITE LAMINATES WITH COUNTERSUNK BOLT JOINTS** *HUANG Heyuan,ZHAO Meiying,ZHOU Yinhua,HOU Chi(Northwestern Polytechnical University)*	1214-3 **FATIGUE PROPERTIES OF DOUBLE LAP-TYPE SINGLE-BOLT COMPOSITES** *X.Y. LV, Y. YU and X. J. ZHANG(Shanghai Jiao Tong University)*	1215-3 **DEVELOPMENT OF A CYCLIC TESTING METHOD FOR ULTRA-FAST ROTATING FLYWHEELS MADE OF CFRP AND IMPROVEMENT OF THEIR FATIGUE STRENGTH BY MATRIX MODIFICATIONS** *J. Krummenacker, J. Häusmann, L. Sirooshynska, A. Klingler, B. Wetzel (Institute for Composite Materials (IVW GmbH))* A cyclic test method is presented that can be used to estimate the lifetime performance of CFRP-tubes manufactured by winding technology. The test method is designed to assess the effectivity of various matrix modifications that aim for an augmented lifetime.	1216-3 **RESEARCH ON THERMOMECHANICAL PROPERTY OF WOVEN FABRIC REINFORCED SHAPE MEMORY POLYMER COMPOSITES** *Jianping Gu (Nanjing Institute of Technology, Nanjing University of Aeronautics and Astronautics), Huiyu Sun (Nanjing University of Aeronautics and Astronautics), Shaoxiang Wang (Nanjing University of Aeronautics and Astronautics)* The thermomechanical properties of Woven fabric reinforced shape memory polymer composites (WFRSMPCs) is studied by employing the multi-scale theory to establish the mesoscopic model for fiber bundles and developing a mesoscopic model for the WFRSMPCs.	1217-3 **MULTIFUNCTIONAL PATTERN RECONFIGURABLE WRIST ANTENNA STRUCTURES BASED ON BISTABLE COMPOSITE CYLINDRICAL SHELLS FOR ON-BODY APPLICATIONS** *Jiangiang Hu, Yang Li, Fuhong Dai (Harbin Institute of Technology)* A novel multifunctional wrist antenna structure with radiation pattern reconfigurability based on bistable composite shell is proposed for on-body communications. The radiation pattern of the antenna structure shows omnidirectionality in stowed state and has excellent directivity and anti-interference ability in extended state. The antenna structure can be acted as a Fitbit Flex of human wrist when it is in stowed state.	1218-2 **TAILORING THE INTERPHASE IN A HIERARCHICAL COMPOSITE BASED ON CARBON NANOTUBE FIBERS** *XiaoMeng Sui (Weizmann Institute of Science), Lin Yang (The University of Sydney), XiaoHua Zhang (Suzhou Institute of Nano-Tech and Nano-Bionics), QingWen Li (Suzhou Institute of Nano-Tech and Nano-Bionics), H. Daniel Wagner (Weizmann Institute of Science)* As an arising reinforcing material, carbon nanotube fibers (CNTFs) has drawn much attention due to the mechanical and electrical properties, and their flexibility. The mechanical behaviour of composites based on CNTFs with various architecture was studied. .	1219-2 **OPTIMISATION OF RECYCLING OF CARBON FIBRE COMPOSITES WITH A SUPERCRITICAL ACETONE/WATER SOLVENT** *Matthew J. Keith, Andrew A. Ingram (University of Birmingham), Gary A. Leeke (Cranfield University)*	1220-3 **SNAP-THROUGH MOTION ESTIMATION OF A BUCKLED BISTABLE BEAM** *Reynolds Addo-Akoto, Jong-Min Yun, Jae-Hung Han (KAIST)* An algorithm to predict the snap-through behaviour of a buckled bistable composite beam is proposed. The validation of the results are conducted using a high-speed camera technique. To study the crushing energy-absorbing characteristics and failure mode, the multi-layer finite element model of composite thin-walled C-channel specimen was established based on the quasi-static axial compression experiments results. The simulation results show that the delamination failure, local buckling and beam bending failure of C-channel specimen can be simulated with the multi-shells finite element model.	1221-3 **THE CRASHWORTHINESS SIMULATION AND FAILURE MODE ANALYSIS OF COMPOSITE THIN-WALLED C-CHANNEL SPECIMEN SUBJECT TO AXIAL COMPRESSION LOAD** *Congyao Ma, Haolei Mou, Xuehan Zhang, Jiang Xie, Zhenyu Feng (Civil Aviation University of China)* To study the crushing energy-absorbing characteristics and failure mode, the multi-layer finite element model of composite thin-walled C-channel specimen was established based on the quasi-static axial compression experiments results. The simulation results show that the delamination failure, local buckling and beam bending failure of C-channel specimen can be simulated with the multi-shells finite element model.	**Workshop: International Benchmark Exercises on Textile Permeability and Compressibility Characterization**

Monday 21 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
16:50	1201-4 **A STUDY OF CROSS-LINKING KINETICS OF CYANATE ESTER RESIN** *L. Zerni (Institut Clément Ader), G.Dusserre (Institut Clément Ader), G. Bernhart (Institut Clément Ader, IRT Saint Exupéry), B.Bonflace (NIMITECH Innovation)* Cyanates esters (CEs) are high performance thermoset resins. To better understand the thermo-kinetics behavior of a CE resin, cure kinetics characterization studied by DSC scans was performed.	1202-4 **EFFECT OF INTERFACIAL CARBIDE ON THE PROPERTIES OF AL/DIAMOND COMPOSITE** *Zilan Che (University of Science and Technology Beijing, The University of Texas at Dallas), Jianwei Li (University of Science and Technology Beijing), Yang Zhang (University of Science and Technology Beijing), Xitao Wang (University of Science and Technology Beijing), Jingua Wang (The University of Texas at Dallas), Moon J. Kim (The University of Texas at Dallas)*	1203-4 **PREPARATION AND PROPERTIES OF CHOPPED CARBON FIBER REINFORCED PEEK COMPOSITES** *Chen Shu-hua, Cui Hong, Wang Xi-zhan, Han Jian-ping (Xi'an Aerospace Composites Research Institute)* The methods of electromagnetic effect mixing technology and compression molding were used to prepare chopped CF/PEEK composites, some physical properties and compressive strength were studied in the paper. The results can be used in the engineer designing of CF/PEEK composites structures.	1204-4 **FAILURE ANALYSIS OF CENTER NOTCHED CFRP LAMINATES UNDER MULTI-AXIAL LOADING** *Guangyan Liu, Hongchen Bao (Beijing Institute of Technology)* In this paper, failure mechanisms of center notched quasi-isotropic composite laminates under multi-axial loading were studied numerically.	1205-4 **MULTISCALE MODELING OF CARBON FIBER/CARBON NANOTUBE/ EPOXY HYBRID COMPOSITES** *Matthew S. Radue, Gregory M. Odegard (Michigan Technological University)* This study addresses the multiscale modeling of hybrid composites composed of carbon fibers, carbon nanotubes, and three different epoxy systems (di-, tri-, and tetra-functional epoxies). Molecular Dynamics and Micromechanics methods are used.	1206-4 **PREPARATION AND PROPERTIES OF ZrB2-SiC COMPOSITES BY CENTRIFUGAL GEL CASTING PROCESS** *Dongyang Zhang, Ping Hu, Xinghong Zhang (Harbin Institute of Technology)* High-permance ZrB2-SiC ceramics was fabricated successfully via a novel colloidal method called centrifigal gel casting.	1207-4 **EFFECT OF DESIGN HEURISTICS ON THE COMPRESSION AND SHEAR BUCKLING PERFORMANCE OF INFINITELY LONG PLATES WITH BENDING-TWISTING COUPLING** *Christopher Bronn York (University of Glasgow), Sérgio Frascino Müller de Almeida (University of São Paulo)* The reduced laminate design space, resulting from the application of the 10% rule (representing the minimum proportion of plies in each of the 4 standard orientations), is shown to match the common design constraint of limiting the number of contiguous plies (or adjacent plies with the same orientation) to a maximum of 3.	1208-4 **MULTISCALE MODELING OF IMPACT BEHAVIOR FOR POLYMER COMPOSITES** *Harpreet Singh, Mohit Gupta, Puneet Mahajan (Indian Institute of Technology Delhi)*	1209-4 **GRAFTING POLYETHYLENE GLYCOL ON NANOCELLULOSE TOWARD BIODEGRADABLE POLYMER NANOCOMPOSITES** *Shiyu Geng, Maria Hanlia (Luleå University of Technology, SE-971 87, Luleå, Sweden), Kun Yao, Q. Zhou (Royal Institute of Technology, School of Biotechnology, SE-100 44 Stockholm, Sweden), Kristina Oksman (Fibre and Particle Engineering, University of Oulu, FI-90014, Oulu, Finland)* In this paper, we investigated the effects of grafting polyethylene glycol on nanocellulose on microstructure, mechanical properties and thermal behaviors of the polylactic acid/nanocellulose composites.		1211-4 **THE STUDY ON THE BALLISTIC PERFORMANCE AND FAILURE MECHANISM OF UHMWPE-ARAMID1414 FIBER HYBRID COMPOSITES** *Zhou Qing, He Yemao, Liu Ting (Beijing Protech New Material Science Co. Ltd)* The ballistic performance of UHMWPE-Aramid1414 fiber hybrid composites was studied through a series of V50 ballistic tests, and the damage mechanism of hybrid composites was analyzed in this paper.
17:10	1301 Polymer Matrix Materials 3	1302 Metal Matrix Composites 3	1303 Fiber-reinforced Composites 3	1304 Fracture and Damage 3	1305 Nano-Composites 3	1306 Ceramic Matrix Composites 3	1307 Structural Analysis and Optimization 3	1308 Multiscale Modelling of Structures 3	1309 Bio-Composites 3	1310 Moire and Grid Based Technique	1311 Hybrid Composites 3
17:10	1301-1 **PERFORMANCE STUDY ON THE FLAME RETARDANT SELF-ADHESIVE RESIN COMPOSITES** *Weiyongjiao (AVIC Composite Corporation LTD)*	1302-1 **MULTI-LAYER GRAPHENE REINFORCED PURE TITANIUM MATRIX COMPOSITES BY A MICRO-LAMINATED STRUCTURE DESIGN** *Xiaonan Mu, Hongnan Cai, Hongmei Zhang, Qunbo Fan, Yan Wu, Ran Sh, Guqiu Li, Hu Wang (Beijing Institute of Technology)* One Ti matrix composite reinforced by multi-layer graphene through novel microstructural design shows superior mechanical property.	1303-1 **MECHANICAL ANALYSIS AND VISCOELASTIC MODELLING OF A 3D INTERLOCK WOVEN COMPOSITE** *Courtois, A. (Ecole Polytechnique Montreal); Marcin, L. (Safran Helicopter); Ruiz, E. (Ecole Polytechnique Montreal); Lévesque, M. (Ecole Polytechnique Montreal)* Experimental viscoelastic properties of a composite material reinforced with 3D interlock woven fabric are compared with the predictions of a temperature- and cure-dependent linearly viscoelastic model. The experimental procedure and the viscoelastic model are presented.	1304-1 **A SPECTRAL STIFFNESS MICROPLANE MODEL FOR UNIDIRECTIONAL COMPOSITES** *Sean E. Phenisee, Sung Lin Tien, Marco Salviato (University of Washington)* The present contribution proposes a general constitutive model for composites able to simulate the orthotropic stiffness, prepeak nonlinearity, failure envelopes, and also the post-peak softening and fracture. The formulation is developed within the framework of the Spectral Stiffness Microplane Theory.	1305-1 **MODE I INTERLAMINAR FRACTURE TOUNGHNESS OF CARBON NANOTUBE WEB-MODIFIED POLYMER COMPOSITES** *Ravi Chitwan (Queen's University Belfast), Brian G. Falzon (Queen's University Belfast), Stephen C. Hawkins (Queen's University Belfast, Monash University), Andres Nistal (Queen's University Belfast)* The study of the effect of using highly aligned carbon nanotube web (CNTW) assemblies as interlayers on the mode I interlaminar fracture toughness of carbon fibre-reinforced polymer composite laminates.	1306-1 **AN EXPLORATION OF STRUCTURE DESIGN IN 3D BRAIDED CERAMIC MATRIX COMPOSITES TURBINE BLADE DOVETAIL ATTACHMENT** *Cheng Tang, Shi Dongqi, Jing Xin, Yang Xiaoguang (Beihang University)* In one braided composites dovetail attachment, the variation of composites direction and mechanical property would influence the structure's stress distribution. When take stress analysis and structural design, some proper equivalent simulation method should be established instead of using conventional orthotropy elasticity.	1307-1 **ELASTIC PROPERTIES OF 3D ADDING RIBS RE-ENTRANT CELLULAR STRUCTURE** *Xiang Li, Zi-Xing Lu, Zhen-Yu Yang (Beihang University)* Analytical and finite element (FE) simulations are carried out to calculate the elastic properties of a 3D augmented re-entrant cellular structure. The Young's modulus enhancement and negative Poisson's ratio in one direction for all topology are presented in detail.	1308-1 **PROPERTIES OF GRAPHENE BASED POLYMER NANOCOMPOSITES THROUGH ATOMISTIC SIMULATIONS** *Anastassia Rissanou, Petra Bačová (Research and Technology Hellas), Vagelis Harmandaris (Research and Technology Hellas, University of Crete)* In this work, we present results from detailed all-atom molecular simulations of graphene based polymeric nanostructured materials. Polymer films supported by graphene and graphene/polymer nanocomposites are studied under equilibrium and non-equilibrium conditions.	1309-1 **EGGSHELL-SILVER NANOPARTICLES REINFORCEMENT POLYMER FILMS AND APPLICATIONS** *Bonface J. Timoti, Shaik Jeelani, Vijaya K. Rangari (*Tuskegee University) The eggshell/silver nanoparticles (ES-Ag) were prepared and studied the effect on the structural property and the impartation of antimicrobial activity on 70/30 poly(butylene-co-adipate terephthalate)/ polylactic acid (PBAT/PLA) immiscible blend.	1310-1 **FULL-FIELD STRAIN MEASUREMENT OF COMPOSITE MATERIALS BY THE SAMPLING MOIRÉ METHOD (INVITED TALK)** *Shien Ri, Qinghua Wang, Hiroshi Tsuda (National Institute of Advanced Industrial Science and Technology Japan)* To observe the damage behavior on the surface of laminated CFRP materials, the sampling Moire method is applied. The attractive advantage of this method is both small strain in elastic-plastic region and larger strain distribution in failure-fracture region can be continuously measured.	1311-1 **PREPARATION AND PROPERTIES OF TI/ CF/PMR POLYIMIDE LAMINATES** *Jie Tao, Yubing Hu, Huaquan Li, Xuelong Fu, Xian Zhang, Lei Pan (*Nanjing University of Aeronautics and Astronautics) Novel high temperature resistance FMLs are reported in this paper, including the preparation and the properties of the FMLs based on carbon fiber reinforced polyimide.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	ROOM 22 (209+210)
	1213-4 **DAMAGE TOLERANCE OF DOUBLE-LAP, MULTI-ROW COMPOSITE BOLTED JOINTS CONTAINING SINGLE MISSING FASTENER** *Fujian Zhuang Puhui Chen (Nanjing University of Aeronautics and Astronautics)* Various defects and damages arising in composite bolted joints, such as missing fasteners, can change the bolt-hole fits directly and seriously alter bolt load proportions, reducing the initial failure strength and possibly the ultimate strength. This paper presents a numerical investigation into damage tolerance characteristics of double-lap, multi-row composite bolted joints containing single missing fastener based on an efficient and accurate explicit finite element model.	1214-4 **AN ADVANCED 1D FINITE ELEMENT SOLUTION FOR THERMOELASTICITY PROBLEMS IN LAMINATED BEAMS** *E. Carrera, M. Filippi , A. Entezari (DIMEAS, Politecnico di Torino)* The present work aims at presenting a unified formulation that enables classical coupled and uncoupled theories of thermoelasticity to be obtained. The proposed high-fidelity beam finite elements are able to provide 3D-like solutions with a low computational effort.	1215-4 **STRAIN RATE-RELATED CHARACTERIZATION OF FATIGUE BEHAVIOR OF GLASS FIBER-REINFORCED POLYURETHANE AND EPOXY** *Daniel Huelsbusch, Michael Jamrozy, Frank Walther (TU Dortmund University)* In cyclic investigations the influence of strain rate on the measurands characteristics has been investigated for glass-fiber-reinforced polyurethane. Furthermore, a newly developed approach for combining stress controlled testing with constant strain rate is shown.	1216-4 **ROBUST SHAPE MEMORY EPOXY NANOCOMPOSITES SPRING WITH GIANT DEFORMABILITY** *Yayun Liu (National Center for Nanoscience and Technology, Beijing; China University of Geosciences (Beijing)), Jun Zhao (National Center for Nanoscience and Technology, Beijing), Xiang Yu (China University of Geosciences (Beijing)), Zhong Zhang (National Center for Nanoscience and Technology, Beijing)* Shape memory epoxy nanocomposites springs with giant deformability and high strength.	1217-4 **DELAMINATION TOUGHENING AND HEALING PERFORMANCE OF 3D WOVEN COMPOSITES** *Rai B. Ladani, Khomkrit Pingkarawat (RMIT University), Chun H. Wang (University of New South Wales), Adrian P. Mouritz (RMIT University)* In this paper, the process and mechanism of in situ deposited nano-SiO2 on the surface of jute fiber were studied by sol-gel method.	1218-4 **THE PROCESS AND MECHANISM RESEARCH OF IN SITU DEPOSITED NANO-SIO2 ON THE SURFACE OF JUTE FIBER** *Yue-hong Yin, Yi-Hua Cui, Sen-jie Hao (Nanjing University of Aeronautics and Astronautics)* In this paper, the process and mechanism of in situ deposited nano-SiO2 on the surface of jute fiber were studied by sol-gel method.	1219-4 **POLYMERS FOR ENERGY STORAGE APPLICATIONS** *Chunyi Zhi (City University of Hong Kong)* Various polymer electrolytes were designed to incorporate various functions into flexible energy stroage devices.		1221-4 **CARBON NANOTUBE WEB: A PROMISING HEATING ELEMENT FOR ANTI-ICING/DE-ICING APPLICATIONS** *Xudan Yao (Queen's University Belfast), Brian G. Falzon (Queen's University Belfast), Stephen C. Hawkins (Queen's University Belfast, Monash University)* Owing to its rapid and uniform heating, as well as its negligible weight, CNT web is a promising heating element for anti-icing/de-icing applications.	**Workshop: International Benchmark Exercises on Textile Permeability and Compressibility Characterization**
1312 Office Naval Research (ONR) Session 3	1313 Joints 3	1314 Composite Structures 3	1315 Fatigue 3	1316 Stimuli Responsiveness and Shape Reconfiguration 3	1317 Design and Manufacture for Multifunctionality 3	1318 Interfaces and Interphases 3	1319 Recycling of Composites and Sustainability 2	1320 Bio and Medical 1	1321 Aerospace 3	
1312-1 **THE EFFECT OF THICKNESS VARIATIONS ON THE TRANSVERSE SHEAR STRENGTH OF NOMEX HONEYCOMB CORES** *T. Allen, M. Battley, S. Stone (University of Auckland, New Zealand)* An investigation into the effect of thickness on the transverse shear failure mechanisms of Nomex honeycomb core materials. Experimental testing and numerical modelling have been used to determine strength degradation with increasing core thickness and the underlying failure initiation and propagation modes.	1313-1 **TENSILE BEHAVIOR OF HYBRID MULTI-BOLTED/BONDED JOINTS WITH CARBON/EPOXY COMPOSITES** *Farid Gamdani, Rachid Boukhili, Aurelian Vadean (Polytechnique Montreal)* Composite hybrid-bolted/ bonded joints were tested with one to three bolts. Their load-displacement responses using quasi-isotropic and cross-ply laminates are presented Vadean(Polytechnique Montreal)Composite hybrid-bolted/bonded joints were tested with one to three bolts. Their load-displacement responses using quasi-isotropic and cross-ply laminates are presented.	1314-1 **INTEGRAL DESIGN OF COMPOSITE STRUCTURES USING A MODIFIED CO-BONDING PROCESS** *Rieger, Florian; Rief, Thomas; Motsch, Nicole; Hausmann, Joachim (Institut für Verbundwerkstoffe GmbH Erwin-Schrödinger)* A concept for production of composite parts using pre-cured structures is analyzed using interlaminar shear strength and interlaminar fracture toughness energy measurements.	1315-1 **EFFECT OF BIAXIALITY ON THE FATIGUE PERFORMANCE OF A LAMINATED COMPOSITE** *Raghuram Mandapati, P. K. Mallick (University of Michigan-Dearborn)* The paper presents the effect of biaxiality ratios on fatigue life diagrams and fatigue damage evolution in a E-glass/epoxy composite laminate. The fatigue data were generated under a combination of normal and shear stresses on butterfly-shaped Arcan specimens.	1316-1 **SHAPE-MEMORY POLYMER COMPOSITES SELECTIVELY RESPONSIVE TO NEAR-INFRARED LIGHTS OF TWO WAVELENGTHS** *Tianyu Fang, Shunping Chen, Liang Fang, Zhengzi Xu, Chunhua Lu (Nanjing Tech University)* Rare earth organic complexes were introduced into thermally-induced shape-memory polymers via physical mixing or chemical in-situ copolymerization to prepare shape-memory polymer composites with selective responsivities for near-infrared lights with two certain wavelengthes.	1317-1 **DESIGN AND MANUFACTURING OF SHAPE CHANGING STRUCTURES AND DEVICES USING HYBRID 3D PRINTING** *Conner Dunn, Quanyi Mu, H. Jerry Qi (Georgia Institute of Technology)*	1318-1 **INTERLAYER SHEAR IN BILAYER GRAPHENE CRYSTALS** *Guorui Wang, Lugi Liu, Zhong Zhang (National Center for Nanoscience and Technology, China)* We utilize pressure in the hole as a controlling load, forcing supported graphene (outside the hole) towards the center of hole by a controllable bulging process, to activate interlayer shear deformation in bilayer graphene system. Multi-type characterization techniques were employed, including Raman spectroscopy and atomic force microscopy, to reveal the interlayer shear stress between graphene layers that is approximated to 0.04 MPa.	1319-1 **NOVEL CARDING PROCESS TO IMPROVE MECHANICAL PROPERTIES OF RECYCLED CARBON FIBER CARD WEB REINFORCED THERMOPLASTICS** *Guangthu Yin, Guangbin Cai , Haowen Wei (The University of Tokyo), Wataru Nagatsuka (Toray Industries, Inc.), Takuma Kohira (Ehime Institute of Industrial Technology Paper Technology Center), Jun Morisawa (Kochi Prefectural Paper Technology Center), Jun Takahashi (The University of Tokyo)* Carbon fiber card web reinforced thermoplastics (CWT) were proposed as the second approach for reusing r-CF in this study. The viability of non-woven carding process was evaluated by investigating mechanical properties of CWT with various Vf of CWT.	1320-1 **AN EXPERIMENTAL STUDY ON CRACK-INSENSITIVE FABRIC/ PDMS COMPOSITES** *Jizhou Song (Zhejiang University)*	1321-1 **STRENGTH ANALYSIS OF FIBER REINFORCED COMPOSITE LAMINATES WITH A CIRCULAR CUTOUT** *Chen Jianlin, Li Zheng, Chu Pengcheng (Peking University)* The strength analysis of carbon fiber reinforced composite laminate with big cutout under unidirectional tension is studied by simulation and experiment. The crack onset is happened around the high stress concentration area, and the failure mode and crack propagation strongly depend on the ply sequences and the cutout size.	**Workshop: International Benchmark Exercises on Textile Permeability and Compressibility Characterization**

Monday 21 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
17:30	1301-2 **SYNTHESIS AND CHARACTERIZATION OF FLAME RETARDANT THERMOSET POLY (LACTIC ACID) (PLA)** *Fei Sun, Xiang Kong, Tao Yu, Yan Li (Tongji University)*	1302-2 **MICROSTRUCTURE AND MECHANICAL PROPERTIES OF TiB MATRIX COMPOSITE AFTER VARIOUS THERMO-MECHANICAL TREATMENTS** *Fengcang Ma, Siyao Lu (School of Materials Science and Engineering, University of Shanghai for science and technology, Shanghai 200093, P.R.China), Weijie Lu, Di Zhang (State Key Laboratory of Metal Matrix Composites, Shanghai Jiao Tong University, Shanghai 200040, P.R.China)*	1303-2 **TOUGHENING QF/PSA WITH SILANE COUPLING AGENT CONTAINING POLY(IMIDE SILOXANE)** *Lingao Ru, Yanhong Hu, Yuanbo Gu, Fangfang Zhang, Bin Cheng, Yan Zhou, Shifeng Deng (East China University of Science and Technology)* 1.One is the properties of poly(imide siloxane) copolymers (PISs) with crystalline polyimide hard block and PISs with amorphous polysiloxane soft block were introduced in our novel silane coupling agent. 2. The other is that with the pretreatment method, 1.5wt% WS added to react with the QF for 60 min, the Interlaminar Shear Strength(ILSS) of the composites improved about 43.6%. However, the flexual strength was increased by 60.6% with 3.5wt% WS added to react with the QF.	1304-2 **XFEM MODELLING OF TRANSVERSE CRACKING IN FIBRE REINFORCED COMPOSITES** *Nikolay A. Petrov (KU Leuven), Larissa Gorbatikh, Stepan V. Lomov (Skolkovo Institute of Science and Technology)* This work investigates the influence of XFEM input parameters on the onset and propagation of transverse cracks in cross-ply laminate under quasi-static loading.	1305-2 **QUANTIFICATION OF DISPERSION AND MIXING OF NANOFILLERS IN POLYETHYLENE COMPOSITES USING RAMAN SPECTROSCOPY** *Anna E. Lewandowska, James Beard (University of Exeter), Erik Frank (Institute of Textile Chemistry and Chemical Fibers), Nor H. Inai, Stephen J. Eichhorn (University of Exeter)*	1306-2 **THE PREPARATION PROCESS OF SiCN CERAMIC BY PYROLYSIS OF PSN-1** *Jinping Li, Yongdong Yu, Songhe Meng, Gaoming Zhang, Yixin Hou (Harbin Institute of Technology)* The precursor treated by curing, cold isostatic pressing and low rate pyrolysis will make the SiCN ceramic yield increase.When the pyrolysis temperature is below 1400℃, the free carbon is highly disordered; and when the temperature is above 1400℃, the crystallization degree of free carbon increases.	1307-2 **COMPARATIVE INVESTIGATION IN DELAMINATION BEHAVIOR OF COMPOSITE STIFFENER RUN-OUT UNDER TENSILE LOAD** *Li Liang, Jia Purong (Northwestern Polytechnical University)* The research in this paper focus on the composite stiffener run-outs loaded in tensile. Delamination behaviors of two types of models were studied in experimental and numerical method.	1308-2 **SPECTRAL STOCHASTIC HOMOGENIZATION OF COMPOSITES WITH RANDOMNESS IN CONSTITUENT MATERIAL PROPERTIES** *J. Zhi, T.E. Tay (National University of Singapore)* In this paper, spectral stochastic homogenization method is developed by combining asymmtric expansion homogenization and spectral stochastic method, which is further implemented in a commercial finite element package. The probability distribution of stochastic effective properties, including transverse moduli and thermal expansion coefficient are predicted with the developed method, the result of which shows a matching accuracy with that of Monte Carlo simulation, but the spectral stochastic homogenization method is much more computationally efficient.	1309-2 **ALL-CELLULOSE COMPOSITES BASED ON WET-SPUN CELLULOSE FIBERS REINFORCED WITH CELLULOSE NANOCRYSTALS AND HALLOYSITE NANOCLAY** *Andrés García Vogel (Luleå University of Technology, University of Oulu), Saleh Hooshmand (Luleå University of Technology), Petteri Piitonen (University of Oulu), Kristiina Oksman (Luleå University of Technology, University of Oulu)* Continuous regenerated cellulose nanocomposite fibers with were successfully manufactured using a simple wet spinning process and used in all cellulose composites.	1310-2 **EXPERIMENTAL STUDY ON BIAXIAL BEHAVIOR OF PVB** *Bing Zhan (Tongji University), Suwen Chen (Tongji University , State Key Laboratory for Disaster Reduction in Civil Engineering China), Fu-pen Chiang (Stony Brook University)* A series of biaxial tensile tests on cruciform specimens of Polyvinyl butyral (PVB) under quasi-static loads at the temperature of 15˚C were carried out and the biaxial true stress - true strain curves of PVB under five displacement loading ratios (1:1.2:1.3:1.4:1.1:0) were obtained.	1311-2 **MATERIALS SELECTION FOR A FIBER-METAL-LAMINATE WITH ELASTOMER INTERLAYERS** *Matthias M. Stoll, Kay A. Weidenmann (Karlsruhe Institute of Technology (KIT))* Materials selection of a fiber-metal-laminate with elastomer interlayers under flexural load with restrictions and requirements of the laminate and its constituents was conducted.
17:50	1301-3 **DEFORMATION AND RESIDUAL STRESSES DURING CURING OF HOT-MELT IMPREGNATED PHENOLIC RESIN/GLASS FABRIC COMPOSITE** *Dixuan Lei, Xue Jiang, You Lv, Yuhong Liu, Xinli Jing (Xi'an Jiaotong University)* The research focused on a novel phenolic resin/glass fabric prepreg prepared via utilizing the environmentally friendly and low-cost hot melt method, and deformation and residual stresses during curing process of hot melt impregnated phenolic resin/ glass fabric composites.	1302-3 **OBTAINING MULTI-LAYER GRAPHENE SHEETS USING ONE-STEP ELECTROCHEMICAL EXFOLIATION AND ITS APPLICATION IN GRAPHENE/METAL COMPOSITE** *Z.Y. Liu, B.L. Xiao, Z.Y. Ma (Chinese Academy of Sciences)* (1) Multi-layer graphene (MLG) sheets with high structure integrity and high dispersion ability were obtained using one-step electrochemical exfoliation. (2) The suspended MLG could be easily to be adsorbed onto metal powders to fabricate high performance MLG/metal composite.	1303-3 **EFFECTS OF MICRO-DEFECTS ON THE MECHANICAL PROPERTIES OF CBCFS CARBON-BONDED CARBON FIBER COMPOSITES** *Yao Zhang, Zixing Lu, Zhenyu Yang (Beihang University)* In this paper, the effects of micro-defect on the mechanical properties of CBCFs are systematically investigated by numerical simulation based on a 3D random fiber network model.	1304-3 **AN EXPERIMENTAL INVESTIGATION INTO THE STACKING SEQUENCE EFFECTS OF QUASI-ISOTROPIC CARBON/EPOXY LAMINATES UNDER COMPRESSIVE LOADS** *Aakash Paul, Xiaodong Xu, Michael R. Wisnom (University of Bristol)* Two sharp-notched quasi-isotropic stacking sequences with and without central 0° plies were tested to understand the significance of the double 0° ply under compression. The two configuations were further analysed using X-ray computed tomography (CT) scans to undertsand the failure mechanism in detail.	1305-3 **MULTIFUNCTIONAL POLYURETHANE-ENHANCED BUCKYPAPER SHEETS BASED ON CARBON NANOTUBES AND BORON NITRIDE NANOTUBES** *B. Ashraf, Y. Martinez-Rubi, M.B. Jakubinek, K. Laqua, D. Park, S. Zou, K.S. Kim, A. Yousefpour, B. Simard (National Research Council Canada)* A comparative study of the influence of BNNTs and CNTs on the tensile, electrical and mechanical properties of polyurethane-based nanocomposite sheets was undertaken. In addition, thermo-electrical response, strain sensing, and Joule heating capabilities were also investigated.	1306-3 **LIGHT AND STRONG HIERARCHICAL POROUS SIC FOAM FOR EFFICIENT THERMAL INSULATION AND ELECTROMAGNETIC INTERFERENCE SHIELDING AT ELEVATED TEMPERATURES** *Zhijiang Wang, Caiyun Liang (Harbin Institute of Technology)*	1307-3 **NUMERICAL SIMULATION ANALYSIS FOR IDENTIFICATION OF AREAS OF HIGH STRESS-CONCENTRATION IN A TURBINE WIND-BLADE-REINFORCEMENTS SCENARIOS** *Venkadesh Ramen, Monsef Drissi-Habti, Aghiad Khadour (Institut de Recherche Technologique J. Verne, Pres Lunam ifsttar)*	1308-3 **RUNWAY DEBRIS IMPACT ON GENERIC COMPOSITE TURBOFAN BLADE MULTISCALE PROGRESSIVE FAILURE ANALYSIS** *Gong Huiling (MVT Group Inc) Frank Abdi, Marc Villa Montero, Cody Godines (Alpha STAR Corp)* Multiscale progressive failure analysis of runway debris impact on composite turbofan blade at different velocities using a standarized multiscle material modeling procedure.	1309-3 **BIODEGRADATION PERFORMANCE OF MAGNESIUM MATRIX COMPOSITE AS AN BIOMEDICAL IMPLANT** *Kun Yu (Central South University, Yantai Nanshan University), Tao Zhang (Yantai Nanshan University), Fang Hongjie (Yantai Nanshan University), Yilong Dai (Central South University, Yantai Nanshan University), Yang Yan (Central South University), Liangjian Chen (Central South University)*	1310-3 **DISPLACEMENT DISTRIBUTION MEASUREMENT USING HIGH-SPEED MEASUREMENT MULTI-CAMERA** *Motoharu FUJIGAKI (University of Fukui), Takaya KONDO (University of Fukui), Takaaki YOSHIKATA (Wakayama University), Yorinobu MURATA (Wakayama University)*	1311-3 **FATIGUE CRACK GROWTH OF TiC/CF/PMR POLYIMIDE LAMINATES UNDER VARIABLE AMPLITUDE LOADING** *Yanyan Lin (Nanjing University of Aeronautics and Astronautics), Huaguan Li (Nanjing Institute of Technology), Xuelong Fu, Kai Chen, Yi Lu, Xiaoge Hua, Jie Tao (Nanjing University of Aeronautics and Astronautics)* We would like to invite you to send us one/ two sentence (s) short summary of your paper for the program and abstracts book by directly replying this email. If we do not receive your short summary till June 9, 2017, your short summary information may be absent from the program and abstracts book.

Time	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	ROOM 22 (209+210)
17:30	1312-2 **DELAMINATION IN BLAST RESISTANT LAMINATED GLASS** *Mohammad Amin Samieian (Imperial College), David Cormie, David Smith, Will Whitley (Arup Resilience Security & Risk), Bamber R.K. Blackman, Paul A. Hooper, John P. Dear (Imperial College)* Laminated glass composite is used in structures for protection against blast loading. This study looks at how temperature and interlayer thickness influences the delamination energy between the polymer interlayer and glass layer.	1313-2 **INFLUENCES OF TEXTILE PARAMETERS ON THE INDUCTION HEATING BEHAVIOR OF CFRPC** *S. Becker,P. Mitschang (Institut für Verbundwerkstoffe GmbH)* By means of stationary heating experiments different textile reinforcement fabrics which differ in the titer (linear density), the thread-count and therefore in their area weight as well as in the weave style have been investigated. The gained results were used to establish guidelines for the structure of an ideal adjusted laminate of a CFRPC organic sheet for induction welding.	1314-2 **NUMERICAL ANALYSIS AND FBG MONITORING OF CURING-INDUCED STRAIN IN POLYMER COMPOSITE LAMINATES** *Qinglin Wang, Yuxi Jia (Shandong University)*	1315-2 **A PROGRESSIVE FATIGUE DAMAGE MODEL FOR COMPOSITE STRUCTURES IN HYGROTHERMAL ENVIRONMENTS** *Meijuan Shan, Libin Zhao (Beihang University), Jianyu Zhang (Chongqing University), Haiming Hong (Shenyang Aircraft Design & Research Institute), Ning Hu (Chongqing University)*	1316-2 **3D PRINTED BIODEGRADABLE SHAPE MEMORY POLYMER STIMULATED BOTH ELECTRICALLY AND MAGNETICALLY** *Xiaomeng Wang, Jun Zhao, Zhong Zhang (National Center for Nanoscience and Technology, Beijing)* 3D printed biodegradable shape memory polymer with multi-stimulus response.	1317-2 **LAMINATE DESIGN WITH NON-STANDARD PLY ANGLES FOR OPTIMISED IN-PLANE PERFORMANCE** *Mark W.D. Nielsen, Kevin J. Johnson, Andrew T. Rhead, Richard Butler (University of Bath)*	1318-2 **A SHEAR-LAG ANALYSIS OF STRESS TRANSFER THROUGH A COHESIVE FIBRE-MATRIX INTERFACE** *Zuorong Chen (CSIRO Energy Flagship), Wenyi Yan (Monash University)* A shear-lag model with a cohesive fibre-matrix interface is presented for the analysis of stress transfer between the fibre and the matrix during the fibre pullout.	1319-2 **INFLUENCE OF RECYCLING PROCESS ON THE TENSILE PROPERTY OF CARBON FIBER** *Guanqbin Cai (The University of Tokyo), Guangtu Yin (The University of Tokyo), Masashi Wada (Asian Fine Ceramics Center), Satoshi Kitaoka (Japan Fine Ceramics Center), Haowen Wei (The University of Tokyo), Ikamu Ohsawa (The University of Tokyo), Jun Takahashi (The University of Tokyo)* The viability of superheated steam (SHS) treatment in recycling carbon fiber reinforced thermoplastics was assessed. And the influence of recycling process (SHS) on the tensile property of carbon fibers was evaluated.	1320-2 **GRAPHENE LAMINATION FOR HIGH GLUCOSE OXIDASE LOADING AND SENSITIVE GLUCOSE DETECTION** *Yabin Hao, Chuan Xu, Minghe Fang, Zhe Ying, You Zeng (Chinese Academy of Science)* In this work, lamination of functional graphene and graphene oxide was used to prepare glucose biosensor with high glucose oxidase loading and sensitive glucose detection.	1321-2 **AEROELASTIC ANALYSIS OF COMPOSITE LAMINATES** *Ramnohan.B (PES University), Dineshkumar. Harursampath (Indian Institute of Science)* Aeroelastic analysis has been carried out with various laminate fiber orientation angles applied for Unmanned aerial vehicles using Velocity-Damping methods. An attempt has been made here to extend the same for Multi-functional Composite laminates.	**Workshop:** **International Benchmark Exercises on Textile Permeability and Compressibility Characterization**
17:50	1312-3 **REPEATED IMPACT BEHAVIOR OF WOVEN COMPOSITES IN ARCTIC CONDITIONS** *Alejandra Castellanos (University of Texas) , Pavana Prabhakar (University of Wisconsin-Madison)* In this paper, the impact and repeated impact behavior of woven carbon fiber/vinyl-ester matrix system at room and arctic temperatures is investigated. A computational modeling framework that is capable of predicting the extent of damage under such conditions is established here.	1313-3 **A STIFFNESS MODEL FOR UNIDIRECTIONAL COMPOSITE BOLTED JOINTS** *Yuxing Yang, Yi-Qi Wang, Xueshu Liu, Yongjie Bao and Hang Gao (Dalian University of Technology)* An analytical stiffness model with assumption of elliptical conical pressure envelope, was proposed to predict the stiffness of composite joints under preload of the bolt for unidirectional laminate.	1314-3 **MODELLING OF PROGRESSIVE MATRIX CRACKING INDUCED DELAMINATIONS USING AN ENRICHED SHELL ELEMENT FORMULATION** *Johannes Främby, Martin Fagerström, Jim Brouzoulis (Chalmers University of Technology)* Matrix crack induced delaminations are studied using a computationally cost-effective adaptive methodology for modelling progressive damage in laminated composites.	1315-3 **IMPROVEMENT OF INTERLAMINAR MECHANICAL PROPERTIES OF CFRP LAMINATES BASED ON NANOFILLER INTERFACE REINFORCEMENT** *HM. Ning (Chongqing University), N. Hu, (Chongqing University), Y. Li (Tohoku University)*	1316-3 **DEVELOPMENT OF DYNAMIC DEPLOYMENT SIMULATION OF THIN COMPOSITE LAYER FOR SHAPE MORPHING STRUCTURE** *Masaaki Nishikawa, Keisuke Nagata (Kyoto University), Yuta Naito (Tsutsui, Masaki-cho), Masaki Hojo, Naoki Matsuda (Kyoto University)* The present study reproduced the dynamic deployment tests of a thin composite layer made of CFRP plain-woven textile composite, using a newly developed dynamic deployment simulation.	1317-3 **THE MECHANICS WHILE BRIDGING PRISTINE GRAPHENE PATCHES FOR LARGE AREA OR 3-DIMENSIONAL STRUCTURE** *Yuje Wei (LNM, Institute of Mechanics)*	1318-3 **THE EFFECTS OF INTERLAYERED CARBON NANOTUBE REINFORCED ELECTROSPUN NANOFIBERS ON MIXED MODE FRACTURE CHARACTERISTICS** *Ozge Kaynan, Yagmur Atescan, Sassan Jahangiri, Hulya Cebeci, Elif Ozden-Yenigun (Istanbul Technical University)* In this study, the responses of CNTs reinforced adhesive layer in interlaminated composites are investigated under mixed mode I+II loading.	1319-3 **PRODUCTION WASTE MANAGEMENT OF THERMOPLASTIC COMPOSITES USING COMPRESSION MOULDING** *Julien Mozhou (University of Orléans), Christian Garnier (ENI TARBES), Pierre Ouagne (University of Orléans, ENI TARBES)* The work presented in this paper deals with the recycling of thermoplastic structural composites by using the compression moulding approach. The main novelty of this work concerns the use of centimetric size particles that preserves the length of the reinforcement material. Multiple cascading recycling of composites is considered and the presented approach is compared to a more classical injection moulding technique.	1320-3 **FLEXIBLE CAPACITIVE COMPOSITE NEURAL ELECTRODES AND SIMPLIFIED FABRICATION ENABLED BY THERMAL RELEASE TAPE** *Zhuocheng Yan, Taisong Pan, Changyong Chen, Yuan Lin (University of Electronic Science and Technology of China)* We present a flexible capacitive composite neural electrode arrays with the high dielectric constant and a thermal release tape transfer printing method to fabricate flexible neural electrodes.	1321-3 **QUALITY SYSTEM DEVELOPMENT FOR THE MANUFACTURE OF PRIMARY COMPOSITE AIRCRAFT STRUCTURE** *AiJun Wang (COMAC)* In this contribution, a quality system for the manufacture of composite structure has been established to control composite parts manufacture and components acceptance. The quality system includes procedures that ensure the quality of incoming materials, the control of in-process manufacturing methods, and testing performed to evaluate the end product for conformity to design requirements. The quality system also includes standards to be used for nondestructive and destructive tests, visual inspection techniques during the manufacturing process, and product final acceptance.	

Monday 21 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
18:10	1301-4 **MODELING OF THE RESIN VISCOELASTICITY IN THE FORMING PROCESS OF THERMOPLASTIC COMPOSITES** *Qi Wu (The University of Tokyo, Nanjing University of Aeronautics and Astronautics), Tomotaka Ogasawara (The University of Tokyo), Nobuhiro Yoshikawa (The University of Tokyo)*	1302-4 **STUDY ON PREPARATION AND MECHANICAL PROPERTIES OF IN-SITU PARTICLES REINFORCED CASTING AI-13SI-4Cu-Mg-2NI ALLOYS** *Lusha Tian, Yongchun Guo, Jianping Li, Feng Xia, Zhong Yang, Wei Yang (Xi'an Technological University)* The paper studies on preparation and mechanical properties of in-situ particles reinforced casting AI-13Si-4Cu-Mg-2Ni alloys with TiC.	1303-4 **DAMAGE TOLERANCE OF CARBON/ EPOXY QUASI-INTERWOVEN COMPOSITES SUBJECTED TO LOW VELOCITY IMPACTS** *B.V. Wadhington, A. Silva-Caballero, P. Potluri, W.R. Kennon (University of Manchester)* Robotic dry fibre placement technology has been shown to be able to create a quasi-interwoven structure that exhibits an increased damage initiation energy and improved damaged resistance when compared against a equivalent cross-ply laminate.	1304-4 **FAILURE OF MATRIX IN A COMPOSITE SUBJECTED TO MULTI-AXIAL LOADS** *Yi Zhou, Zheng-Ming Huang, Yuan-De Xue, Li-Min Xin (Tongji University)* A new micromechanical method is presented in this paper to predict strength of composites under three-dimensional loading with only component material properties needed.		1306-4 **MODELING AND SIMULATION OF RANDOMLY DISTRIBUTED COATED FIBERS IN A CERAMIC MATRIX COMPOSITE** *Hye-gyu Kim, Wooseok Ji (Department of Mechanical and Nuclear Engineering, UNIST, Ulsan, 44919, Korea)* A numerical model of randomly distributed coated fibers in a CMC is developed and its mechanical responses and cracking behaviors are observed through finite element analyses.	1307-4 **A GENERAL COMPUTATIONAL FRAMEWORK FOR DESIGNING MORPHING STRUCTURES** *R.M.J. Groh, A. Pirrera (University of Bristol)* A generalised path-following algorithm is ideally suited for analysing multistable morphing structures as it is capable of detecting singular points, branch-switching to secondary equilibrium paths, and evaluating the parametric response of singular points with respect to any continuously varying parameter. We show that the full complexity of multi-snap events of bistable laminates is robustly captured by this algorithm, and that the ability to determine loci of singular points with respect to a set of parameters is especially useful for rapid parametric studies.	1308-4 **MULTISCALE CO-ROTATIONAL METHOD FOR GEOMETRIC NONLINEAR ANALYSIS OF HETEROGENEOUS PIEZOELECTRIC COMPOSITE** *Hui Liu (Wuhan University), Ping Fu (Wuhan University, Yangtze River Scientific Research Institute), Xihua Chu (Wuhan University)*	1309-4 **DESIGN OF BIO-INSPIRED MINIATURE BOAT AND ITS CONTROLLED MOVEMENT AT OIL/ WATER INTERFACE** *Ying Chu, Qinmin Pan (Harbin Institute of Technology)* In this article, we realized the movement of a "bio-inspired miniature boat" at varieties of interfaces (e.g., gas-liquid interface or liquid-liquid interface) by Marangoni effect.	1310-4 **ACCURACY EVALUATION OF SMALL ROTATION ANGLE MEASUREMENT USING SAMPLING MOIRE METHOD** *Yusei SENBA (University of Fukui), Motoharu FUJIGAKI (University of Fukui), Kenichi KURIBAYASHI (JR WEST JAPAN CONSOULTANTS CMPANY), Daiki TOMITA (Wakayama University), Yorinobu MURATA (Wakayama University)*	1311-4 **ENHANCEMENT OF INTERLAMINAR FRACTURE TOUGHNESS AND DAMAGE MECHANISMS ANALYSIS IN CFRPS REINFORCED WITH SPRAYED NANO PARTICLES** *Huiyong He, Xin Liu, Zhanjun Wu (Dalian University of Technology)* Three kinds of nano particles were prepared and sprayed evenly on the surface of every prepregs, enhancement of interlaminar fracture toughness and damage mechanisms were analysised.
18:40	Welcome Reception										

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	ROOM 22 (209+210)
	1313-4 **APPLICATION OF RADIAL AND CIRCULAR REINFORCEMENT FOR CFRP BOLTED JOINTS** *Toshifumi Fujii,Kazuo Nakajima,Yasuhiko Iwasaki (Shikibo.Ltd),Yusuke Osugi, Shun Kudu, Takayuki Kusaka (Ritsumeikan University)* In this study, a novel reinforcement technique using radial and circular layers (R-layer, C-layer) was studied to improve the strength and reliability of bolted joints, especially for large-scale composite parts.	1314-4 **ELASTIC WAVE PROPAGATION ANALYSIS IN A 2D FUNCTIONALLY GRADED HOLLOW CYLINDER USING SPECTRAL FINITE ELEMENT METHOD** *Ze-Xing YU, Chao XU,Fei DU (Northwestern Polytechnic University)* Wave propagation analysis in funcionnally graded material cylinder by using spectral element method.	1315-4 **FATIGUE LIFE AND FAILURE OF IMPACT-DAMAGED CARBON FIBRE COMPOSITES UNDER COMPRESSIVE CYCLIC LOADS** *F. Xu, W. Liu, P. E. Irving* (Cranfield University) This paper explores and identifies delamination growth and failure processes in impact-damaged carbon fibre epoxy composites under compressive cyclic loading. The results show that monitoring of local normal displacement at the impact damage site provided earlier indications of fatigue induced changes in delamination buckling than observations of delamination area growth and a three-dimension analytical model was developed to analyse the results.	1316-4 **4D MATERIALS: PROGRAMMING REVERSIBLE SHAPE CHANGE INTO TOUGH HYDROGELS** *Anna B. Baker, Duncan F. Wass, Richard S. Trask, (University of Bath, United Kiongdom)* This work details the development of stimuli-responsive morphing hydrogels (high water content plastics) through the creation of regions of localised stiffening and reduced water content. Shape change occurs through the formation of bilayers constructed in the regions of stiffening, which are actuated in response to small temperature changes.	1317-4 **DEVELOPMENT OF CARBON NANO-TUBES ON CARBONIZED-COTTON FOR MULTI-FUNCTIONAL APPLICATIONS** *Masud Rana (Chinese Academy of Sciences, University of Chinese Academy of Sciences), Peng-Cheng Ma (Chinese Academy of Sciences)* This work demonstrates a facile technique to develop multifunctional material by growing carbon nanotubes on carbonized cotton using a single step chemical vapour deposition method.	1318-4 **WETTABILITY AND INTERPHASE ADHESION OF MOLTEN THERMOPLASTICS ON GLASS FIBRES** *C.A. Fuentes (KU Leuven), Y. Zhang (KU Leuven), H.Guo (KU Leuven), W. Woigk (ETH Zürich), K. Masania (ETH Zürich), C. Dransfeld (University of Applied Sciences and Arts Northwestern Switzerland), D. Severo (KU Leuven), A.W. Van Vuure (KU Leuven)*		1320-4 **HYBRID COMPOSITES OF SILICA GLASS FIBRE/NANO-HYDROXYAPATITE/ POLYLACTIC ACID FOR MEDICAL APPLICATION** *Lizhe He, Chenkai Zhu, Xiaoye Cong, Chris D. Rudd, Xianling Liu (University of Nottingham Ningbo China)* In this paper, the flexural properties of ternary composites of glass fibres, nano-hydroxyapatite and polylactic acid were investigated. These composites were of flexural properties similar to bone and potential for the making of load-bearing bone fixation devices.	1321-4 **A PROGRESSIVE FAILURE MODEL FOR COMPOSITE LAMINATES WITH INITIAL DELAMINATION UNDER COMPRESSIVE LOADING** *Yaling Liu (Beihang University), Libin Zhao (Beihang University), Kangkang Wang (Beihang University), Haiming Hong (Aviation Industry Corporation of China), Jianyu Zhang (Chongqing University)*	
Welcome Reception										

Tuesday 22 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
08:00	PLENARY LECTURE at Qujiang Auditorium: **Brief Introduction to Materials Genome Initiative and Materials Informatics** Tongyi Zhang, Shanghai University, China										
09:05	2101 Polymer Matrix Materials 4	2102 Metal Matrix Composites 4	2103 Fiber-reinforced Composites 4	2104 Fracture and Damage 4	2105 Nano-Composites 4	2106 Ceramic Matrix Composites 4	2107 Structural Analysis and Optimization 4	2108 Multiscale Modelling of Structures 4	2109 Bio-Composites 4	2110 Thermography 1	2111 Hybrid Composites 4
09:05	2101-1 **EXPERIMENTAL STUDY ON MECHANICAL PROPERTIES OF BISPHENOL F EPOXY RESIN AT DIFFERENT CRYOGENIC TEMPERATURES** *Zhiwei Li, Lei Yang, Cong Peng, Hongyu Wang, Jialiang Li, Zhanjun Wu* (Dalian University of Technology) The mechanical properties of bisphenol F epoxy resin were tested under different temperature environment, to study how low temperature influences the stiffness and strength of bisphenol F epoxy resin.	2102-1 **ACHIEVING HIGH STRENGTH AND HIGH DUCTILITY IN METAL MATRIX COMPOSITES REINFORCED WITH A DISCONTINUOUS THREE-DEMENTIONAL GRAPHENE-LIKE NETWORK** *Xiang Zhang, Chunsheng Shi, Jiajun Li, Enzuo Liu, Fang He, Liying Ma, Chunnian He, Naiqin Zhao* (Tianjin University) We propose an easy and scalable strategy to in situ synthesizing uniformly dispersed, high-quality 3Ds as well as Gris-CNTs hybrids in copper matrix.	2103-1 **ANALYSIS OF CF /GF HYBRID COMPOSITES APPLIED IN WIND TURBINE BLADES** *Liangliang Sun* (Wuhan University of Technology) A progressive damage model (PDM) is present in this paper for the ultimate strength analysis of single-lap composite adhesive joints, and the effects of fiber angles of Ply Adjacent to Adhesive Layer (PAAL) on the stress and strain distributions of adherends and adhesive layers are presented.	2104-1 **THE MECHANICS OF INTERFACE FRACTURE IN LAYERED COMPOSITE MATERIALS: (1) BRITTLE, HOMOGENEOUS AND BI-METAERIAL INTERFACES** *S. Wang* (Loughborough University, Hebei University of Engineering) *C.M. Harvey* (Loughborough University), *J.D. Wood* (Loughborough University) A powerful orthogonal pure-mode partition theory (OPPT) is discovered for the partitions of mixed mode fracture modes at brittle homogeneous and bi-material interfaces. Previously claimed unsolvable problem and several confusions are cleared.	2105-1 **EFFECT OF BUCKYPAPER ON THE PROPERTIES OF CARBON FIBER REINFORCED HYBRID COMPOSITES** *Xuhai Xiong* (Chinese Academy of Sciences, Shenyang Aerospace University), *Han Wang* (Chinese Academy of Sciences), *Rong Ren* (Shenyang Aerospace University) Nanocomposite laminates with sandwiching CNT buckypapers between commercial carbon fiber prepregs were fabricated by vacuum-bag processing. The effect of CNT buckypaper on the damping factor, moisture resistance, interlaminar shear strength (ILSS) and fracture morphologies under shear loading of carbon fiber reinforced composites was discussed in detail.	2106-1 **EFFECTS OF RESIDUAL STRESS ON STRENGTH OF CARBON FIBER-REINFORCED CERAMIC COMPOSITE: THEORETICAL INVESTIGATION AND NUMERICAL SIMULATION** *Zhaofu Zhang, Jianjun Sha* (Dalian University of Technology) Residual stresses in the carbon fiber-reinforced ceramic composite would inevitably accumulate during the fabrication process and have an influence on the mechanical properties of the ceramic composite to some extent. A brief investigation concentrated in the effects of residual stresses on strength of carbon fiber-reinforced ceramic composite was conducted through theoretical analysis and numerical simulation in this work.	2107-1 **INFLUENCE OF DIFFERENT STRUCTURAL PARAMETERS ON THE MECHANICAL PROPERTIES OF COMPOSITE THIN-WALLED STRUCTURE** *Long Wang, Guanyu Liu, Xianguo Wu, Xianhong Meng, Haibo Li* (Beihang University) The influence of different parameters on the mechanical property of composite thin-walled structure was studied by using the simplified macroscopic FE models, and the key parameters affecting the mechanical property were identified.	2108-1 **RECENT ADVANCES IN DEVELOPING THE GENERALIZED INTERPOLATION MATERIAL POINT METHOD FOR SIMULATING BRITTLE FRACTURE BASED ON MOLECULAR DYNAMICS** *Jun Tao* (Dalian University of Technology), *Shan Jiang* (University of Mississippi), *Yu-Chen Su* (University of Missouri-Columbia), *Zhen Chen* (Dalian University of Technology) A hierarchical multiscale approach based on molecular dynamics (MD) and the generalized interpolation material point method (GIMP) is developed for the multiscale modeling and simulation of energetic composites under simple loading conditions.	2109-1 **PHOTONIC CRYSTAL& ELECTROCHROMIC FUNCTIONAL COMPOSITE MATERIALS INSPIRED BY NATURE** *Xiaoyi Chen, Hangchuan Zhang, Jiupeng Zhao, Na Li, Yao Li* (Harbin Institute of Technology) Nature has developed materials, objects and processes that function from the macroscale to the nanoscale. Synthetic microspheres and colloidal crystals were used to simulate the structure of butterfly wings to prepare many kinds of photonic crystals, including the opal structure and inverse opal structure.	2110-1 **CONTROL OF COMPOSITE FATIGUE DAMAGE EVOLUTION USING INFRARED THERMOGRAPHY AND THERMOELASTIC STRESS ANALYSIS** *J.E. Thatcher, D.A. Crump*(University of Southampton, UK), *P.B.S. Bailey*(Instron Division of ITW Ltd., UK), *J.M. Dulieu-Barton*(University of Southampton, UK) An investigation into the use of the full field monitoring technique, infrared thermography, as a method to control the damage evolution rate in a composite material fatigue test. Thermoelastic stress analysis is used to identify, characterise and quantify the material damage type.	2111-1 **FILTRATION EFFECTS OF GRAPHENE NANOPLATELETS IN LIQUID MOULDING OF COMPOSITES: PROBLEMS AND POSSIBLE SOLUTIONS** *Han Zhang, Yi Liu, Arnaud Kernin, Emiliano Bilotti, Tim Peijs* (Queen Mary University of London) For the first time the filtration effect of GNPs during manufacturing of nano-engineered hybrid composites has been demonstrated and characterized. An innovative alternative solution has been proposed and examined without filtration effects to deliver GNPs into composite laminates.
09:25	2101-2 **TUNGSTEN DOPED VO_2 AND MICROGELS HYBRID THERMOCHROMIC MATERIAL** *Yong-Sheng Yang* (Wuhan Textile University, Nanyang Technological University) *Yang Zhou* (Nanyang Technological University) *Freddy Boey Yin Chiang* (Nanyang Technological University), *Yi Long* (Nanyang Technological University)	2102-2 **EFFECT OF ELECTROPLATING PARAMETERS ON MICROSTRUCTURE OF COPPER COATING ON CARBON FIBERS USED FOR FABRICATION OF ALUMINUM MATRIX COMPOSITE** *Fei Guo, Yongbum Choi, Zhefeng Xu, Kazuhiro Matsugi, Kenjiro Sugio, Gen Sasaki* (Hiroshima University) Preforms of vapor-grown carbon fibers were fabricated and characterized with microstructure, porosity, compressive property and thermal property. Subsequently, the preforms were utilized to fabricate aluminum matrix composites for heat sink material by low pressure infiltration method.	2103-2 **TIME DEPENDENT DEFORMATION BEHAVIOR OF ADAPTIVE FIBER REINFORCED PLASTICS** *Moniruddoza Ashir, Jan Hindahl, Andreas Nocke, Chokri Cherif* (Dresden University of Technology) Depending on the activation time of shape memory alloys, the deformation behavior of the investigated adaptive pleated fiber reinforced plastics is adjustable.	2104-2 **THE MECHANICS OF INTERFACE FRACTURE IN LAYERED COMPOSITE MATERIALS: (5) THIN FILM SPALLATION DRIVEN BY POCKET ENERGY CONCENTRATION – MICROSCOPIC INTERFACE FRACTURE** *S. Wang* (Loughborough University, Hebei University of Engineering), *C.M. Harvey* (Loughborough University), *B. Wang* (Loughborough University), *A. Yanson*, *J. Rogers* (Loughborough University) For the first time, it is discovered that spallation of thin films of micro or nanoscale thicknesses is often driven by pockets of energy concentration. The developed analytical theory gives excellent predictions for the thin film spallation behaviour including straight edge spallation, circular edge spallation and telephone cord spallation.	2105-2 **INTERLAMINAR REINFORCEMENT OF CARBON FIBER COMPOSITES USING ALIGNED CARBON NANOTUBES** *Xiaotian Yu* (Massachusetts Institute of Technology), *Estelle Cohen* (Massachusetts Institute of Technology), *Carlos Portugal* (University of Porto), *Brian Kozy* (Massachusetts Institute of Technology), *Nathan Fritz* (Massachusetts Institute of Technology), *Alberto Alonso* (University of Porto), *Gabriel Varela* (Massachusetts Institute of Technology), *Tawni Hank* (Massachusetts Institute of Technology), *Brian Wardle* (Massachusetts Institute of Technology) Aligned nanoscale fibers (carbon nanotubes, CNTs) are used to reinforce the interlaminar resin-rich region of aerospace-grade unidirectional carbon fiber laminates in an architecture termed "nanostitching". The effect of nanostitching on laminate strength was investigated through ex situ and in situ mechanical testing.	2106-2 **A NOVEL DIGITAL LIGHT PROCESSING TECHNOLOGY OF SHORT SIC FIBER REINFORCED SIC MATRIX COMPOSITES** *Ruike He, Dong Liang, Kegiang Zhang, Lu Zhang, Lei Hu, Zongwei Tong* (Beijing Institute of Technology)	2107-2 **MESHLESS SIMULATION OF CLASSICAL RE-ENTRANT HONEYCOMB AUXETIC STRUCTURES** *D. M. Li, Chen Liu* (Wuhan University of Technology) Started with an simplest case, classical re-entrant honeycomb auxetic structures, this paper pursues implementation of the meshless method to numerical analysis of multiply connected bodies. Numerical analysis is carried out for the purposes of validating numerical approach and demonstrating new methods as well as proposing novel structures using EFG, RKPM, IEFG and IRKPM.	2108-2 **MICROMECHANICAL ANALYSIS ON INFLUENCE OF THE FUNCTIONAL-GRADED INTERPHASE ON THE IMPACT RESPONSE OF CARBON-FIBER REINFORCED COMPOSITE** *Kaifu Zhang, Yi Cheng , Hui Cheng* (Northwestern Polytechnical University)	2109-2 **LISTEN TO THE WATER CONCERTO DURING THE FRACTURE PROCESS OF CELLULOSE FIBROUS BAMBOO** *Guowei Chen, Hongyun Luo* (Beijing University of Aeronautics and Astronautics) There were three kinds of fracture behaviours during the fracture process of the cellulose fibrous bamboo, which were parenchyma cells breakage, interfacial dissociation and fibre breakage. While the three fracture types were decorated as accompaniment instruments, and water played as the main theme and the leading role in this enchanting and wonderful concerto.	2110-2 **DEVELOPMENT OF A TECHNIQUE FOR EVALUATING DAMAGE IN COMPOSITE OVERWRAPPED PRESSURE VESSELS USING TSA** *D.A. Crump, N. Sathon., S.I. Ahmed, T.M Allen, R.C Tighe, P.A Reed, J.M.Dulieu- Barton* (University of Southampton) Composite overwrapped pressure vessels are subjected to quasi-static indentation to impart damage of the type and level that may occur from low velocity impact at two different energy levels. The damage zone is inspected using X-ray computed tomography (CT) to provide information on subsurface damage, and thermoelastic stress analysis to determine how the stresses were redistributed in the vicinity of the damage.	2111-2 **HYBRID METACOMPOSITES WITH DOUBLE-NEGATIVE EFFECTS** *Y. Luo, Yongqiang* (University), *F.X. Qin* (Zhejiang University), *F. Scarpa* (University of Bristol), *M. Ipatov* (Universidad del Pais Vasco), *A. Zhukov* (Universidad del Pais Vasco), *J. Carbonell* (Universidad Politecnica de Valencia), *H.X. Peng* (Zhejiang University) In the work we design microwave metasurface based metacomposite containing ferromagnetic microwires arranging in a simple parallel fashion. The metacomposite is featured with typical left-handed electromagnetic properties obtained from the waveguide microwave measurement which are recognized being promising for electromagnetic cloaking and high efficient antenna applications.

Time	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
08:00	PLENARY LECTURE at Qujiang Auditorium: **Brief Introduction to Materials Genome Initiative and Materials Informatics** Tongyi Zhang, Shanghai University, China										
09:05	2112 Office Naval Research (ONR) Session 4	2113 Joints 4	2114 Composite Structures 4	2115 Fatigue 4	2116 Stimuli Responsiveness and Shape Reconfiguration 4	2117 Design and Manufacture for Multifunctionality 4	2118 Interfaces and Interphases 4	2119 Recycling of Composites and Sustainability 3	2120 Bio and Medical 2	2121 Aerospace 4	
09:05	2112-1 **DEBOND FRACTURE CHARACTERIZATION IN SANDWICH COMPOSITES UNDER ARCTIC LOW TEMPERATURE CONDITIONS** *Christian Berggreen* (Technical University of Denmark)	2113-1 **THE EFFECT OF SURFACE TREATMENTS ON THE BEHAVIOUR OF ADHESIVELY BONDED, THERMOPLASTIC COMPOSITE LAP JOINTS** *Emer McAleavy, Brian G. Falzon, Damian Quinn*(Queen's University Belfast) Thermoplastic resin composites are currently of great interest, as they possess greater fracture toughness, are potentially recyclable and form imperishable prepregs, in comparison to their more commonly used thermosetting resin counterparts.	2114-1 **RADAR CROSS SECTION SIMULATION OF A CORE SANDWICH COMPOSITE PLATE BY MOM METHOD** *Ye Yuan, Mingtong Yang, Xiaodong He,Yibin Li* (Harbin Institute of Technology)	2115-1 **INVESTIGATING THE GOODMAN DIAGRAM FOR SHORT-FIBRE CARBON REINFORCED POLYPROPYLENE COMPOSITES** *P.B.S.Bailey* (Instron Dynamic Systems), *P.R.Wilson* (University of Warwick) A short investigation of the fatigue of a carbon fibre reinforced injection moulding compound through experimental determination of a Goodman (or Haigh-Soderberg) diagram, and the use of video extensometry to continuously monitor dynamic stiffness and damping.	2116-1 **CHARACTERIZATIONS OF THREE-DIMENSIONAL DEPLOYMENT BEHAVIOR OF SHAPE MEMORY POLYMER COMPOSITE ANTENNAS** *Yongsan An* (Seoul National University), *Jinsu Kim* (Seoul National University), *Seok Bin Hong* (Seoul National University), *Joon hyeok Jang* (Seoul National University), *Nam Seo Goo* (Konkuk University), *Woong-Ryeol Yu* (Seoul National University) The three-dimensional deployment behavior of shape memory polymer composite antennas were characterized using 3D shape descriptors.	2117-1 **NUMERICAL SIMULATION ON THE EVOLUTION OF SHEAR BANDS IN BULK METALLIC GLASS COMPOSITES TOUGHENED BY PARTICALS WITH DIFFERENT MECHANICAL PRPERTIES (Invited Talk)** *Wei Rao, Juan Zhang, Guozheng Kang* (Southwest Jiaotong University)	2118-1 **MULTIFUNCTIONAL COMPOSITES BASED ON VARIOUS NANOLAYERS** *Jie Zhang* (Xi'an Jiaotong University), *Shanglin Gao* (Leibniz-Institut für Polymerforschung Dresden), *Zuoguang Ye* (Xi'an Jiaotong University, Simon Fraser University) In this report, we presented the enhanced the interfacial shear strength of composites with glass fibers deposited by nano-layer (CNTs, ZnO). At the same time, the single modified fiber could be designed as multifunctional sensor based on various nano-layers.	2119-1 **INFLUENCE OF RECYCLING CONDITION ON THE SCATTER OF CFRP PROPERTIES** *N. Okano* (The University of Tokyo), *H. Wei* (The University of Tokyo), *G. Cai* (The University of Tokyo), *M. Wada* (Japan Fine Ceramics Center), *S. Kitaoka* (Japan Fine Ceramics Center), *J. Takahashi* (The University of Tokyo) The difference of coefficient of variation between virgin carbon fibers and recycled carbon fibers whose recycling method is superheated steam treatment is investigated.	2120-1 **CELL INTERACTION WITH ELASTIC NANOPARTICLES** *Xin Yi* (Peking University) We conducted a theoretical study on the kinetics of receptor-mediated endocytosis of elastic nanoparticles that is limited by receptor diffusion. It is shown that, while soft nanoparticles are energetically less prone to full wrapping than stiff ones, the wrapping of the former is kinetically faster than that of the latter.	2121-1 **TAILOR-MADE THERMOPLASTICS: PRODUCTION TECHNOLOGY AND QUALITY ASSURANCE OF A THERMOPLASTIC AIRCRAFT FUSELAGE SKIN SEGMENT** *Frederic J.C. Fischer, Christoph Frommel, Arthur-Hans Thellmann, Thomas Stefani, Michael Kühnel, Matthias Beyrle, Alfons Schuster, Tobias Gemrangss, Michael Kupke* (German Aerospace Center (DLR))	
09:25	2112-2 **EFFECT OF LOW TEMPERATURE ON IMPACT BEHAVIOR OF COMPOSITE SANDWICH STRUCTURES** *Mohammed Elamin, Bing Li, K.T. Tan*(Department of Mechanical Engineering, The University of Akron) This work explores the impact behavior of composite sandwich structures in arctic condition, with the aim to elucidate damage response of CFRP facesheets and foam core due to extreme low temperature effects.	2113-2 **THE EFFECT OF WRINKLED INTERFACE ON TENSILE STRENGTH OF COMPOSITE SINGLE-LAP JOINT.** *Yu-Ju Chen, Hsin Haou Huang*(National Taiwan University) This paper is about the experimental research about the effect of symmetry wrinkled interface on the composite single-lap joint.	2114-2 **QUASI-STATIC CRUSHING OF DIFFERENT CONFIGURATIONS OF METAL-COMPOSITES HYBRID TUBES UNDER AXIAL/LATERAL LOADING** *Dongdong Chen, Guohua Zhu, Hang Yu, Xintao Hua* (Hunan University), *Guangyong Sun* (The University of Sydney) This study explores the crushing characteristics involving energy absorption and damage behaviors of different configurations of hybrid aluminum/CFRP under quasi-static axial/lateral loading.	2115-2 **INTEGRATIVE SIMULATION CHAIN FOR LIFETIME ASSESSMENT OF HIGHLY LOADED SHORT FIBER-REINFORCED THERMOPLASTICS: STATE-OF-THE-ART AND NEED FOR IMPROVEMENTS** *Matthias De Monte* (Robert Bosch GmbH), *Camilo Cruz* (Robert Bosch GmbH), *Jan Martin Kaiser* (Robert Bosch GmbH), *Andreas Wilmes* (Robert Bosch GmbH) In this work the state of the art of the integrative simulation chain for design and dimensioning of short fiber reinforced plastics part under fatigue loading is discussed. After introducing the single steps of this chain, the topics of strength reduction due to weld line and fatigue damage accumulation are treated in detail.	2116-2 **GOLD NANOPARTICLES/ POLY (VINYL ALCOHOL) SHAPE MEMORY NANOCOMPOSITES** *Wenxin Wang* (Harbin Institute of Technology, Nanyang Technological University), *Xianbin Liu* (Nanyang Technological University), *Wei Xu* (Harbin Institute of Technology), *Honggu Wei* (Harbin Institute of Technology), *Yanru Liu* (Harbin Institute of Technology), *Yu Han* (Harbin Institute of Technology), *Yong Jin* (Harbin Institute of Technology), *Haiun Du* (Nanyang Technological University), *Jinsong Leng* (Harbin Institute of Technology) A novel light-induced SMP microfluidic chip was developed for the first time by taking advantage of photothermal effect of AuNPs and SME of PVA-based SMP.	2117-2 **FABRICATION AND DESIGN OF MULTILAYER ANISOTROPIC COMPOSITES BASED SOFT ACTUATORS** *Wang Dong* (Singapore University of Technology and Design), *Ling Li* (Shanghai Jiao Tong University), *Ahmad Serguieh* (Singapore University of Technology and Design), *Long-Teng Dong* (Shanghai Jiao Tong University), *Guo-Ying Gu* (Shanghai Jiao Tong University), *Qi Ge* (Singapore University of Technology and Design)	2118-2 **INTERMITTENT INTERFACES: BIOINSPIRED STRATEGIES TOWARDS MATERIAL RESILIENCE** *H. Daniel Wagner* (Weizmann Institute of Science) We have designed interfaces in fiber composites comprising droplets as intermittent obstacles spread along single fibers, to generate strength and toughness increases. Preliminary data with epoxy (EP828) beads on single E-glass fibers reveal simultaneous enhancement of composite strength and toughness resulting from the presence of the beads. Preliminary pull-out tests of fibers with a single bead demonstrate the principle of the concept. From a materials science viewpoint, this approach could bring about innovative thoughts for the structural design of future bio-inspired multiscale composite materials.	2119-2 **RECYCLING CPPS LAMINATES INTO LONG FIBRE THERMOPLASTIC COMPOSITES BY LOW SHEAR MIXING** *TA. de Bruijn* (Saxion University of Applied Sciences, University of Minho), *G. Vincent* (ThermoPlastic composites Research Center), *F.W.J. van Hattum* (Saxion University of Applied Sciences) Shredded C/PPS laminate waste is recycled by a special low shear mixing machine and compression moulding, while focusing on long fibre length. Mechanical and microscopic results are obtained and compared to cut semipreg waste, LFT pellets, virgin laminate and micromechanical models.	2120-2 **THERMAL ANALYSIS OF MICRO-SCALE INORGANIC LIGHT-EMITTNG DIODES WITH ORTHOTROPIC LAYERED SUBSTRATE INTEGRATED WITH HUMAN SKIN** *Yuhang Li* (Institute of Solid Mechanics, Beihang University (BUAA), Beijing 100191) The layered materials can help control the temperature distribution in the micro-scale inorganic light-emitting diodes (μ-LEDs) device integrated with human skin. An analytical three-dimensional heat transfer model is established for the system integrated with Fourier heat transfer equation and Pennes bioheat equation considering the layer material as substrate layer.	2121-2 **BOLT-LOAD CARRYING AND TRANSFER MECHANISM IN HIGHLY TORQUED SINGLE-LAP COMPOSITE BOLTED JOINTS WITH BOLT-HOLE CLEARANCES** *Fengrui Liu* (Beihang University), *Xuheng Lu* (Shanghai Electric Wind Power Group Co., Ltd.), *Libin Zhao* (Beihang University), *Jianpu Zhang* (Chongqing University) The free body diagram analyses, 3D FE analyses and static load distribution experiments of single-bolt and three-bolt joints were performed to disclose the load distribution mechanism in highly torque single-lap bolted joints with bolt-hole clearances.	

Tuesday 22 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
09:45	2101-3 **EFFECTS OF SILICA ON NANO-IMPRINTING PATTERN FORMATION OF PHOTO-REACTIVE ACRYLATE RESINS** *Seok Hyeon Kim, Sunhee Park, Kipook Song (Kyung Hee University)* Nano-imprinting technique has received considerable attention because of its advantages, such as low cost and high resolution for nano scale patterns applied in various fields. In this study, the effects of silica content were studied on curing characteristics of imprinted nano-size patterns with photo-reactive polymers.	2102-3 **FABRICATION AND THERMAL CONDUCTIVITY OF CARBON NANOFIBER REINFORCED ALUMINUM MATRIX COMPOSITES BY LOW PRESSURE INFILTRATION CASTING** *Fei Gao, Yongbum Choi, Zhefeng Xu, Kazuhiro Matsugi, Kenjiro Sugio, Gen Sasaki (Hiroshima University)* Preforms of vapor-grown carbon fibers were fabricated and characterized with microstructure, porosity, compressive property and thermal property. Subsequently, the preforms were utilized to fabricate aluminum matrix composites for heat sink material by low pressure infiltration method.	2103-3 **THE EFFECTS OF FIBER WAVINESS ON THE STIFFNESS OF COMPOSITE LAMINATES** *Wen-Hao Zeng, Peng He, Guo-Feng Chen, Yong-Tai Yang (Chinese Academy of Sciences)* An analysis method for calculating the equivalent stiffness of composite laminates that contain sinusoidal or cosine curved fiber waviness is presented, which is simple and suitable for fast caclulation on the effect of fiber waviness on the stiffness of composite laminates.	2104-3 **THE MECHANICS OF INTERFACE FRACTURE IN LAYERED COMPOSITE MATERIALS; (6) SPALLATION OF THERMAL BARRIER COATINGS OF TURBINE BLADES** *C.M. Harvey (Loughborough University), B. Yuan (Loughborough University), R. Tomson (Loughborough University), G. Critchlow (Loughborough University), S. Wang (Loughborough University, Hebei University of Engineering)* An analytical mechanical model is developed to predict the room temperature spallation behaviour of the electron beam-physical vapour deposited (EB-PVD) TBCs on engine turbine blades. Preliminary studies show that the developed mechanical model has potential to predict the TBC spallation behaviour.	2105-3 **GRAPHENE/ COPPER NANOWIRE NANOCOMPOSITE FOR THERMAL MANAGEMENT APPLICATION** *Xianyan Sun, Fan Xu, Zaishan Lin, Qingzu Peng, Xiaodong He, Yibin Li (Harbin Institute of Technology)* Here we propose a novel method to fabricate the three dimensional assembling graphene and copper nanowire nanocomposite, where the thickness direction could be changeable. The thermal conductivity of graphene-based nanocomposite is up to 1100 W/m.K, which is nearly there times that of copper, six times that of aluminum.	2106-3 **THE THERMAL EVOLUTION OF LITHIUM SUBSTITUTED CESIUM BASED GEOPOLYMER IN HEAT TREATMENT PROCESS** *Aus. Jingkun Yuan, Peigang He, Dechang Jia (Harbin Institute of Technology)* The thermal evolution process of lithium substituted Cs-based geopolymer was investigated and disclosed the effects of thermal treatment temperature and soaking time, respectively.	2107-3 **DAMAGED ALUMINUM PANEL REINFORCED BY COMPOSITE PATCHES UNDER SHEAR LOADS- A NUMERICAL AND EXPERIMENTAL INVESTIGATION** *H. Abramovich , Y. Simanovsky (Technion)* The research aims to study the effect of various parameters like, patch size, overlaps, sequences and bonding thickness on composite repair patch for a panel, subjected to shear loads. The research is based on a new approach of finite element modeling, consisting of a combination of 2D and 3D elements, and backed up by a dedicated set of experiments, which validated the FE approach.	2108-3 **PERIDYNAMICS FOR PREDICTING A DAMAGE TENSOR IN COMPOSITES** *E. Madenci , A. Barut (The University of Arizona), N. Phan (Naval Air Systems Command (NAVAIR))*	2109-3 **TOUGNENING MECHANISMS IN A NATURAL COMPOSITE: A CROSSED-LAMELLAR STRUCTURE** *H.M. Ji (Ryerson University, Northeastern University), X.W. Li (Northeastern University), D.L. Chen (Ryerson University)* Biological shell, as a kind of natural composite, exhibit several toughening mechanisms, including micro cracking, channel cracking, bridgings, etc.	2110-3 **RESHAPING THE TESTING PYRAMID: UTILISATION OF DATA- RICH NDT TECHNIQUES AS A MEANS TO DEVELOP A 'HIGH FIDELITY' COMPONENT AND SUB-STRUCTURE TESTING METHODOLOGY FOR COMPOSITES** *D. J. Bull (University of Southampton), J. M. Dulieu-Barton (University of Southampton), O. T. Thomsen (University of Southampton), R. Butler (University of Bath), A. T. Rhead (University of Bath), T. Fletcher (University of Bath), K. D. Potter (University of Bristol), R. A. Smith (University of Bristol)* This talk explores the feasibility of thermoelastic stress analysis and digital image correlation to study the effects of wrinkle defects on real structural scale components. Finite element models and ultrasonic work which were conducted alongside this work are also presented.	2111-3 **THE EFFECT OF INTERACTION BETWEEN TITANIUM ALLOY AND CFRP ON THE INTERFACE DAMAGE IN CUTTING TI/CFRP STACK COMPOSITE** *Chen Chen, Zhenyuan Jia, Fuji Wang, Bin Niu, Fan Yang, Guanglan Bi (Dalian University of Technology)* Establish a 3D finite element macro oblique cutting model to simulate the sub-surface damage of CFRP in the interface region with the constraint of titanium.
10:05	2101-4 **3D BORON NITRIDE FOAM REINFORCED FLEXIBLE INSULATED POLYMER WITH HIGH THERMAL CONDUCTIVITY** *Haoming Fang, Shulin Bai (Peking University)* A series of novel flexible polymer composites consist of boron nitride foam and polydimethylsiloxane (PDMS) were prepared and shows a large enhancement in thermal conductivity due to the interconnected network of BNF.	2102-4 **MECHANICAL PROPERTIES OF TITANIUM METAL MATRIX NANOCOMPOSITES REINFORCED WITH MULTIWALLED CARBON NANOTUBES, GRAPHENE AND NANODIAMONDS PREPARED BY SPARK PLASMA SINTERING** *Sufi Liu, Faming Zhang, Peipei Zhao, Tengfei Liu, Lili Wang (Southeast University)* The nanocarbon materials including multiwalled carbon nanotubes (MWCNTs), graphene (Gr) and nanodiamonds (NDs) were used as reinforcements in the titanium metal matrix composites (TiMMCs) fabricated via ball milling and spark plasma sintering techniques. Experimental results show that the mechanical properties in the three kinds of TiMMCs.	2103-4 **IMPACT OF THERMAL LOADS ON THE DAMAGE ONSET OF FIBER REINFORCED PLASTICS** *David Kraus, Volker Trappe (Federal Institute for Material Research and Testing (BAM))* A new approach for the calculation of static damage and damage onset of thermomechanical fiber reinforced plastics based on the matrix effort at different temperatures is shown. Calculations are compared with the results of quasi-static tests with glass fiber reinforced epoxy.	2104-4 **THE MECHANICS OF INTERFACE FRACTURE IN LAYERED COMPOSITE MATERIALS (7) ADHESION TOUGHNESS OF MULTILAYER GRAPHENE MEMBRANES – NANOSCALE INTERFACE FRACTURES** *J.D. Wood (Loughborough University), C.M. Harvey (Loughborough University), S. Wang (Loughborough University, Hebei University of Engineering)* The presence of sliding in multilayer graphene membranes increases the fracture mode ratio , leading to a decrease in adhesion toughness measurements when using the circular blister tests.	2105-4 **STRUCTURE AND PROPERTIES OF LIGNIN BASED CARBON NANOFIBERS (INVITED TALK)** *Lixin Song (University of British Columbia, Zhejiang Sci.-Tech University), Addie Bahi (University of British Columbia), Li-Ting Lin (University of British Columbia), Lynn (Yuqin) Wan (University of British Columbia), Angela Dodd (University of British Columbia), Suzana K. Straus (University of British Columbia), Frank K. Ko (University of British Columbia)* Carbon nanofiber (CNF) made of inexpensive and bio-renewable raw materials, such as lignin, can provide a pathway to lowering manufacturing cost of CNFs for structrual and functional composite applicaitons. In this study, lignin based CNF mats were succussfully fabricated by electrospinning.	2106-4 **FAILURE MECHANISM OF THE WOOD PLASTIC COMPOSITES** *R. Kitamura (Tokyo university of science), A. Hara (Tokyo university of science), S. Ogihara (Tokyo university of science), H. Ito (Tecos Corporation), S. Ogoe (Tecos Corporation), A. Nordin (Ymaguchi university), K. Sakamoto (Ymaguchi university), H. Balgis, (Ymaguchi university), K. Goda (Ymaguchi university)* The stress-strain curves of wood plastic composites showed nonlinear behavior, and the strength and elastic modulus were increased with wood flour addition rate due to the micro void growth.	2107-4 **MULTI-MATERIAL TOPOLOGY OPTIMISATION FOR COMPOSITE METAL AIRCRAFT STRUCTURES** *Cheng Liu, Mehdi Yasaee, Iman Dayyani (Cranfield University)* This paper proposes a new optimization routine for lightweight composite-metal aircraft structures. It is developed based on two existing topology optimization approaches (i.e. Moving Morphable Components and level set method updated by a reaction diffusion equation).	2108-4 **DYNAMIC VISCOELASTIC MODELING OF INTERFACIAL DEBONDING FOR MAGNETORHEOLOGICAL MULTIFUNCTIONAL NANOCOMPOSITES** *Lizhi Sun (Zhejiang University of Technology, University of California, Irvine)* Recognizing the importance of interfacial debonding in determining the overall mechanical properties of materials, in this paper we developed a micromechanics-based effective viscoelastic model for magnetorheological multifunctional nanocomposites		2110-4 **NONLOCAL CONSTITUTIVE MODELING OF DAMAGEABLE BRITTLE AND QUASI-BRITTLE MATERIALS** *Zhenyuan Gao, Liang Zhang, Wenbin Yu (Purdue University)* A nonlocal constitutive model for damageable brittle and quasi-brittle materials, capable of predicting multi-site damage initiation and arbitrary fracture paths, is developed as a general standard model. It is implemented as a VUMAT in Abaqus to simulate several cases to demonstrate its application.	2111-4 **TENSILE MODULUS OF GLASS FIBER/ CARBON FIBER REINFORCED POLYPROPYLENE HYBRID COMPOSITES FABRICATED BY VENTED INJECTION MOLDING** *Xiaofei Yan (Kyoto Institute of Technology), Lichao Yu (Kyoto Institute of Technology), Akihiko Imaizu (Kyoto Institute of Technology), Akio Kataoka (Nihon Yuki Co., Ltd.), Hiroyuki Hamada (Kyoto Institute of Technology), Yuqiu Yang (Donghua University)* Tensile modulus of glass fiber/carbon fiber reinforced hybrid composite manufactured by vented injection molding machine was evaluated based on the skin-core-skin structure and the laminate analogy approach method. The predicated results were in good agreement with the experiments one.
10:25	Coffee Break										

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
2112-3 **COMPARISON OF SEAWATER EFFECTS ON MECHANICAL AND VISCOELASTIC PROPERTIES OF EPOXY COMPOSITES WITH GLASS, CARBON AND THEIR HYBRID FABRIC REINFORCEMENTS** *Alfred Tcherbi-Narteh, Delroy Watson, Mohammad Zaheeruddin, Donnell Tobias, Mahesh Hosur, Shaik Jeelani (Tuskegee University)* This work focuses on the synthesis and characterization of glass, carbon and hybrid of glass and carbon composites in an epoxy matrix when exposed to sea water conditioning.	2113-3 **STRENGTH PREDICTION IN LAMINATES PULL-THROUGH COUNTERSUNK BOLTED JOINTS STRUCTURES** *Feng Lao, Licheng Guo, Li Zhang1, Yang Sun (Harbin Institute of Technology)* An asymptotic damage model for predicting the damage behavior and failure of composite bolted joints structure was proposed which can predict the damage behavior of complex PJS effectively.	2114-3 **DEVELOPMENT OF COMPOSITE GEARBOX** *Dr. Thomas Schneider, Raik Rademacher, Monika Kreutzmann(Department of Simulation, ARRK Engineerin)* The project is about the development of a carbon fiber reinforced thermoplastic transmission housing based on a conventional aluminum gearbox. By saving 30% of weight it fulfills all requirements like stiffness and strength of the original gearbox.	2115-3 **FATIGUE CRACK INITIATION LIFE PREDICTION OF FIBER METAL LAMINATES BASED ON DISLOCATION DYNAMICS** *Zhang Mingyi (China Academy of Engineering Physics), Yue Guangquan (Beijing Aeronautical Science & Technology Research Institute of COMAC), Liu Fu (Shanghai Aircraft Design and Research Institute of COMAC)* An analytical approach combining the residual stress analysis method for FMLs and probabilistic micromechanical model is proposed for predicting the fatigue crack initiation life of FMLs, and it does not rely on the fatigue life database of metals.	2116-3 **GRAPHENE-REINFORCED CHITOSAN/ PDMS MORPHING COMPOSITES** *Zhenying Huang, Xingmin Wei, Hongxiang Zhai, Leping Cai, Wenqiang Hu (Beijing Jiaotong University)* Graphene-reinforced chitosan/ polydimethylsiloxane bi-layered morphing composites are designed leveraging differential coefficient of thermal expansion in the layers. Under the activation of thermal triggers, the active bi-layered composite achieves rapid, reversible and multi-repeatable morphing.	2117-3 **ADVANCES IN PORO-VASCULAR COMPOSITES: TOWARD NON-MECHANICAL SURFACE ROUGHNESS CONTROL** *Russell C. Reid, James P. Thomas, Marriner H. Merrill (U.S. Naval Research Laboratory)* Recent progress on poro-vascular composites (PVCs) with structural skin and active surface roughness functionalities is reported focusing on liquid-phase component design and characterization for pore menisci control at the skin surface.	2118-3 **FINITE ELEMENT IMPLEMENTATION OF INTRINSIC FIELD TENSORS** *D.J. O'Shea, D.C. Kellermann, M.M. Attard (University of New South Wales)* This paper presents the implementation of a novel orthotropic-based elasticity theory into finite element applications; employing it to the analysis of interlaminar stress behaviour of multi-layered fibre-reinforced composites. The physical significance of the new theory is readily apparent when observing the well-researched and longstanding free-edge stress singularity problem, and comparing to the classical mechanical approach.	2119-3 **BESTOW METAL FOAMS AND WIRES WITH NANOSTRUCTURED SURFACE VIA CONVENIENT ELECTROCHEMICAL METHODS FOR IMPROVED DEVICE PERFORMANCE** *Yawen Zhan, Jian Lu, Yang Yang Li (City University of Hong Kong)*	2120-3 **MECHANICS-GUIDED DETERMINISTIC 3D ASSEMBLY WITH BIOMEDICAL APPLICATIONS (INVITED TALK)** *Yonggang Huang (Northwestern University)*	2121-3 **HAIL IMPACT ON COMPOSITE STRUCTURES OF CIVIL AIRCRAFTS** *Ye Zhang, Yue Shi, Caoning Su, Sifeng Xu (Beijing Aeronautical Science & Technology Research Institute of COMAC)* The high velocity hail impact on composite structures of civil aircraft was experimentally and numerically investigations. A explicit FE procedure was established to predict failure of hailstones during high velocity impacting.	
	2113-4 **EXPERIMENTAL INVESTIGATION OF INTEGRAL COMPOSITE T-JOINTS UNDER MIXED MODE LOADING** *A. Hannig, F. Nolte , P. Horst(Institute of Aircraft Design and Lightweight Structures)* A novel test fixture for mixed mode loading of composite T-joints is developed and first experimental results are presented.	2114-4 **AN AXIAL TENSILE TEST OF COMPOSITE STIFFENED PANELS WITH TWO MAN-HOLES AFTER IMPACT** *Peng Shi, Qun Zhao, Jianzhuo Sun , Chuanjun Liu(Beijing Aeronautical Science & Technology Research Institute of COMAC)* A set of composite stiffened panels with two man-holes, subjected to an axial tensile load, was tested after impact. The effects of impact damage on the panel, especially on the strain distribution, were investigated and discussed.	2115-4 **RAPID DETERMINATION OF FATIGUE LIMITS OF COMPOSITES BY LUONG'S METHOD AND ITS IMPROVEMENT** *J. Huang, M.L. Pastor, C. Garnier, X.J. Gong (Université Toulouse)* New treatment methods based on thermographic data were developed to determine the fatigue limit of composite with uniqueness and the accuracy and applicability were evaluated.	2116-4 **ADAPTIVE AIR INLET FOR FLUID FLOW CONTROL** *G. Arena, R.M.J. Groh, R. Theunissen, A. Brinkmeyer, P.M. Weaver, A. Pirrera (University of Bristol)* Exploiting structural instabilities for the design of a shape changing air duct.	2117-4 **FABRICATION OF SOFT COMPOSITE FLAPPING ACTUATOR** *Min-Sik Kim, Sung-Hyuk Song, Sung-Hoon Ahn (Seoul National University)* This research is associated with making a flapping wing without using mechanical structures.	2118-4 **FRACTAL-BASED ANALYSIS OF THE VOID MICROSTRUCTURE OF BI2SR2CACU2OX MULTIFILAMENTARY COMPOSITE ROUND WIRES AND THE CAUSED ANOMALOUS THERMAL DIFFUSION** *Xiaofan Gou, Peijun Zhuo, Xinxin Zhou (Hohai University)* Bi2Sr2CaCu2Ox (Bi2212) multifilamentary composite wires are the only round wire candidate for fabricating high field magnets. Fractal-based studies of the Bi2212 filaments/Ag matrix and voids in the filaments have been carried out in this work.			2121-4 **EXPLORING DEPLOYABLE CONFIGURATIONS USING INTERLEAVED COMPOSITES WITH SHAPE MEMORY CAPABILITY** *H.A. Maples (Imperial College London, University of Vienna), B. Zhang (Imperial College London), P. Robinson (Imperial College London), A. Bismarck (Imperial College London, University of Vienna), W. Li (Imperial College London), C. Burgstaller (Transfercenter für Kunststofftechnik (TCKT))*	
Coffee Break										

Tuesday 22 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
10:50	KEYNOTE at Quijang Auditorium: **Modeling of Thermoplastic Composites Manufacturing Processes Reinforced with Continuous Fibers** Woo Il Lee, Seoul National University, Korea KEYNOTE at Lily Hall: **Muscular Compliance in Bioinspired Soft Robots** Norman Wereley, University of Maryland, USA KEYNOTE at Rose Hall: **A Snapshot into the Evolution of Manufacturing, Characterization, Modeling Efforts to Tailor Function-Performance Strategy in Composites** Ozden Ochoa, Texas A&M University, USA										
11:35	2201 Polymer Matrix Materials 5	2202 Metal Matrix Composites 5	2203 Fiber-reinforced Composites 5	2204 Fracture and Damage 5	2205 Nano-Composites 5	2206 Fiber-reinforced Composites 16	2207 Structural Analysis and Optimization 5	2208 Multiscale Modelling of Structures 5	2209 Bio-Composites 5	2210 Thermography 2	2211 Hybrid Composites 5
11:35	2201-1 **CONVENIENT CONTROL OVER HIGH TEMPERATURE SHAPE MEMORY POLYMERS** *Deyan Kong, Xinli Xiao (Harbin Institute of Technology)* New generation of heat-shrinkable polyimide tubes and shape memory polyimide films with controllable properties have been prepared and analyzed.	2202-1 **QUANTITATIVE CONTROL AND MEASUREMENT OF CNT/AL INTERFACIAL REACTION DEGREE FOR ENHANCED MECHANICAL PROPERTIES** *Ziyun Yu, Zhangju Tan, Genlian Fan, Qing-Bang Xiong, Zhigang Li, Di Zhang (Shanghai Jiao Tong University)* A quantitative method based on the hydrolysis effect of Al4C3 was developed for measuring CNT/Al interfacial reaction. Such method allows quantitative study on the effect of interfacial reaction on mechanical properties of CNT/Al composite, which set theoretical basis for optimizing material processing.	2203-1 **TOWARD LED CURED CARBON FIBER COMPOSITES: DUAL-CURE PHOTOCHEMICAL/ THERMAL INFUSION PROCESS.** *Ahmad Ibrahim, Xavier Allonas, Fabrice Laurent (LPIM University of Upper Alsace)* The potential of UV cure (ecofriendly, ultrafast, space and temporal control, …) in combination with carbon fiber has rarely been considered due to the opacity of the fiber and to the limited cure speed. In order to overcome these limitations, a ducal-cure photochemical/ thermal formulation with long pot-life (> 4 hours) was developed for the fabrication of carbon fiber composites by infusion process.	2204-1 **WHEN AN INTERFACE DEBONDING OCCURS IN A COMPOSITE?** *Zheng-Ming Huang, Yi Zhou, Limin Xin (Tongji University)* To estimate a composite failure in a general sense only based on constituent fiber and matrix properties, the homogenized stresses of the matrix by any micromechanics theory must be converted into true values. The conversion is done by multiplying each of the homogenized stresses with a stress concentration factor, which cannot be defined following a classical approach but is derived in this work.	2205-1 **REVEALING THE EFFECT OF CRUMPLING ON THE REINFORCEMENT EFFICIENCY OF GRAPHENE IN COMPOSITES** *Zheling Li, Dimitrios G. Papageorgiou, Robert J. Young (University of Manchester)* The reinforcement efficiency of graphene has been studied. It has been found that the crumpling prevents the efficient interfacial stress transfer in the middle of the flake.	2206-1 **MECHANICAL BEHAVIOR OF CARBON/STEEL HYBRID FIBER-REINFORCED COMPOSITES** *Minchang Sung, Woong-Ryeol Yu (Seoul National University)* In this study, the hybrid effect of the hybrid fiber composites is demonstrated both experimentally and numerically, providing a design tool for optimized hybrid fiber composites.	2207-1 **DESIGN AND OPTIMIZATION METHOD FOR 3D PRINTED CARBON REINFORCED AIRCRAFT COMPONENTS** *W.M. van den Brink (Netherlands Aerospace Centre (NLR)), R. Bruins (NLR), F. van der Kiff (Delft University of Technology), M. Hermans (Delft University of Technology)*	2208-1 **MULTISCALE MODELLING OF LAMINATION DEFECTS IN CURVED STRUCTURES** *Anne Reinarz , Tim Fletcher (University of Bath), Tim Dodwell, Richard Butler, Rob Scheichl* We have implemented the multiscale preconditioner GenEO suitable for large anisotropic problems in the High Performance Computing library DUNE and show that it allows us to solve large problems quickly on hundreds of computer cores. As an example, we use this preconditioner to test the effect of varying the slope of a simple wrinkling defect on the initiation of damage.	2209-1 **NOVEL BIORESORBABLE TEXTILE COMPOSITES FOR MEDICAL APPLICATIONS** *Chenkai Zhu (The University of Nottingham Ningbo China), Iffy Ahmed (University of Nottingham), Andy Parsons (University of Nottingham), Yunqi Wang (The University of Nottingham Ningbo China), Chao Tan (The University of Nottingham Ningbo China), Jingsong Liu (Sinoma Co., Ltd.), Chris Rudd (The University of Nottingham Ningbo China), Xiaoling Liu (The University of Nottingham Ningbo China)* The novel textile fabric of phosphate glass fibre was woven in lab scale and used to produce fully bioresorbable composites which presented excellent properties with potential application for medical device.	2210-1 **THERMOELASTIC STRESS ANALYSIS FOR STRUCTURAL PERFORMANCE ASSESSMENT OF AEROSPACE COMPOSITES** *Nik Rajic (Australian Defence Science & Technology Group)* This paper draws on several case studies from coupon level to full-scale airframe fatigue testing to demonstrate how compact low-cost thermal detector based TSA systems can play an important role in evaluating the structural performance of composite aircraft components.	2211-1 **MECHANICAL, DAMAGE AND PIEZORESISTIVE BEHAVIOR OF CARBON NANOSTRUCTURE INFUSED-GLASS FIBER HYBRID COMPOSITES FOR POWER LINES** *M. F. Arif, H. Alhashmi, S. Kumar (Masdar Institute of Science and Technology)*
11:55	2201-2 **REDUCED PERMITTIVITY OF POLYIMIDE COMPOSITE FIBERS BY GRAFTING AMINO FUNCTIONALIZED HYPERBRANCHED POLYSILOXANE** *Jie Dong, Cairan Yang, Yang Cheng, Tingting Wu, Xin Zhao, Qinghua Zhang (Donghua University)*	2202-2 **STRAIN HARDENING BEHAVIOURS IN CARBON NANOTUBE/ ALUMINIUM (CNT/ AL) COMPOSITES** *Run Xu, Zhangju Tan, Genlian Fan, Qing-Bang Xiong, Zhigang Li, Di Zhang (Shanghai Jiao Tong University)* The present work investigates the strain hardening behaviors of carbon nanotube reinforced aluminum matrix composite and the roles and origins of back stress and effective stress in their flow stress.	2203-2 **INTERFACIAL EVALUATION OF UD-CFRP BY THERMAL AGING VIA ACOUSTIC EMISSION, ELECTRICAL RESISTANCE AND THERMOGRAM METHODS** *PS Shin (Gyeongsang National University), D. J. Kwon (Gyeongsang National University), J. H. Kim (Gyeongsang National University), K. L. Devries (The University of Utah), J.M. Park (Gyeongsang National University, The University of Utah)*	2204-2 **REDUCED ORDER TECHNIQUES FOR MODELLING THE EFFECTS OF DAMAGE IN COMPOSITE PLATES** *Basem Suliman, Carol Featherston, David Kennedy (Cardiff University)* The exact strip method provides an efficient vibration analysis for prismatic composite plates using an exact dynamic stiffness matrix based on a continuous distribution of stiffness and mass. The paper introduces a novel hybrid combination of exact strip and finite element analysis which enables accurate modelling of a wide range of damaged plates, verifying its capability and efficiency by comparisons with pure finite element analysis and a previous smearing technique.	2205-2 **FABRICATION PROCESSES AND PROPERTIES OF CARBON NANOMATERIALS FILLED NANOCOMPOSITES** *Soon Hyung Hong (Korea Advanced Institute of Science and Technology (KAIST))* The molecular level mixing process has been demonstrated to achieve homogeneous dispersion of carbon nanomaterials including graphene and carbon nanotube with strong interfacial bonding with matrices. Carbon nanomaterials filled nanocomposites show outstanding mechanical and functional properties, exhibiting a wide scope of possible applications such as strong and tough structural materials, organic photovoltaic devices, flexible and stretchable conductors, etc.	2206-2 **IN SITU POLYMERIZATION AND CHARACTERIZATION OF PA6/CFRTP COMPOSITES** *Mei Xian Li (Seoul National University), Gou Hee Lee (Seoul National University), Dasom Lee (Seoul National University), Jaemin Jung (Seoul National University), Seung Mo Kim (Korea University of Technology and Education), Woo Il Lee (Seoul National University)* In this study, in situ polymerization and characterization of PA6/ CFRTP composites were carried out.	2207-2 **ON GRADIENT BASED STRUCTURAL OPTIMIZATION OF A WIND TURBINE BLADE** *E. Lund , J.H. Sjølund (Aalborg University)* The paper presents investigations of structural optimization of a wind turbine blade where the objective is to minimize mass while taking a number of structural constraints together with manufacturing considerations into account.	2208-2 **MULTISCALE ANALYSIS OF METAL / THERMOPLASTIC COMPOSITE INTERFACES USING ESI VPS** *Sebastian Müller (ESI Software Germany GmbH), Patrick de Luca , Alain Tramecon (ESI Group)* The present contribution introduces a multiscale analysis of hybrid metal-composite joints. The method allows for the determination of effective mechanical properties of laser structured material interfaces.	2209-2 **MECHANICAL PROPERTIES, VISUAL ASPECT, MICROSTRUCTURE AND LIFE CYCLE ASSESSMENT APPROACH (LCA) FOCUSED ON PP/ WOOD FLOUR BIOCOMPOSITES** *Célia Badji, Lara Soccalingame, Jean-Charles Bénézet, Hélène Garay, Joana Beigbeder, Didier Perrin, Valérie Desauziers, Anne Bergeret (Ecole des Mines d'Alès)*	2210-2 **THE INFLUENCE OF SANDWICH STRUCTURE CORE MATERIAL ON THERMOGRAPHIC NDT TECHNIQUES** *G. Olafsson, A. Fjuol-Solano Dualde, R. C. Tighe, J. M. Dulieu-Barton (University of Southampton)*	2211-2 **FINITE ELEMENT MODELING AND FAILURE ANALYSIS OF ROLL BENDING FORMING OF GLARE LAMINATES** *Jingming Tian, Gang Tao, Cheng Liu, Huaquan Li, Xian Zhang, Jie Tao (Nanjing University of Aeronautics and Astronautics)* In this paper, a three-dimensional finite element model of three-roller bending forming process was built under the ABAQUS/Explicit environment based on the solutions of several key techniques, consisting of material property definition, diverse failure criterions, contact boundary condition treatment and meshing technique.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
KEYNOTE at Quijang Auditorium: **Modeling of Thermoplastic Composites Manufacturing Processes Reinforced with Continuous Fibers** Woo Il Lee, Seoul National University, Korea KEYNOTE at Lily Hall: **Muscular Compliance in Bioinspired Soft Robots** Norman Wereley, University of Maryland, USA KEYNOTE at Rose Hall: **A Snapshot into the Evolution of Manufacturing, Characterization, Modeling Efforts to Tailor Function-Performance Strategy in Composites** Ozden Ochoa, Texas A&M University, USA									
2212 Sandwich Structures and Materials 1	2213 Joints 5	2214 Composite Structures 5	2215 Fatigue 5	2216 Self-Healing and Bio-inspired Designs 1	2217 Design and Manufacture for Multifunctionality 5	2218 Interfaces and Interphases 5	2219 Recycling of Composites and Sustainability 4	2220 Bio and Medical 3	2221 Aerospace 5	
2212-1 **HYBRID DESIGN OF ARCHITECTED LATTICE MATERIALS FOR INCREASED BUCKLING RESISTANCE** *Sha Ying (Beihang University&Xi'an Jiaotong University), Hongfu Li, Yaobo Wu, Jiani Li(Beihang University), Jun Xu(Beihang University&Xi'an Jiaotong University&Tsinghua University)*	2213-1 **THE INFLUENCE OF PRE-TENSION LOAD IN THE COMPOSITE LAMINATE FASTENER JOINT DURING REPEATED TITGHTING** *Li Cui, Huaizhong Su (Beijing Aeronautical Science & Technology Research Institute of COMAC)* In this paper, the variety of the equivalent total friction coefficient, which includes the friction coefficient of the thread and the friction coefficient of the bearing surface under nut, and the variety of the pre-tension load in the composite laminate fastener joint during repeated tightening, can be received.	2214-1 **APPLICATION OF COMPOSITES IN RAIL VEHICLES** *Mark Robinson (Newcastle University)* This paper reviews components of rail vehicles in which composite materials have been employed successfully to date and those in which they are most likely to be exploited in the near future. Specific references are made to vehicles in which composites are employed routinely for the fabrication of complex three-dimensional moulded profiles and high stiffness-to-weight ratio paneling for cab ends and vehicle interiors.	2215-1 **STOCHASTIC DAMAGE MODELLING OF MIXED MODE FATIGUE DELAMINATION OF COMPOSITE WIND TURBINE BLADES** *Chi Zhang, Hua-Peng Chen (University of Greenwich)* This paper deals with a stochastic approach to simulate mixed mode fatigue delamination development and obtain the failure probability of composite blades of wind turbines. The results show that the Paris model with gamma process provides a good prediction of the failure time of the mixed mode fatigue delamination growth, and this stochastic method can be used for reliability analysis and determining optimum maintenance strategies.	2216-1 **INFLUENCE OF HEALING RATE ON STRENGTH OF HIERARCHICAL FIBER BUNDLE MATERIALS** *X. L. Ji, J. X. Li(Xi'an Jiaotong University)* Self-healing is one of the fascinating properties for bio-materials such as bone and tendon. Hierarchy is the basic feature of bio-materials. The effect of self-healing rate on the strength of hierarchical fiber bundle materials is theoretically studied.	2217-1 **DESIGN AND FABRICATION OF A MULTI-LAYER RADAR ABSORBING COMPOSITE STRUCTURE** *Hongshuai Lei (Beijing Institute of Technology), Zhili Zhou (Beijing Institute of Technology), Changxuan Wang (Peking University), Mingqi Chen (Beijing Institute of Technology), Huimin Li (Beijing Institute of Technology), Daining Fang (Beijing Institute of Technology, Peking University)* A novel non-magnetic multi-layer radar absorbing structure (RAS) was designed and fabricated. The broadband absorbing performances and load-bearing capacities of RAS were evaluated through experimental tests.	2218-1 **EFFECTS OF WATER AGING ON MECHANICAL PROPERTIES OF CONTINUOUS CARBON FIBERPOLYAMIDE 6 COMPOSITES** *Hongfu Li, Sha Yin, Yang Wang, Boming Zhang (Beihang University)* Interfacial shear strength between carbon fiber and polypropylene showed decline with temperature increase in micro-droplet test.	2219-1 **TOWARDS A CIRCULAR ECONOMY FOR END-OF-LIFE CARBON FIBRE COMPOSITE MATERIALS VIA FLUIDISED BED PROCESS** *F Meng, J Mckechnie, SJ Pickering (University of Nottingham)* In this study, we develop life cycle cost models to quantify cost impacts of recovering CF and using rCF products as substitutes for conventional materials (e.g., steel, aluminum) in automotive applications. The results show financial advantages of the CF recovery, which supports the emerging commercialisation of CF recycling technologies.	2220-1 **SOFT ARTIFICIAL MUSCLE IN SMART STRUCTURES FOR BIO MEDICAL APPLICATION** *Tiefeng Li (Zhejiang University)*	2221-1 **STUDY ON CRASH OF COMPOSITE FUSELAGE WITH STRAIN RATE EFFECT** *Yan Wang (Beijing Aeronautical Science & Technology Research Institute of COMAC), Tian Zhang (Beijing Aeronautical Science & Technology Research Institute of COMAC), Lingwei Tang (Beijing Aeronautical Science & Technology Research Institute of COMAC), Pu Xue (Northwestern Polytechnical University), Jifeng Xu (Beijing Aeronautical Science & Technology Research Institute of COMAC)* We developed dynamic property test of composite and obtained constitutive model and strength under high and medium strain rate. Based on the test data, we analysed the crash of composite fuselage with strain rate considered.	
2212-2 **VIBRATION DAMPING OF HYBRID COMPOSITE CORRUGATED SANDWICH CYLINDRICAL PANELS** *Jin-Shui Yang, Li Ma, Ge Qi, Lin-Zhi Wu(Harbin Institute of Technology)* The modal behaviours of empty and foam filled ACSCPs and CCSCPs are investigated experimentally and numerically. It is demonstrated that foam filled CSCPs can obviously improve the structural damping compared to the empty CSCPs without significantly changing the corresponding natural frequencies.	2213-2 **DESIGN OF PIN REINFORCEMENTS IN METAL-COMPOSITE HYBRID JOINTS TO MAXIMISE ENERGY ABSORBANCE DURING FRACTURE** *A. T. T. Nguyen, M. Brandt, A.C. Orifici (RMIT University), S. Feih(Singapore Institute of Manufacturing Technology)* A validated design approach is presented to design pin geometry, pin angle and density in accordance with joint parameters (adherend thickness, adherend strength, bond line stresses) to achieve maximum energy absorbance during hybrid metal-composite joint fracture.	2214-2 **ADAPTIVE MODELLING OF DELAMINATION GROWTH USING ISOGEOMETRIC CONTINUUM SHELL ELEMENTS** *M. Fagerström(Chalmers University of Technology). J.J.C Remmers(Eindhoven University of Technology)* An adaptive isogeometric continuum shell element formulation which can be utilised to model initiating and propagating delamination cracks is presented. Focus is on the adaptive procedure and on the particular benefits of basing the formulation on the isogeometric analisys concept.	2215-2 **AE MONITORING OF FATIGUE DAMAGE GROWTH IN PLAIN WEAVE COMPOSITES WITH EMBEDDED FLAWS** *Jiaqing Wu, Ahmed Maslouhi (Université de Sherbrooke)* The main objective of this study is to assess the influence of manufacturing flaws on the fatigue life of plain weave composites and to evaluate experimentally the effect of environmental factors such as humidity and temperature on the fatigue life of the composite materials. Composites with an artificial delamination were assessed in real time by using Acoustic Emission (AE) and Digital Image Correlation (DIC) under tension-tension cycle loading to generate fatigue life curves and to evaluate the degradation of mechanical properties.	2216-2 **INTERFACIAL STRUCTURE AND DAMAGE MITIGATION FROM THE RADULAR TEETH OF CRYPTOCHITON STELLERI** *Steven Herrera, Ruoheng Zhao, Lessa Kay Grunenfelder, Enrique Escobar de Obaldia, David Restrepo Arango, Pablo Zavattieri, David Kisailus (University of California)* Here, we discuss the biologically controlled synthesis of the ultra hard magnetic teeth found in a marine mollusk and the resulting structure -abrasion resistant relationships.	2217-2 **BISCROLLED NANOFIBER COMPOSITE YARNS FOR MULTIFUNCTIONAL APPLICATIONS: ENERGY STORAGE, ENERGY HARVESTING, SENSING AND ACTUATION** *Ray H. Baughman (University of Texas at Dallas), Seon Jeong Kim (Hanyang University)* Biscrolling provides a powerful method for making weavable, knittable, braidable, sewable, and knottable nanofiber yarns that can contain over 95wt% of otherwise unspinnable multifunctional nanopowder or micropowder guest in a nanofiber host.	2218-2 **EXPERIMENTAL AND NUMERICAL STUDY ON THE INTERFACIAL PROPERTIES OF CFRTP IN MICRO-DROPLET TEST** *Hao Piao, Michinobu Fujita, Isamu Ohsawa, Jun Takahashi (The University of Tokyo)* Interfacial shear strength between carbon fiber and polypropylene showed decline with temperature increase in micro-droplet test.	2219-2 **HIGHLY DRAPABLE ORGANIC SHEETS MADE OF RECYCLED CARBON STAPLE FIBER YARNS** *C. Goergen (University of Kaiserslautern), S. Baz (Institut für Textil- und Verfahrenstechnik Denkendorf), P.Mitschang (University of Kaiserslautern), G. T. Gresser (Institut für Textil- und Verfahrenstechnik Denkendorf)* Organic sheets made of recycled carbon staple fiber yarns can be deep-drawn in a thermoforming process. Mechanical properties of these semi-finished products are close to virgin carbon fiber organic sheets.	2220-2 **A COUPLED VISCOELASTICITY AND MULLINS EFFECT MODEL FOR SOFT MATERIALS** *Tongping Lu, Jikun Wang, Ruisen Yang, T. J. Wang (Xi'an Jiaotong University)* In this work, we developed a coupled viscoelastic and Mullins-effect model to characterize the loading and unloading response of soft materials.	2221-2 **THE STABILITY INVESTIGATION OF STRETCHED COMPOSITE FUSELAGE PANELS UNDER COMBINED PRESSURE AND COMPRESSION** *Bo Ma (Beijing Aeronautical Science & Technology Research Institute), Jifeng Xu (Beijing Aeronautical Science & Technology Research Institute), Tianliang Oin (Beijing Aeronautical Science & Technology Research Institute), Lei Peng (Beijing Aeronautical Science & Technology Research Institute), Zizi Lu (Beijing Aeronautical Science & Technology Research Institute), Yanan Chai (China Aircraft Strength Research Institute)*	

Tuesday 22 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
12:15	2201-3 **EXPERIMENTAL AND THEORETICAL STUDY ON ELASTIC MODULI OF POROUS PDMS WITH DIFFERENT POROSITIES AT DIFFERENT TEMPERATURES** *Chen Huang (Zhejiang University), Chengfeng Fang (Zhejiang University), Xiaoliang Zhou (Beihang University), Zuguang Bian (Zhejiang University)* In this paper, the elastic moduli of porous PDMS with different porosities at different temperatures are studied by experimental and theoretical methods.	2202-3 **FLAKE POWDER METALLURGY: A BIOINSPIRED AND SMART STRATEGY TO FABRICATE NANOCARBON REINFORCED METAL MATRIX COMPOSITES** *Zhigang Li, Zhanglu Tan, Genlian Fan, Ding-Bang Xiong, Qiang Guo, Di Zhang (Shanghai Jiao Tong University)* The recent progress in developing high performance nanocarbon reinforced MMCs with the bottom-up Flake Powder Metallurgy route is introduced and the structure-property relationship in nacre-like architectured MMCs will be discussed.	2203-3 **HDPE AND PVC CREEP AND THERMAL RATCHETING BEHAVIOR UNDER COMPRESSION** *Rahul Palaniappan Kanthabhabha Jeya, Abdel-Hakim Bouzid (Ecole Technologie Superieure)* The creep and thermal ratcheting performance of HDPE and PVC at multitude of temperature and compressive loads are scrutinized. The gravity of these phenomenon on understanding the perennial behaviour of the selected polymer materials is objectified.	2204-3 **A NEW TEST METHOD TO CHARACTERIZE MIXED MODE II/ III AND I/II/III DELAMINATION** *Sang Nguyen, Carla Canturri Gispert, Emile S Greenhalgh, Paul Robinson, Giuliano Allegri (Imperial College London)* A new delamination toughness test for mixed mode II/III and I/ II/III fracture has been developed. Post-test fractography has been used to characterize the initiation delamination processes involving mode III fracture in IM7/8552.	2205-3 **FABRICATION OF FERRIC OXIDE /CARBON BLACK/CARBON NANOTUBE COMPOSITES FOR PROMTED ELECTROMAGNETIC MICROWAVE PERFORMANCE** *Junyao Shen, Yongtao Yao, Jinsong Leng, Yanju Liu (Harbin Institute of Technology (HIT))* Fe_2O_3/CB, Fe_2O_3/CNT and Fe_2O_3/CB/CNT composites are fabricated for microwave absorption and Fe_2O_3/CB/CNT composite exhibits prompted absorption behavior with RL of -22.54 dB.	2206-3 **SHAPE MEMORY POLYMER COMPOSITES AND THEIR APPLICATIONS IN DEPLOYABLE STRUCTURES IN SPACE (INVITED TALK)** *Xin Lan, Liwu Liu, Yang He, Jian Sun, Yanju Liu, Jinsong Leng (Harbin Institute of Technology)* For the shape memory polymer composites (SMPCs), their performance of active deformation is expected to promote the development in smart active deformation structures. We aim to summarize the recent progresses of SMPCs using in deployable space structures, including hinges, trusses, solar arrays, lock/ release devices.	2207-3 **OPTIMIZATION OF COMPOSITES WITH REPEATING SUB-LAMINATES** *Ming Zhou, Raphael Fleury, Jeffrey Wollschlager (Altair Engineering)*	2208-3 **SENSITIVITY OF ORTHOTROPIC MATERIAL PARAMETERS USED WITHIN THE STRAIN INVARIANT FAILURE THEORY** *Nayeem Tawgir Chowdhury, Garth Pearcey, Akhlis Mukkavilla(UNSW), Wing Kong Chiu(Monash University), John Wang (Aerospace Division, Defence Science and Technology Group)* The Strain Invariant Failure Theory has a number of material properties that need to be characterised. An investigation is carried out to examine the key properties that have the biggest effect on the failure criterions predictions.	2209-3 **THERMO-SENSITIVE HYDROGEL COMPOSITE FOR CONTROLLED DELIVERY OF DRUGS WITH FUNCTIONALIZED CARBON NANOTUBES** *Wen Qin, Jiangiang Liu, Jing Ma, Xi Nan, Weihui Zhu, Bin Tang (Taiyuan University of Technology)* The functionalized carbon nanotubes were entrapped within a thermo-sensitive hydrogel based on poly (N-isopropylacrylamide-co-N-vinylpyrrolidone) copolymer. The morphology, temperature sensitivity, and release of drug of the composites were investigated.		2211-3 **EXPLORING DISCONTINUITIES AND HYBRIDIZATION TO DESIGN GRADUAL FAILURE IN UNIDIRECTIONAL CARBON FIBER SELF-REINFORCED POLYPROPYLENE COMPOSITES** *Jun Tang (KU Leuven), Anya Aslani (KU Leuven), Yent Swolfs (KU Leuven), Gianmaria Bullegas (Imperial College London), Silvestre T. Pinho (Imperial College London), Sepan V. Lomov (KU Leuven), Larissa Gorbatikh (KU Leuven)* This work combines discontinuous reinforcement and hybridization to overcome the stiffness-toughness dilemma that conventional fiber reinforced polymer composites suffer from. The aim is to further explore the potential of discontinuities in the field of hybrid composites.
12:35	Lunch										
13:35	PLENARY LECTURE at Qujiang Auditorium: **From Structural to Functional Composites: A Personal Journey** Tsu-Wei Chou, University of Delaware, USA										
14:40	KEYNOTE at Qujiang Auditorium: **Structural Battery Composites – Roles of Constituents and Device Architecture** Leif Asp, Chalmers University of Technology, Sweden KEYNOTE at Lily Hall: **Multi-Scale Modelling of Processing and Performance for Textile Composites** Andy Long, The University of Nottingham, UK KEYNOTE at Rose Hall: **Nanocomposites at Extreme (Space) Environment** Alan KT Lau, Swinburne University of Technology, Australia										
15:15	Coffee Break										
15:40	2301 Polymer Matrix Materials 6	2302 Metal Matrix Composites 6	2303 Fiber-reinforced Composites 6	2304 Fracture and Damage 6	2305 Nano-Composites 6	2306 Fiber-reinforced Composites 17	2307 Structural Analysis and Optimization 6	2308 Multiscale Modelling of Structures 6	2309 Bio-Composites 6	2310 Energy Harvesting and Storage 1	2311 Hybrid Composites 6
15:40	2301-1 **POLYBENZIMIDAZOLE CARBON FIBRE COMPOSITE – UTILISING A HIGH PERFORMANCE THERMOPLASTIC** *Thomas R. Pozegic, Ian Hamerton, Michael R. Wisnom (University of Bristol)*	2302-1 **MECHANICAL PROPERTIES OF TiB2-AlFe COMPOSITE FABRICATED BY THE SPARK PLASMA SINTERING** *M. Yoshida, H. Shiraishi (National Institute of Technology)* We have fabricated TiB2-AlFe composite by the reaction sintering of elemental powders of Ti, B, Al and Fe using spark plasma sintering. The size of TiB2 particles is as small as 0.2 micro-meter when sintered at 1373K.	2303-1 **RATIONALISATION OF THE TSAI-WU FAILURE CRITERION** *Shuguang Li, Elena Sitnikova, Yuning Liang, Abdul-Salam Kaddour (University of Nottingham)* This paper re-examines the Tsai-Wu criterion from the perspective of rationality and a rationalised version of it has been obtained as a consequence which irons out the empiricism of it on one hand and defines its applicability on a rational basis on the other hand.	2304-1 **FAILURE INITIATION DEPENDENCE ON SPECIMEN GEOMETRY IN OFF AXIS TESTS** *Christian Mandrzke, Titus Feldmann (BAM (Federal Institute for Materials Research & Testing))* The reliability of off axis test data is evaluated by means of finite element simulations of the stress and strain field arising in the specimens. The consequences of the inhomogeneity as a result of the anisotropy of the material are studied.	2305-1 **IN-MOULD MULTIFUNCTIONAL COATINGS WITH GRAPHENE NANOCOMPOSITES** *Konstanze Seidler (Imperial College London), Alexander Bismarck (Imperial College London, University of Vienna)* The utilization of the 2D geometry and the positive properties of graphene for confined applications like coatings.	2306-1 **COMPARISON OF FIBER ORIENTATION ANALYSIS METHODS IN FIBER-REINFORCED COMPOSITES** *Eric Ho (Thermo Fisher Scientific)* By comparing different fiber orientation analysis methods in fiber-reinforced composites, fiber using cylinder template correlation would be prove most effective method in fiber segmentation, especially in noisy low resolution images.	2307-1 **MECHANICAL ANALYSIS OF CARBON NANOTUBE/SHAPE MEMORY POLYMER COMPOSITE** *Jinsu Kim, Yongsan An, Seokbin Hong , Woong-Ryeol Yu (Seoul National University)* The mechanical behaviour of CNT-SMPCs was analysed using 3D constitutive equation at macro and micro level.	2308-1 **EFFECTS OF CELL SIZE AND CELL WALL THICKNESS VARIATIONS ON THE STRENGTH OF CLOSED-CELL FOAMS USING LAGUERRE TESSELLATION** *Youming Chen(Wuhan University of Technology) , R. Das , Mark Battley (University of Auckland)* It is found that the compressive and shear strengths of closed-cell foams decrease as cell size and cell wall thickness variations increase, and the compressive strength reduces more significantly.	2309-1 **MOISTURE STABILITYAND MECHANICAL DURABILITY OF PEAT BIOCOMPOSITES** *Maiju Hietala, Elisa Koivuranta Ari Ämmälä (University of Oulu), Kristiina Oksman (University of Oulu, Luleå University of Technology), Minja Illikainen (University of Oulu)* The results show that the moisture stability and mechanical permanence of the peat-PP composites was similar or better when compared with reference wood-plastic composite (WPC)	2310-1 **CORE-DOUBLE-SHELL STRUCTURED HYPERBRANCHED AROMATIC POLYAMIDE FUNCTIONALIZED GRAPHENE NANOSHEETS-POLY(P-PHENYLENE BENZOBISOXAZOLE) NANOCOMPOSITE FILMS WITH IMPROVED DIELECTRIC PROPERTIES AND THERMOSTABILITY** *Hao Feng, Jiasong Hua, Zhe Zhang, Guifang Liu, Qixin Zhuang (East China University of Science and Technology)* This study reports a novel method to fabricate core-double-shell structured hyperbranched aromatic polyamide functionalized graphene.	2311-1 **JOINT DESIGN OF CONTINUOUS/ DISCONTINUOUS HYBRID CARBON FIBRE COMPOSITES** *A.D. Evans , L.T. Harper , T.A. Turner, N.A. Warrior (University of Nottingham)* Investigation into co-compression moulded continuous/discontinuous hybrid carbon fibre architecture. Key areas of evaluation are the mechanical performance, the transition zone between high stiffness UD fabrics and low stiffness discontinuous fibre bundles and the mode I fracture toughness of the hybrid interface.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
2212-3 **CRUSHING BEHAVIOUR OF CARBON FIBRE LATTICE STRUCTURES** *Karna Subramaniyan (University of Liverpool&University of Tun Hussein Onn Malaysia), Zhongwei Guan (University of Liverpool &Chengdu University) , Wesley Cantwell (University of Liverpool & Khalifa University)*	2213-3 **EFFECT OF HIGH LOADING RATE AND LOW TEMPERATURE ON MODE I FRACTURE TOUGHNESS OF DUCTILE ADHESIVE** *Zhemin Jia1, Guoqing Yuan (Tongji University)*	2214-3 **EXPERIMENTAL AND NUMERICAL ANALYSIS OF FIBRE-REINFORCED COMPOSITE PIPES SUBJECTED TO UNDERGROUND BLASTS** *William Toh1, Karthikayen Raju, Chong Hun Yeo, Siang Huat Goh, Vincent Beng Chye Tan, William Toh1, Karthikayen Raju, Chong Hun Yeo, Siang Huat Goh, Vincent Beng Chye Tan(National University of Singapore)* This paper focuses on the investigation of the response of buried filament wound composite pipes subjected to subsurface blasts through experimental and simulation means.	2215-3 **FREQUENCY EFFECT ON LIFETIME AND TEMPERATURE OF A TAILORED BLANK C/PPS THERMOPLASTIC COMPOSITE** *Roman Ruzek, Martin Kadlec, Lucie Novákov& (VZLU)* This paper discussed the influence of loading frequency on the temperature, fatigue behaviour, and failure mechanisms of carbon-fibre-fabric-reinforced PPS laminates whose thickness was varied using of ply drops. The loading frequency higher than 4-7 Hz was shown to have a significant influence on the fatigue lifetime of specimens with varying thickness.	2216-3 **IMPACT RECOVERY OF SELF-HEALING COMPOSITES BASED ON A SUPRAMOLECULAR POLYMER MATRIX** *Federica Sordo, Lucien Berret, Baris Caglar, Véronique Michaud (Ecole Polytechnique Fédérale de Lausanne (EPFL))* The extent of damage and ability to heal cracks after low velocity impact is investigated for glass fibre reinforced composites with a matrix based on a supramolecular hybrid network, combining covalent cross-links with non-covalent reversible hydrogen bond. Recovery after a 20 Joules impact damage is evaluated both through the analysis of impact curves, and by image analysis of the impact zone, which almost disappears after several weeks.	2217-3 **ALIGNMENT OF NANO AND MICRON DIAMETER CARBON FILLERS IN EPOXY VIA ELECTRIC FIELD** *Anil R. Ravindran (RMIT University), Raj B. Ladani (RMIT University), Shuying Wu (RMIT University), Anthony J. Kinloch (Imperial College London), Chun H. Wang (RMIT University, University of New South Wales), Adrian P. Mouritz (RMIT University)* Here we report the effect of electric field alignment of nano and micron diameter carbon fibrous fillers toward the electrical conductivity and fracture toughness properties of epoxy composites. The multi-scale reinforced composites containing both nano and micron scale carbon filler that were exposed to an electric field exhibited a greater improvement in the through-the-thickness electrical conductivity and quasi-static mode I fracture toughness in comparison samples that were not exposed to an electric field.	2218-3 **NANOSTRUCTURED "BRICK-AND-MORTAR" INTERPHASE INSPIRED BY NACRE TO IMPROVE CARBON FIBRE COMPOSITE PERFORMANCE** *Francois De Luca (Polymer & Composite Engineering (PaCE) Group), Adam J. Clancy (Imperial College London), Giorgio Sernicola (Imperial College London), Milo S. P. Shaffer (Imperial College London), Alexander Bismarck (Polymer & Composite Engineering (PaCE) Group, University of Vienna)* A "brick-and-mortar" coating inspired by nacre was developed at the nanometre length and conformally deposited at the circumference of carbon fibres. The classic toughening mechanisms of nacre were reproduced and implemented at the interphase of carbon fibre composites, leading to improved mechanical performance in tension.	2219-3 **FIBRE LENGTH DISTRIBUTIONS OF SHREDDED THERMOPLASTIC COMPOSITE SCRAP** *Guillaume Vincent (ThermoPlastic composites Research Center, University of Twente), Thomas A. de Bruijn (Saxion University of Applied Science), Mohammed Iqbal Abdul Rasheed (University of Twente), Sebastiaan Wijskamp (ThermoPlastic composites Research Center), Remko Akkerman (ThermoPlastic composites Research Center, University of Twente)* A new method to characterise the fibre length distribution of shredded consolidated fibre composites was developed. It was then applied to determine how shredding parameters and offcuts size influence the fibre length distributions.	2220-3 **A SHORT REVIEW OF MECHANICS FOR SKIN MODULUS MEASUREMENT VIA CONFORMAL PIEZOELECTRIC SYSTEMS** *Yan Shi (Nanjing University of Aeronautics and Astronautics)* This review will reveal the mechanism of the conformal skin modulus measurement systems and the expectable applications from this kind of soft piezoelectric composite actuator/sensors.	2221-3 **RECENT ADVANCE ON LIGHTWEIGHT GRADED THERMAL STRUCTURE FOR HYPERSONIC VEHICLES** *Qin Lu, Long F. Hu, Xiao G. Luo, Ji J. Yu, Bang C. Ai (China academy of aerospace aerodynamics)* In this paper, an integrated hot structure with graded-outer-layer, has been brought forward in order to avoid fragmentation and improve the strength of ceramic materials for hypersonic vehicles. High temperature test to evaluate the thermal performance of hot structure has been performed in the wind tunnel, which surface temperature reached to 1973K high temperature for 550 seconds exposure.	
Lunch										
PLENARY LECTURE at Qujiang Auditorium: **From Structural to Functional Composites: A Personal Journey** Tsu-Wei Chou, University of Delaware, USA										
KEYNOTE at Qujiang Auditorium: **Structural Battery Composites – Roles of Constituents and Device Architecture** Leif Asp, Chalmers University of Technology, Sweden KEYNOTE at Lily Hall: **Multi-Scale Modelling of Processing and Performance for Textile Composites** Andy Long, The University of Nottingham, UK KEYNOTE at Rose Hall: **Nanocomposites at Extreme (Space) Environment** Alan KT Lau, Swinburne University of Technology, Australia										
Coffee Break										
2312 Sandwich Structures and Materials 2	2313 Joints 6	2314 Composite Structures 6	2315 Fatigue 6	2316 Self-Healing and Bio-inspired Designs 2	2317 Design and Manufacture for Multifunctionality 6	2318 Interfaces and Interphases 6	2319 Renewable Energy 1	2320 Bio and Medical 4	2321 Automotive and Rail 1	
2312-1 **MICRO-STRCUTURES AND BENDING PROPERTIES OF SKULL CELLULAR BONES** *Qiangian Wu, Li Ma, Wei Zheng, Lin-Zhi Wu, Jian Xiong (Harbin Institute of Technology)*	2313-1 **EXPERIMENTAL AND NUMERICAL INVESTIGATION OF SINGLE COUNTERSUNK COMPOSITE JOINTS** *Siyuan Yao, Xiuhua Chen, Xiaoling Zhang, Zhefeng Yu (Shanghai JiaoTong University)* Bearing tests are conducted to study the damage propagation and the effects of countersunk geometry on the load-carrying capacity of the joints are further investigated through a series of FE models.	2314-1 **MECHANICAL BEHAVIORS OF THIN-PLY COMPOSITE LAMINATES UNDER SHORT-BEAM SHEAR AND OPEN-HOLE TENSILE LOADS: PSEUDO-HOMOGENEOUS AND ISOTROPIC BEHAVIORS** *Chunfang Huang, Mingchang He, Yongjiu He, Jiayu Xiao, Jianwei Zhang, Su Ju , Dazhi Jiang (National University of Defense Technology)*	2315-1 **MODE I FATIGUE DELAMINATION GROWTH ONSET IN FIBRE REINFORCED COMPOSITES: EXPERIMENTAL AND NUMERICAL ANALYSIS** *Man Zhu , Larissa Gorbatikh (KU Leuven, SIM M3 program), Sander Fonteyn (SIM M3 program, Vrije Universiteit Brussel), Lincy Pyl, Danny Van Hemelrijck (Vrije Universiteit Brussel), Stepan Lomov (KU Leuven, SIM M3 program)* Digital image correlation (DIC) was used to detect movement of the inter-laminar crack tip position during fatigue delamination growth onset test.	2316-1 **SELF-ASSEMBLED GRAPHENE OXIDE MICROCAPSULES REINFORCED WATERBORNE POLYURETHANE COMPOSITE COATINGS FOR SELF-HEALING PROPERTIES** *Jing Li, Qingkang Feng, Jincan Cui, Junhe Yang(University of Shanghai for Science and Technology)* The microcapsules were embedded into waterborne polyurethane matrix to prepare a self-healing polymer composite coating on metal surfaces.	2317-1 **TOWARDS MULTIFUNCTIONAL COMPOSITES BY CARBON NANOTUBES BASED NANO/ MICRO HYBRID STRUCTURES** *Delong He, Jinhu Bai (Université Paris-Saclay)* In this communication, we summarize some of our recent works concerning the development of multifunctional composites through nano/micro hybrid structures which consist of carbon nanotubes (CNTs) and microparticles or long continuous fibers.	2318-1 **INTERPHASE TAILORING FOR MULTIFUNCTIONAL GLASS/EPOXY COMPOSITES BY GRAPHENE OXIDE AND REDUCED GRAPHENE OXIDE** *Haroon Mahmood, Alessandro Pegoretti (University of Trento)* The work confirms the possibility of offered by an engineered graphene interphase in fiber/polymer composites not only in improving mechanical properties but also in inducing multifunctionality in the structures.	2319-1 **EFFECTS OF GEOMETRY ON BOND STRENGTH OF SINGLE-LAP ADHESIVELY BONDED JOINT WITH THICK ADHESIVE** *Zhiwen Qin (Wuhan University of Technology), Chinese Academy of Sciences), Haijun Peng, Lixin Zhang (Chinese Academy of Sciences), Ke Yang (Chinese Academy of Sciences), Jihui Wang (Wuhan University of Technology)*	2320-1 **TEMPERATURE-DEPENDENT ELASTIC PROPERTIES OF BRAIN TISSUES MEASURED WITH THE SHEAR WAVE ELASTOGRAPHY METHOD** *Yaqiang Cao, Yanlu Liu Guoyang Li (Tsinghua University), Ping He (Peking University Third Hospital), Zeqi Mao (Tsinghua University)* An ultrasound elastography method has been presented to characterize the temperature-dependent mechanical properties of extremely soft composites like brain tissues.	2321-1 **ASSEMBLED STRUCTURAL BATTERY - POUCH CELL INSERTED LATTICE STRUCTURE** *Xiang Gao (Beihang University), Yikai Jia (Beihang University), Lubing Wang (Beihang University), Sha Yin (Beihang University, Xi'an Jiaotong University), Jun Xu (Beihang University, Xi'an Jiaotong University, Tsinghua University)*	**Panel Session on Composite Regulation: MODERNISING COMPOSITE MATERIALS REGULATIONS – BARRIER TO INNOVATION AND AN EMERGING OPPORTUNITY**
2312-2 **MECHANICAL PROPERTIES OF SANDWICH STRUCTURES WITH 3D PRINTED CELLULAR CORES** *Ahmad Alsaadi, Ahmad Alambeigi, Mohammad Hajikhani, Mohammad Hossein Pol (Amirkabir University of Technology)* In this study, the mechanical properties of sandwich structures with 3D printed cellular cores are investigated.	2313-2 **EXPERIMENTAL AND NUMERICAL INVESTIGATION OF THE EFFECT OF ADHESIVE FILLET ON THE STRENGTH OF SINGLE LAP BONDED JOINTS** *Ali Fallahi, Mahmoud Shariati (Ferdowsi University of Mashhad)* In this study, the effect of adhesive fillet on the strength of single lap bonded joints is investigated experimentally and numerically.	2314-2 **MECHANICAL PROPERTIES OF CARBON FIBER REINFORCED POLYMER COMPOSITES WITH GRAPHENE NANOPLATELETS** *Ali Ghasemi, Mohammad Hajikhani, Mohammad Hossein Pol (Amirkabir University of Technology)* In this study, the mechanical properties of carbon fiber reinforced polymer composites with graphene nanoplatelets are investigated.	2315-2 **FATIGUE BEHAVIOR OF CARBON FIBER REINFORCED POLYMER COMPOSITES WITH GRAPHENE NANOPLATELETS** *Ali Ghasemi, Mohammad Hajikhani, Mohammad Hossein Pol (Amirkabir University of Technology)* In this study, the fatigue behavior of carbon fiber reinforced polymer composites with graphene nanoplatelets is investigated.	2316-2 **SELF-HEALING OF CARBON FIBER REINFORCED POLYMER COMPOSITES WITH GRAPHENE NANOPLATELETS** *Ali Ghasemi, Mohammad Hajikhani, Mohammad Hossein Pol (Amirkabir University of Technology)* In this study, the self-healing behavior of carbon fiber reinforced polymer composites with graphene nanoplatelets is investigated.	2317-2 **ALIGNMENT OF NANO AND MICRON DIAMETER CARBON FILLERS IN EPOXY VIA ELECTRIC FIELD** *Anil R. Ravindran (RMIT University), Raj B. Ladani (RMIT University), Shuying Wu (RMIT University), Anthony J. Kinloch (Imperial College London), Chun H. Wang (RMIT University, University of New South Wales), Adrian P. Mouritz (RMIT University)* Here we report the effect of electric field alignment of nano and micron diameter carbon fibrous fillers toward the electrical conductivity and fracture toughness properties of epoxy composites. The multi-scale reinforced composites containing both nano and micron scale carbon filler that were exposed to an electric field exhibited a greater improvement in the through-the-thickness electrical conductivity and quasi-static mode I fracture toughness in comparison samples that were not exposed to an electric field.	2318-2 **NANOSTRUCTURED "BRICK-AND-MORTAR" INTERPHASE INSPIRED BY NACRE TO IMPROVE CARBON FIBRE COMPOSITE PERFORMANCE** *Francois De Luca (Polymer & Composite Engineering (PaCE) Group), Adam J. Clancy (Imperial College London), Giorgio Sernicola (Imperial College London), Milo S. P. Shaffer (Imperial College London), Alexander Bismarck (Polymer & Composite Engineering (PaCE) Group, University of Vienna)* A "brick-and-mortar" coating inspired by nacre was developed at the nanometre length and conformally deposited at the circumference of carbon fibres. The classic toughening mechanisms of nacre were reproduced and implemented at the interphase of carbon fibre composites, leading to improved mechanical performance in tension.	2319-2 **FIBRE LENGTH DISTRIBUTIONS OF SHREDDED THERMOPLASTIC COMPOSITE SCRAP** *Guillaume Vincent (ThermoPlastic composites Research Center, University of Twente), Thomas A. de Bruijn (Saxion University of Applied Science), Mohammed Iqbal Abdul Rasheed (University of Twente), Sebastiaan Wijskamp (ThermoPlastic composites Research Center), Remko Akkerman (ThermoPlastic composites Research Center, University of Twente)* A new method to characterise the fibre length distribution of shredded consolidated fibre composites was developed. It was then applied to determine how shredding parameters and offcuts size influence the fibre length distributions.	2320-2 **A SHORT REVIEW OF MECHANICS FOR SKIN MODULUS MEASUREMENT VIA CONFORMAL PIEZOELECTRIC SYSTEMS** *Yan Shi (Nanjing University of Aeronautics and Astronautics)* This review will reveal the mechanism of the conformal skin modulus measurement systems and the expectable applications from this kind of soft piezoelectric composite actuator/sensors.	2321-2 **ASSEMBLED STRUCTURAL BATTERY - POUCH CELL INSERTED LATTICE STRUCTURE** *Xiang Gao (Beihang University), Yikai Jia (Beihang University), Lubing Wang (Beihang University), Sha Yin (Beihang University, Xi'an Jiaotong University), Jun Xu (Beihang University, Xi'an Jiaotong University, Tsinghua University)*	

Tuesday 22 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
16:00	2301-2 **EFFECTS OF THERMAL COMPRESSIVE STRAIN ON THE ORIENTATION RECOVERY FOR ULTRA-THIN CNT-FILLED POLYPROPYLENE MOLDING** *Haihong Wu (Henan University of Technology), Zeyue Guo (Northwestern University)* This paper is focus on the effects of thermal compressive strain on the electrical conductivity of CNT filled polymer composites.	2302-2 **PREPARATION AND REACTION PROPERTIES OF Ni/AL MICRO-NANO ENERGETIC MATERIALS** *Baitong Tang, Mingzhi Wang, Xinyi Luo, Jie Tao, Sha Liao, Liangsheng Qiu, Jingming Tian (Nanjing University of Aeronautics and Astronautics)* The accumulative roll bonding (ARB) was employed to prepare micro-nanoscale Ni/Al composites from pure nickel and aluminum foils of four different thickness, and structural evolution in the composite was observed throughout the process. The microstructure and energetic properties of the fabricated Ni/Al energetic composites were then studied to determine the ARB cycles and the ratios of original thickness.	2303-2 **EXPERIMENTS AND ANALYTICAL MODELING FOR DESIGNING TAPE SPRING COMPOSITES** *Huina Mao, Gunnar Tibert (KTH Royal Institute of Technology)* Neutral stable carbon fiber tape springs and bi-stable glass fiber tape springs were manufactured and their self-deployabilities after stowage were experimentally tested. An analysis methodology that predicts neutral stability or bi-stability in appropriately arranging fiber directions, layups and fabric properties is presented.	2304-2 **PREDICTION OF FAILURE BEHAVIOUR OF COMPOSITE LATTICE STRUCTURE UNDER COMPRESSIVE LOAD** *Min-Hyeok Jeon, In-Gul Kim, Eun-Su Go (Chungnam National University)* I studied about compressive test of composite lattice unit cell and FEA about test.	2305-2 **REINFORCING EFFECT OF MAGNETICALLY ALIGNED MULTI WALLED CARBON NANOTUBE ON EPOXY-BASED COMPOSITES** *Wenqiao Zhang, Rongrong Xie, Yang Cao, Xiaolong Jia, Qing Cai, Xiaoping Yang (Beijing University of Chemical Technology)*	2306-2 **CARBON NANOTUBE FILM ENGINEERED FIBER REINFORCED POLYMER COMPOSITES** *Xiaokui Xu, Shuxuan Qu, Yulin Zhang, Yongxi Zhang, Qingwen Li, Weibang Lu (Suzhou Institute of Nano-Tech and Nano-Bionics)* In this paper, we present an energy-saving process of curing polymeric composites through the resistive heating of carbon nanotube films.	2307-2 **CONCURRENT MULTI-SCALE OPTIMIZATION DESIGN OF COMPOSITE FRAME STRUCTURES WITH MAXIMUM FUNDAMENTAL FREQUENCY** *Jun Yan (Dalian University of Technology), Zunyi Duan (Dalian University of Technology, Harbin Electric Corporation), Jingyuan Wang (Dalian University of Technology), Tao Yu (Dalian University of Technology), Erik Lund (Aalborg University)* With the conception of interaged optimization of composite materials and structures, the present paper proposed a novel method to realize the concurrent multi-scale optimization of composite frame with maximum fundamental frequency under the composite material volume constraint.	2308-2 **NUMERICAL MODELING OF DELAMINATION RESISTANCE IMPROVEMENT THROUGH THE USE OF CNT-REINFORCED BONDING LAYERS** *Yassine El-Assami (PRES LUNAM IFSTTAR), Venkadesh RAMAN (Institut de Recherche Technologique), Monsset, DRISSI-HABTI (PRES LUNAM IFSTTAR)*	2309-2 **SUSTAINABLE LIGHTWEIGHT BIOCOMPOSITES FROM TOUGHENED POLYPROPYLENE AND BIOCARBON FOR AUTOMOTIVE APPLICATIONS** *Elisan Behazin, Amar Mohanty, Manju Misra (University of Guelph)* Solution processed microbatteries offer high areal specific capacity of > 2 mAh/cm2, ease of fabrication, and ability of taking on arbitrary shape, making them appealing for energy harvesting applications.	2310-2 **SOLUTION PROCESSED MICROBATTERIES FOR ENERGY HARVESTING APPLICATIONS** *Xing Xing, Boyung-Sun Lee, Ping Liu (University of California, San Diego)* Solution processed microbatteries offer high areal specific capacity of > 2 mAh/cm2, ease of fabrication, and ability of taking on arbitrary shape, making them appealing for energy harvesting applications.	2311-2 **TITANIUM BUTYL-PHOSPHATE GRAFTED MESOPOROUS SILICA HYBRID COMPOSITE FOR RARE EARTH SEPARATION** *Wenzhong Zhang (University of Helsinki), Dzenita Avdibegovic (KU Leuven), Risto Koivula (University of Helsinki), Koen Binnemans (KU Leuven), Risto Harjula (University of Helsinki)* Liquid phase layer-by-layer grafting of titanium butyl-phosphate to mesoporous MCM-41 silica enabled the rare earth separation capability of the material.
16:20	2301-3 **STUDY ON CURING PROCESS OPTIMIZATION OF EXTRA-THICK CARBON FIBER REINFORCED EPOXY RESIN MATRIX COMPOSITES AND THEIR PROPERTIES** *Hong'en Wang, Xieyao Yuan, Jie Xu, Yang Yang, Weiping Liu (Shanghai Aircraft Manufacturing CO., Ltd)* With the purpose of determining suitable curing cycle of a composites with extra thickness, the recommended curing process was firstly analyzed, based on the systematically study on curing properties, rheology analysis of prepregs, some curing optimizations with low heating rate within the recommended curing was applied, and the corresponding cured composites were inspected with ultrasonic C-scan and internal quality analysis.	2302-3 **AGING BEHAVIOR AND TENSILE PROPERTIES OF CAST AND SQUEEZED 6061-SiC PARTICLE COMPOSITES** *F. M. Fairouz, A. Daoud, M. T. Abou El-khair (Central Metallurgical Research and Development Institute (CMRDI))* Aging behavior, tensile properties and effect of squeeze casting of 6061 alloy reinforced by 5vol. % fine SiC particles were studied. Hardness and tensile properties improved by heat treatment and applying of squeeze casting technique, such as ultimate tensile stress that increases with 55% than cast composites and with 17% than extruded matrix.	2303-3 **THE EFFECT OF VOIDS ON TRANSVERSE CRACKING IN COMPOSITE LAMINATES AS REVEALED BY COMBINED COMPUTATIONAL ANALYSIS AT THE MICRO- AND MESO-LEVELS** *Mahoor Mehdikhani (KU Leuven, SIM M3 program), Nikolay Petrov (SIM M3 program, Skolkovo Institute of Science and Technology), António R. Melro (University of Bristol), Stepan V. Lomov (KU Leuven, SIM M3 program, Skolkovo Institute of Science and Technology), Larissa Gorbatikh (KU Leuven, SIM M3 program, Skolkovo Institute of Science and Technology)* The influence of voids on the crack density evolution in cross-ply composites is investigated using a two-level methodology: computational micromechanics combined with X-FEM on the laminate level.	2304-3 **A VIRTUAL TESTING APPROACH TO MATERIALS SELECTION FOR IMPACT SHIELDING APPLICATIONS** *Diego Garijo (IMDEA Materials), Claudio S. Lopes (IMDEA Materials), Gilberto Falcó (IMDEA Materials), Carlos González (IMDEA Materials, Polytechnic University of Madrid), Vasilis Vossios (Airbus Operations)* A workflow supported by high-fidelity virtual testing for the selection of candidate materials to be incorporated into shielding protection systems is presented in this paper. Robust modelling techniques are described for the accurate simulation of impact events on carbon-based composite shields hybridized with several other materials of standout ballistic performance.	2305-3 **GRAPHENE-BASED THERMOPLASTIC ELASTOMERS** *Dimitrios G. Papageorgiou, Mufeng Liu, Ian A. Kinloch, Robert J. Young (University of Manchester)* Graphene-based thermoplastic elastomers were prepared by melt-mixing. The effect of the diameter of the nanoplatelets on the electrochemical properties of the nanocomposites, was thoroughly evaluated.	2306-3 **DYNAMIC PROPERTIES OF THERMAL CURING FIBER/EPOXY SUPPORTING BOOM** *Jianzheng Wei, Ding Haiyin, Jianxin Yu, Tan Huifeng (Harbin Institute of Technology)*	2307-3 **EIGENVALUE BUCKLING ANALYSIS OF FUNCTIONALLY GRADED GRAPHENE PLATELETS REINFORCED CORRUGATED WEBS** *Yu Wang, Chan Zhao, Chuang Feng, Jie Yang (RMIT University)* Corrugated webs are extensively used in various engineering fields. This paper employs finite element method to investigate the buckling behaviours of a new novel class of multi-layered corrugated webs reinforced by non-uniformly distributed graphene platelets (GPLs).	2308-3 **PRELIMINARY OBSERVATIONS ON THE ARCHITECTURE OF TEXTILE COMPOSITES USING MICRO-XRAY-CT** *Naveen Tavge Chowdhury, Garth Pearcea (UNSW)* A preliminary investigation into the use of Micro-Xray CT to examine the fabric architecture of textile composites without the use of contrast enhancement agents is presented.	2309-3 **IMPROVING INTERFACIAL AND MECHANICAL PROPERTIES OF T800 CARBON FIBER REINFORCED ITACONIC ACID-BASED EPOXY RESIN (EIA) COMPOSITES BY INTRODUCING CELLULOSE NANOMATERIALS ONTO THE SURFACE OF FIBERS** *Lu kangyi (Beijing University of Chemical Technology), Tian Jungeng (Chinese Academy of Sciences), Li Jingxuan, Deng Quan (Beijing University of Chemical Technology), Yu Yunhua (Beijing University of Chemical Technology), Liu Xiaoping (Chinese Academy of Sciences), Yang Xiaoping (Beijing University of Chemical Technology)* The results demonstrate that the nanocomposites are much promising in the electro-caloric solid state refrigeration and electrical energy storage because of their giant and tunable ECE and ultra-high electrical energy storage density, excellent processability, high breakdown electrical strength and light weight.	2310-3 **THERMAL-TO-ELECTRICAL ENERGY CONVERSION AND ELECTRICAL ENERGY STORAGE IN POLY(VINYLIDENE FLUORIDE-TRIFLUOROETHYLENE) BASED NANOCOMPOSITES CONTAINING FERROELECTRIC NANOWIRES** *Chnyan Jiang, Guangping Zheng (Hong Kong Polytechnic University)* The flexible self-regulating heating devices, using a simple and universal materials design strategy, provide a unique control over pyro-resistive behaviours by connecting different conductive polymer composites in series. A tri-component series assembled device has been developed and combines for the first time high positive temperature coefficient intensity with good Joule heating as well as mechanical flexibility and robustness.	2311-3 **UNIVERSAL CONTROL OF PYRO-RESISTIVE BEHAVIOUR FOR FLEXIBLE SELF-REGULATING HEATING DEVICES** *Yi Liu, Han Zhang, Harshit Agrawal, Tori Peiis, Emiliano Bilotti (Queen Mary University of London)* Flexible self-regulating heating devices, using a simple and universal materials design strategy, provide a unique control over pyro-resistive behaviours by connecting different conductive polymer composites in series. A tri-component series assembled device has been developed and combines for the first time high positive temperature coefficient intensity with good Joule heating as well as mechanical flexibility and robustness.

Time	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
16:00	2312-2 **CYLINDER TYPE PYRAMID LATTICE SANDWICH COMPOSITE STRUCTURE ANALYSIS OF THE AXIAL COMPRESSION PERFORMANCE** *Zhang Hang Wang Bing (Harbin Institute of Technology) Wang Shixun (Beijing Institute of Astronautical Systems Engineering) Wu Liyzhi (Harbin Institute of Technology)* A study about the uniaxial compression behaviour of cylinder type pyramid lattice sandwich composite material structure.	2313-2 **A PARAMETRIC STUDY ON STRENGTH AND STIFFNESS OF HYBRID SCARF JOINTS** *S Vijay Shankar, A S Ganapathi, I Sridhar(Nanyang Technological University)* This work presents a parametric study of adhesively bonded scarf joints enriched with mechanical fasteners. Tensile strength and mode of failure for different fastener positions along the load path is investigated and are compared with bonded scarf joint.	2314-2 **MECHANICAL PROPERTIES EVALUATION OF 3D WOVEN COMPOSITES UNDER BIAXIAL LOADING CONSIDERING THE RANDOM WAVINESS OF FIBER YARNS** *Gang Liu, Licheng Guo(Harbin Institute of Technology), Prasad Potluri(University of Manchester), Yinong Han, Feng Liao(Harbin Institute of Technology)* This paper will investigate the mechanical properties of 3D woven composites under biaxial loading condition considering the random waviness of both warp and weft yarns. Based on the actual statistics of the fiber yarns' random waviness, the stiffness and strength of a type of 3D angle inter-lock woven composites are predicted by using the random waviness model and a series of corresponding biaxial testing of cruciform specimens are carried out simultaneously. The variations of the modulus and the strength with the random characteristics of the fiber yarns' waviness are discussed.	2315-2 **AMICROMECHANICS-BASED FATIGUE LIFE PREDICTION APPROACH WITH OCTAGONAL FIBER MODEL FOR THERMOPLASTIC COMPOSITES** *Chao Zhao, Syed Zulfiqar Hussain Shah, Yong Joo Cho, Sung Kyu Ha (Hanyang University)* A micromechanics-based fatigue life prediction approach with octagonal fiber model for thermoplastic and thermoset composites, and two types of experiments were performed to compare with prediction, good agreement was observed.	2316-2 **IMPACT RESISTANCE AND RECOVERY IN SMA STITCHED E-GLASS REINFORCED POLY(ε-CAPROLACTONE)/ EPOXY COMPOSITES** *Arnaldi Cohadies, Malvina Pauchard, Véronique Michaud (Ecole Polytechnique Fédérale de Lausanne (EPFL))* Damage recovery after low-velocity impact has been assessed in shape memory alloy wires stitched woven E-glass fibre-reinforced polymer composites.	2317-2 **THE DESIGN, MANUFACTURE, AND CHARACTERIZATION OF FUNCTIONAL MAGNETOELECTRIC NANOSTRUCTURES** *Christopher S. Lynch (University of California, Los Angeles, USA)* Despite its importance in the processing of glass fiber-reinforced polymer composites, almost no attention has been paid to the wetting behavior of molten drops of thermoplastic polymers. We have therefore investigated the spreading dynamics of polypropylene, maleic anhydride-grafted polypropylene, and poly(vinylidene fluoride) on glass.	2318-2 **SPREADING DYNAMICS OF PP, PVDF AND MAPP ON GLASS SUBSTRATE** *Yichuan Zhang (KU Leuven, Université de Mons), Carlos A. Fuentes (KU Leuven), Aart W. Van Vuure (KU Leuven), Joël De Coninck (Université de Mons), David Seveno (KU Leuven)* The thermal properties of composite proton exchange membrane are investigated in the paper.	2319-2 **THE EXPERIMENTAL STUDY ON THERMAL CONDUCTIVITY OF COMPOSITE PROTON EXCHANGE MEMBRANE** *Lei Chen, Shanyou Wang, Zhongzhen Li, Wenquan Tao (Xi'an Jiaotong University)* Tumor interstitium is a polyelectrolyte gel composed of a collagen network and glycosaminoglycans (GAGs). Both the transport and mechanical properties of tumor interstitium are responsible for the modest nanomedicine treatment outcome, and matrix normalization (i.e. degradation of tumor matrix) has been suggested as a strategy for advancing nanomedicine. Here, a general poroelastic theory is established to study the transport, deformation and degradation of tumor interstitium.	2320-2 **TRANSPORT AND MECHANICAL PROPERTIES OF TUMOR INTERSTITIUM** *Shi-Lei Xue, Bo Li, Xi-Qiao Feng (Tsinghua University)* Tumor interstitium is a polyelectrolyte gel composed of a collagen network and glycosaminoglycans (GAGs). Both the transport and mechanical properties of tumor interstitium are responsible for the modest nanomedicine treatment outcome, and matrix normalization (i.e. degradation of tumor matrix) has been suggested as a strategy for advancing nanomedicine. Here, a general poroelastic theory is established to study the transport, deformation and degradation of tumor interstitium.	2321-2 **CARDBOARD PANELS REINFORCED WITH BRAIDED UNIDIRECTIONAL GLASS RODS FOR VEHICLE CRASH IMPACT ATTENUATION** *Gabriel Fortin, Yuri Imai (The Department of Advanced-Fibro Science, Kyoto Institute of Technology, Matsupasaki, Sakyo-ku, Kyoto, 606-8585, Japan), Hiroyuki Hamada (The Future-Applied Conventional Technology Centre, Kyoto Institute of Technology, Matsupasaki, Sakyo-ku, Kyoto, 606-8585, Japan)*	**Panel Session on Composite Regulation: MODERNISING COMPOSITE MATERIALS REGULATIONS – BARRIER TO INNOVATION AND AN EMERGING OPPORTUNITY**
16:20	2312-3 **TENSILE BEHAVIOR OF ALUMINUM – SELF REINFORCED POLYPROPYLENE FIBER METAL LAMINATES BASED ON 2/1 AND 3/2 CONFIGURATIONS** *Yifan Wang, Lei Pan, Aamir Ali Wenliang Ma, Zengmin Zheng, Tao Jie (Nanjing University of Aeronautics and Astronautics)* Tensile behaviors of aluminum – self reinforced polypropylene fiber metal laminates (Al-SRPP FMLs) based on 2/1 and 3/2 configurations were investigated at various temperatures.	2313-2 **EVALUATION OF LASER SURFACE IRRADIATION ON THE MODE I FRACTURE TOUGHNESS OF COMPOSITE JOINTS WITH CFRP ADHERENDS** *Ran Tasa (a King Abdullah University of Science and Technology), Marco Alfano (University of Calabria), Gilles Lubineau (A King Abdullah University of Science and Technology)* Mode I fracture toughness of adhesively bonded DCB samples with laser treated CFRP (UD) substrates was analyzed. Fracture toughness was enhanced through to the removal of surface contamination and engineered surface morphologies.	2314-3 **CARBON FIBRE COMPOSITES WITH MULTI-NANOFILLERS FOR LIGHTNING STRIKE PROTECTION** *Anchalee Duongthipthewa, Yiyin Su , Limin Zhou (The Hong Kong Polytechnic University)* The enhancement of thermal and electrical functionalities in through-thickness direction of CFRP composite materials indicates new superconductive prepreg for lightning strike protection (LSP) in the aircraft structures.	2315-3 **A NEW EQUIVALENT CONSTANT R-RATIO LOADING APPROACH FOR PREDICTING FATIGUE LIFE OF CFRP LAMINATES UNDER VARIABLE LOADING** *M. Kawai, D. Sango (University of Tsukuba)* A new method for predicting fatigue life of CFRPs under variable loading is developed on the basis of the assumption of equivalent variable maximum stress loading at a constant stress ratio.	2316-3 **A THERMODYNAMIC ANALYSIS OF THE SHAPE MEMORY ASSISTED SELF-HEALING POLYMERS** *Yigi Mao, Meide Yang, Shuaun Hou (University Changsha China)* A thermodynamic model is developed to reflect the fundamental mechanism of the shape memory assisted self healing. In the model, an interpolated network model is proposed to simulate the cross-linked network and linear polymer system, respectively. The shape memory property of chemically crosslinked network is captured by a viscoplastic model considering the typical glass and rubbery transformation in the material, while the mechanical property of the linear polymer system is modeled by a viscoelastic model.A micro-mechanism based polymer fracture model is developed by scaling theory, and the monomer diffusion based self healing model is established.	2317-3 **DYNAMIC COMPRESSIVE RESPONSE OF 3D PRINTED THERMOPLASTIC POLYURETHANE HONEYCOMBS WITH GRADED DENSITIES** *Simon R.G. Bates (University of Bath), Ian R. Farrow (University of Bristol), Richard S. Trask (University of Bath)* This work describes the manufacture and dynamic compressive analysis of 3D printed cellular structures with graded densities, with tailored energy absorbing properties. An optimised 3D printing procedure was developed which allowed the manufacture of high quality thermoplastic polyurethane structures which were capable of undergoing cyclic compression and extreme impact loading without failure.	2318-3 **FRACTOGRAPHIC INVESTIGATION ON TEMPERATURE-MODIFIED FIBRE/ MATRIX INTERFACE OF CARBON FIBRE REINFORCED COMPOSITE** *Zhengrong Yu, Emile Greenhalgh, Giuliano Allegri (Imperial College London)*	2319-3 **ASSESSMENT OF WIND TURBINE BLADE TRAILING EDGE FAILURE WITH SUB-COMPONENT TESTS** *F. Lafuente, R.P.L. Nijssen, N. Koorn, D. Smissaert (Knowledge Centre WMC)* This paper describes a test set-up for a blade sub-component aimed at achieving trailing edge failure after buckling, which is an improvement in the experimental verification of a blade design. The description of the test setup and static test results are reported. Experimental results are discussed and compared with a FE model to describe the failure mechanism.	2320-3 **THEORETICAL MODELING ON MONITORING THE GROWTH AND RUPTURE ASSESSMENT OF ARTERIAL ANEURYSMS** *Yi Wan, Jun Takahashi (The University of Tokyo)* A new strategy of using dielectric elastomer sensors to monitor the growth and assess the rupture risk of arterial aneurysms.	2321-3 **DESIGN METHODOLOGIES FOR AUTOMOTIVE COMPONENTS MADE FROM SHORT CARBON FIBER REINFORCED THERMOPLASTIC MATERIALS** *Martin Reiter (Johannes Kepler University Linz), Andreas Pröll (Johannes Kepler University Linz), Markus Thurmeier (Audi AG), Zoltan Major (Johannes Kepler University Linz)* Design methodologies for short carbon fiber reinforced components are presented in this study based on the development of an automotive part. Fully micromechanically coupled as well as purely isotropic simulation approaches are combined.	**Panel Session on Composite Regulation: MODERNISING COMPOSITE MATERIALS REGULATIONS – BARRIER TO INNOVATION AND AN EMERGING OPPORTUNITY**

Tuesday 22 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
16:40	2301-4 **FACILE SURFACE MODIFICATION OF BACTERIAL CELLULOSE FOR COMPOSITE APPLICATIONS** *Min Tang (Imperial College London), Martin Hervy (Imperial College London) Koon Y. Lee (Imperial College London), Alexander Bismarck (Imperial College London, University of Vienna)* This paper described a new way of connecting the polymer matrix and cellulose fibrils by creating covalent bonding between them in one step of polymerization. The bonded cellulose fibrils significantly increased the tensile modulus of the epoxy resin used in this paper.		2303-4 **EFFECT OF DRILLING PARAMETERS ON SURFACE QUALITY OF NATURAL FIBER REINFORCED POLYMER COMPOSITES** *M.Omkumar, K.Selvakumar, A.Suresh Babu (Anna University)* Analyzing the drilling quality of natural fiber reinforced polymer composites helps to reduce rejection of components during assembly. The present research work concentrated on the fabrication and study of mechanical properties and effect of machining parameters on drilling of natural fiber hybrid composites.	2304-4 **MICRO-MECHANICAL SIMULATION OF MODE I INTERLAMINAR FRACTURE IN PARTICLE-TOUGHENED INTERLAYERS** *G. Borstnar, M. Jackson, M. N. Mavrogordato, I. Sinclair, S. M. Spearing (University of Southampton)* A 2D plane-strain image-based Finite Element model was created to simulate Mode I delamination propagation in particle-toughened Carbon Fibre Reinforced Polymers. The model was supported by time-resolved Computed Tomography data that permitted the simulated crack paths to be compared to experimental results.	2305-4 **MAGNESIUM COMPOSITES REINFORCED BY METAL COATED CARBON NANOTUBES** *Qiangian Li (Imperial College London), Samaneh Nasiri (University of Erlangen-Nuremberg), Michael Zaiser (University of Erlangen-Nuremberg)* Nanocarbon reinforced lightweight metal composites have great potential for e.g. automotive and aeronautics application, however, the challenges are to develop a suitable manufacturing process and a good dispersion of nanocarbon in metal matrix. We have optimised the manufacturing parameters to improve dispersion of nanocarbon in matrix and the characterisation of such composites have also been investigated.	2306-4 **A STUDY ON THE PROCESSING ABILITY OF CARBON FIBER REINFORCED THERMOPLASTIC EPOXY RESIN COMPOSITES BY USING PULTRUSION TECHNIQUE** *Wongsriraksa Patchanat, Nakai Asami (Ally University)* This research is to studies processing ability of carbon fiber reinforced thermoplastic epoxy resin composites by using Pultrusion technique to produce the hollow shape composite. The optimum condition and an effect of thermoplastic epoxy resin on the Pultrusion processing of the composites was evaluated.	2307-4 **OCTET CELLULAR LATTICE STRUCTURES BASED ON CARBON FIBER COMPOSITE TUBES** *Xiao Liu, Andrew Burke, Christopher J. Hansen (University of Massachusetts Lowell)* In this study, an ultra-light weight and robust cellular structure has been produced using CFRP material. Both theoretical analysis and experimental testing have been applied to investigate the compressive stiffness of this structure and an excellent agreement has been reached between them.			2310-4 **TEMPERATURE-RELATED PERFORMANCE OF A DIELECTRIC ELASTOMER GENERATOR WITH CONSIDERATION OF VISCOELASTICITY AND FAILURE MODES** *Shoue Chen (Hunan University), Zhicheng He (Hunan University), Eric Li (The Chinese University of Hong Kong)* Lowering the operating temperature (273~353K) can improve the electromechanical conversion efficiency of the dielectric elastomer generator (DEG) made of VHB 4910 and enhance its stability.	2311-4 **INFLUENCE OF PTFE FIBER CONTENT ON THE TRIBOLOGICAL PROPERTIES OF HYBRID KEVLAR/ PTFE FABRIC SELF-LUBRICATING COMPOSITES** *Yingyi Liu, Dongxing Zhang (Harbin Institute of Technology)* Hybrid Kevlar/PTFE fabric self-lubricating composites specimens were prepared with different content of Polytetrafluoroethylene (PTFE) fiber and Kevlar fiber (DuPont, USA) by hand-knitting machine. The friction and wear tests were conducted under dry sliding conditions at various speeds under a load of 50N. The result showed that PTFE fiber was effective in reducing the wear of the hybrid PTFE/ Kevlar fabric composite, the higher PTFE fiber content the fabric had, the lower the friction coefficient was.
17:00	2401 Polymer Matrix Materials 7	2402 Metal Matrix Composites 7	2403 Fiber-reinforced Composites 7	2404 Fracture and Damage 7	2405 Nano-Composites 7	2406 Fiber-reinforced Composites 18	2407 Structural Analysis and Optimization 7	2408 Multiscale Modelling of Structures 7	2409 Bio-Composites 7	2410 Energy Harvesting and Storage 2	2411 Hybrid Composites 7
17:00	2401-1 **THE METHOD TO IMPROVE INTERFFACIAL PROPERTIES OF CFRP COATING NANO-CARBON-MATERIAL ON CF SURFACE** *Jianjun Jiang, Xuming Yao, Xinyu Gao (Northwestern Polytechnical University)* Carbon nanotubes (CNTs) and graphene oxide (GO), which are also called as nano-carbon-material, were deposited on the electrochemically oxidized CF surface.In this paper, the interfacial performance of carbon fiber (CF) and epoxy resin,as well as their composites mechanical properties were tested and proved to be improved obviously.	2402-1 **INTERFACIAL MODIFICATION IN CARBON NANOTUBES REINFORCED MAGNESIUM MATRIX COMPOSITES** *H.L. Shi, X.J. Wang, X.S. Hu, K. Wu (Harbin Institute of Technology)* The aluminum alloying element was used to modify the Mg-CNT interface which obtained better interface bonding.	2403-1 **ORIENTATION, DISPERSION AND LENGTH REDUCTION OF FIBRES IN LONG GLASS FIBRE REINFORCED INJECTION MOULDING** *Phil Caton-Rose (University of Bradford), Millan-John Gilson (University of Bradford), Peter Hine (University of Leeds)* Within this paper we show an in depth investigation into the moulding of short and long glass fibre reinforced composites. Short fibre orientation is predicted within Autodesk Simulation Moldflow Insights to a high accuracy. Fibre dispersion and fibre length for long fibre reinforced materials is shown to be highly effected by the injection moulding screw, in particular within the compression zone.	2404-1 **STRESS INVARIANT BASED ELASTOPLASTIC DAMAGE MODELLING OF UNIDIRECTIONAL FIBRE REINFORCED COMPOSITES** *M.N. Rao, A.K. Bangaru, K.-U. Schröder (RWTH Aachen University)* A continuum damage based yield condition is defined for fiber, fiber/matrix interface failure with the assumption of associated plastic flow rule in the interface region. With the help of user defined subroutine, the combined fiber and fiber/ matrix transverse debonding failure criteria have been implemented in the finite element software ABAQUS.	2405-1 **TUNABLE POLY(URETHANE-UREA) BASED ALIGNED CARBON-NANOTUBE POLYMER NANOCOMPOSITES** *Jeffrey Gair (U.S. Army Research Laboratory), Dale Lidston (Massachusetts Institute of Technology), Daniel Cole (U.S. Army Research Laboratory), Brian Wardle (Massachusetts Institute of Technology)* A method for controlling poly(urethane-urea) cure via heating has been developed to permit voidless infusion into densely packed carbon nanotube forests. These polymer nanocomposites exhibit tunable mechanical properties which arise from stoichiometrically tunable polymer matrix.	2406-1 **MECHANICAL PROPERTIES AND MICROSTRUCTURE OF CELLULOSE NANOFIBER (CNF) REINFORCED EPOXY** *Xudong Wang, K. Hanaki, T. Kurashiki, K. Mukoyama, Xingsheng Li (Osaka University)* This study aims to illustrate the reinforcing effect of CNF addition on waterborne resin, especially, effects on Young's modulus, shear strength and the glass transition temperature are reported in this paper.	2407-1 **A STRUCTURE DESIGN OF CFRP REAR PRESSURE BULKHEAD WITHOUT STIF-FENERS** *Li Zhongyang, Li Dong, Guo Xiang* Research on structure design of CFRP Rear Pressure Bulkhead without stiffeners is finished. The FEA results show that the web crack stopper inner the dome skin have a positive influence on improving the buckling performance and stability of the structure. There is no need to arrange extra stiffeners on the dome skin. The design can meet the strength requirement.	2408-1 **ON STRESS CONCENTRATION FACTORS OF THE MATRIX IN A COMPOSITE** *Zheng-Ming Huang, Limin Xin, Yi Zhou (Tongji University)* The load level at which debonding occurs between the fiber and matrix interface of a composite subjected to any load is determined analytically, based essentially on the fiber and matrix properties plus a transverse tensile strength of a UD composite.	2409-1 **SHAPE MEMORY COMPOSITES FOR BONE REGENERATION** *Ruqi Xie, Jinlian Hu, Frankie Ng, Xia Guo (The Hong Kong Polytechnic University)*	2410-1 **FLEXIBLE SUPERCAPACITORS BASED ON ALIGNED CARBON NANOTUBES WITH UNIQUE NANOSTRUCTURE** *Yue Zhou, Estelle Cohen , Brian L. Wardle (Massachusetts Institute of Technology)* Flexible supercapacitors based on aligned carbon nanotubes as electrodes were fabricated successfully. Different than randomly dispersed carbon nanotubes that were used for a flexible electrode matrix in the current literature, the flexible aligned carbon nanotube electrodes herein have a textured nanostructure with aligned channels to enhance the ion transport, resulting in superior electrochemical performances.	2411-1 **PROCESSING OF HYBRID METAL/ COMPOSITE SYSTEMS** *C. Pereira (DEMec), J. P. Sousa (DEMec), S. Miranda (INEGI), P. Amaral (INEGI), A. Santos (INEGI / FEUP), A. T. Marques (INEGI / FEUP)* The main aim of this paper is to present a manufacturing strategy for the production of metal/ polymer composite sheets using the combination of metal and composites processing technologies. It will be presented the laboratorial processing strategies to produce hybrid metal (steel or aluminum) with a prepreg system based on IM7 carbon fiber.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
2312-4 **LOW-VELOCITY IMPACT OF SANDWICH STRUCTURES WITH EMBEDDED CERAMIC PLATES** *Tobias Mayr, Mark Battley, Tobias Müller, Abhiram Ramesh, Tom Allen, Helmut Rapp* Inspired by the tree leaves, a ground-structure based topology optimization method is proposed as an effective tool for designing of composite sandwich structures. Experimental results demonstrate that the optimized hybrid-core sandwich structures is an optimized configuration, with much higher specific compression stiffness and peak load than the other two typical composite sandwich structures.		2314-4 **FLATWISE COMPRESSION PROPERTY OF HIERARCHICAL THERMOPLASTIC SQUARE LATTICE** *Houchang Liu, Bing Du, Liming Chen (Chongqing University)*		2316-4 **CFRP COMPOSITE WITH NACRE-INSPIRED MICRO-STRUCTURE AND FRACTAL-TEXTURED INTERFACE** *Federico Narducci, Silvestre T. Pinho (Imperial College London)* We design, synthesise and test a carbon/epoxy composite with nacre-inspired interlocking micro-structure and PLA-textured interfaces, showing its potential for crack deflection and damage diffusion.	2317-4 **IMPREGNATION STRATEGIES FOR GRADIENT FUNCTIONALIZATION OF FRP STRUCTURES WITH NANOPARTICLE-MODIFIED RESIN SYSTEMS** *Dilmurat Abliz, Gerhard Ziegmann (TU Clausthal)* Introduction of nanoparticles is a promising way to effectively improve the performance of fiber reinforced polymer structures or introduce certain functionalities to them. Impregnation with selective nanoparticle-modified resin systems enables an optimal gradient-functionalized FRP structure regarding the stress gradient during application, which still guarantees production efficiency.	2318-4 **CONTINUOUS PRODUCTION OF CARBON NANOTUBE-GRAFTED QUARTZ FIBRES: EFFECT OF CARBON NANOTUBE LENGTH ON FIBRE/ MATRIX ADHESION** *Huan De Luca (Imperial College London), David B. Anthony (Imperial College London), Emile S. Greenhalgh (Imperial College London), Alexander Bismarck (Imperial College London, University of Vienna), Milo S. P. Shaffer (Imperial College London)* Hierarchical quartz fibres were produced continuously in an open CVD reactor with different CNT lengths/ configurations. The effect of CNTs upon the fibre/matrix interface was investigated through single fibre pull-out tests.		2320-4 **MONITORING EYE FATIGUE USING FLEXIBLE PIEZOELECTRIC SENSORS** *Chaofeng Lu, Shuang Wu, Yangyang Zhang, Yangkun Du (Zhejiang University)* An innovational flexible piezoelectric sensor designed and fabricated for fatigue monitoring.	2321-4 **INTRODUCING A NOVEL MANUFACTURING PROCESS FOR AUTOMOTIVE COMPOSITE** *S.Cozien-Cazuc (Far-United Kingdom), K.Lindsey (Far-United Kingdom), M.Ravaioli (Far-United Kingdom), H.Amel (University of Warwick), D.J.Hughes (University of Warwick), N.Raatti (University of Warwick), G.Williams (University of Warwick), S.Currie (University of Warwick), A.Boots (Expert Tooling), M.Hawrylak (Expert Tooling), C.Voss (Expert Tooling), T.Elford (National Composites Centre, United Kingdom), F.Goodmane (National Composites Centre, United Kingdom)* The aim of the present study was to show the development of a novel end-to-end production process for the manufacture of high volume, low-cost and lightweight structural component for the automotive industry.	**Panel Session on Composite Regulation: MODERNISING COMPOSITE MATERIALS REGULATIONS – BARRIER TO INNOVATION AND AN EMERGING OPPORTUNITY**
2412 Sandwich Structures and Materials 3	2413 Joints 7	2414 Composite Structures 7	2415 Fatigue 7	2416 Self-Healing and Bio-inspired Designs 3	2417 Tribology and Wear 1	2418 Processing-Preforming Technologies 1	2419 Renewable Energy 2	2420 Bio and Medical 5	2421 Automotive and Rail 2	
2412-1 **GROUND-STRUCTURE-BASED TOPOLOGICAL OPTIMIZATION OF BIONIC SANDWICH STRUCTURES WITH HYBRID CORE AND CFRP FACE SHEETS** *Dong Li, Zhi Sun, Weisheng Zhang (Dalian University of Technology), Shanshan Shi(Dalian Jiaotong University), Haoran Chen, Xu Guo (Dalian University of Technology)* In this study, mechanical joining method between anchor processed aluminum sheet and CFRTP (Carbon Fiber Reinforced Thermo-Plastic) sheet without rivets by using induction heating for carbon fiber is suggested, and joining strength were investigated.	2413-1 **DIRECT JOINING OF CFRTP AND ALUMINUM SHEETS** *K.KUWABARA,T. YASUHARA (Nippon Institute of Technology)* In this study, mechanical joining method between anchor processed aluminum sheet and CFRTP (Carbon Fiber Reinforced Thermo-Plastic) sheet without rivets by using induction heating for carbon fiber is suggested, and joining strength were investigated.	2414-1 **INVESTIGATION ON CRIPPLING OF T-SECTION COMPOSITE STRINGERS** *L.Chen,M.R.Xiong,Z.F. Li,C.J.Liu (Beijing Aeronautical Science and Technology Research Institute)* The effects of layup, ratio of web height to thickness and edge impact damage on local buckling and crippling strength of composite stringers were evaluated. Stringer compression test results indicate that the edge impact damage may lead to 18% reduction in crippling strength of stringers.	2415-1 **EXPERIMENTAL INVESTIGATION OF THE FATIGUE BEHAVIOR OF OFF-AXIS CFRP LAMINATES USING NON DESTRUCTIVE TECHNIQUES** *K.A. Kalteremidou (Vrije Universiteit Brussel (VUB)), S. Fonteyn (VUB, SIM M3 Program), L. Pyl (VUB), D. Van Hemelrijck (VUB)* Off-axis CFRP specimens are tested under static and fatigue loads in different stress levels and R-ratios. The effect of the angle and the testing parameters on the fatigue behaviour by means of DIC and AE is examined.	2416-1 **INVESTIGATING THE POTENTIAL OF HIERARCHICAL NON-SELF-SIMILAR DISCONTINUOUS COMPOSITES** *Joël Henry, Soraia Pimenta (Imperial College London)* Numerical simulations and experimental results show that hierarchical brick-and-mortar composites can successfully delay damage localisation, spread damage and dissipate energy stably before failure. Non-self-similar variations of the microstructure are developed to significantly extend the damage tolerance of composites.	2417-1 **STUDY ON THE SCRATCH BEHAVIOR OF ABS/PBT- GLASS FIBER REINFORCED COMPOSITES** *Qian Cheng, Han Jiang (Southwest Jiaotong University)*	2418-1 **MANUFACTURE OF HYBRID BICOMPONENT FIBERS BY KISS-ROLL COATING** *Christoph Schneeberger, Nicole Aegerter, Ioanna C. H. Wong, Paolo Ermanni (ETH Zurich)* Kiss-roll coating is proposed as a potential method to manufacture hybrid bicomponent fibers for the high-volume production of thermoplastic composites. A high-speed study is provided to prove the feasibility of the approach and the influence of different process parameters is investigated via a second-degree full factorial parameter study.	2419-1 **MULTIFUNCTIONAL COMPOSITES FOR ENERGY STORAGE** *K. Y. Chan, B. Jia, N. Hameed, K. T. Lau (Swinburne University of Technology)* This paper is focused on the development of multifunctional energy storage systems. The concept of multifunctional dielectric capacitors are introduced.	2420-1 **A TENSEGRITY MODEL OF CELLS UNDER STRETCHES** *Guang-Kui Xu (Xi'an Jiaotong University)* A cytoskeletal tensegrity model is proposed for the first time to study the dynamics of cell reorientation on a substrate under biaxial strains. It is shown that the model is capable of reproducing all available experimental observations.	2421-1 **DEVELOPMENT OF A CFRP CAR ROOF WITH NOVEL HOLISTIC STRUCTURE** *Wang Shengqi, Zou Wenbin, Chen Guofeng, Ma Yongshuai, Lin Song, He Peng*	**Panel Session on Composite Regulation: MODERNISING COMPOSITE MATERIALS REGULATIONS – BARRIER TO INNOVATION AND AN EMERGING OPPORTUNITY**

Tuesday 22 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
17:20	2401-2 **EFFECT OF POST TREATMENTS ON THE SHRINKAGE RESISTANCE OF MELAMINE FOAM** *Zhang Junxiong, Chen Zhaofeng, Xue Songhai (Nanjing University of Aeronautics and Astronautics)* 1. The thermal treatment and PF modification are practical methods to pretreat the melamine foam for its carrier utilization. 2. The mechanism shows that all methods are aimed at improving the crossing degree of the raw melamine foam.	2402-2 **REGRYSTALLIZATION BEHAVIOR OF IN-SITU SYNTHESIZED MgAl$_2$O$_4$ WHISKERS REINFORCED 6061 ALUMINUM ALLOY COMPOSITES** *Geng Hao, Chunsheng Shi, Naigin Zhao (Tianjin University)* In-situ MgAl2O4 whiskers reinforced 6061 aluminum alloy composites were fabricated by a powder metallurgy method. The obtain composites showed good mechanical property and recrystallization resistance.	2403-2 **THERMAL BUCKLING ANALYSIS OF VARIABLE ANGLE TOW COMPOSITE PLATES** *Fei Li, Guoqun Nie (Tongji University)* Assumed that the fibre angle of each ply varies linearly along the length of the laminate, the governing equation of the thermal buckling problem is derived based on the classical plate theory. By expressing the out of plane displacement as the Chebyshev polynomials and characteristic functions, the critical thermal buckling loads of laminate plates with variable angle tows(VAT) under different boundary conditions and uniform temperature rise are solved by employing Rayleigh-Ritz method.	2404-2 **ON THE STIFFNESS OF COMPOSITE LAMINATE WITH DELAMINATIONS FOR ANALYTICAL MODEL OF LOW VELOCITY IMPACT** *Jicheng Feng (Shanghai Jiao Tong University), Na Li (Shanghai aircraft design and research institute), Yi Fu (Shanghai Jiao Tong University), Yaolu Chen (Shanghai Jiao Tong University)* An analytical model on the transvers stiffness of composite laminate with delaminations was developed. It is applied to the simulation of low velocity impact of laminate based on the spring-mass model.	2405-2 **ULTRALIGHT GRAPHENE COMPOSITE SANDWICH FOR STRETCHABLE LIGHT-EMITTING DISPLAY** *Zhenyu Wang, Ne Myo Han, Xu Liu, Ying Wu, Yi Shen, Qingbin Zheng, Yang-Kyo Kim (The Hong Kong University of Science and Technology)* Graphene composite sandwiches with exceptional stretchability, durability, and electrical conductivities are fabricated through a 3D printing technique. A stretchable light-emitting display is constructed using the graphene composite sandwich as the electric circuit, which delivers reliable electronic performance under different loading modes.	2406-2 **A TOUGHENING AND CONDUCTIVE APPROACH FOR HYBRID COMPOSITES WITH NON-WOVEN CARBON TISSUE INTERLEAVES** *F Xu (Northwestern Polytechnical University, The University of Sydney), XS Du (Jinan University, The University of Sydney), XY Hu (Northwestern Polytechnical University), MG Guo (Northwestern Polytechnical University)*	2407-2 **A TWO-STEP OPTIMIZATION SCHEME FOR GLOBAL OPTIMIZATION DESIGN OF COMPOSITE FRAME** *Jingxuan Wang (Dalian University of Technology), Jun Yan (Dalian University of Technology), Zunyi Duan (Dalian University of Technology, Harbin Electric Corporation), Tao Yu (Dalian University of Technology), Erik Lund (Aalborg University)* The present paper adopts the jointed parameter method in the optimization design of composite frames to solve the problem of local optimal when using filament winding angles as design variables.	2408-2 **MULTI-SCALE MECHANICAL ANALYSIS AND DESIGN OPTIMIZATION OF THREE-DIMENSIONAL TEXTILE COMPOSITE STIFFENED STRUCTURES** *Xinwei Fu, Hao Wang(Institute of Manned Spacecraft System Engineering CAST), Sergio Ricci (Department of Aerospace Science and Technology), Chiara Bisagni(Delft University of Technology)* The paper proposes an optimisation strategy for the design of structures made of three-dimensional woven composites. The knowledge of the influence of the weaving architecture on the mechanical properties of a composite structure is essential to properly optimize the design of structural components subject to specific load conditions.	2409-2 **EXTRACTION OF CELLULOSE AND LIGNIN FROM BIOMASS AND THEIR USE IN REINFORCING POLYMERS AND SYNTHESIS OF PHENOLIC RESINS** *Mahesh Hosur, Md. Nuruddin, Dereca Hubbard, Alfred Tcherbi-Narteh, Shaik Jeelani (Tuskegee University)* This research focuses on synthesizing a completely bio-based polymer to achieve a high bio-content via an epoxidation process which uses soybean oil to produce a soybean based epoxy resin.	2410-2 **COMPARISON OF ELECTRICAL AND MECHANICAL PROPERTIES BETWEEN PMN-PT AND PZT THIN FILMS IN ENERGY HARVESTER APPLICATION** *Y.H. Fu, W. H. Tang, S. C. Lin, T. K. Lin1, C. T. Chen, W.J. Wu (National Taiwan University)* This paper mainly discusses the comparison of mechanical properties and electrical properties between PMN-PT and PZT based Energy Harvester devices.	2411-2 **MULTI-SCALE HYBRID COMPOSITES: CARBON NANOTUBE FILM FORMATION ON NON-CONDUCTIVE FIBERS USING ELECTROPHORETIC DEPOSITION** *Aris Mardinossian (University of Delaware), Sagar M. Doshi (University of Delaware), Andrew N. Rider (University of Delaware), Erik T. Thostenson (Fisherman's Bend VIC)* Electrophoretic deposition (EPD) is studied as a means to deposit carbon nanotubes onto the surfaces of non-conductive fibers creating a hierarchical reinforcement structure. Our characterization results show that carbon nanotube films deposit initially on the cathode and form coatings on contacting fibers throughout the bundle, extending the electrode throughout the bundle.
17:40	2401-3 **CHARACTERIZING BIAXIALLY STRETCHED POLYPROPYLENE/ GRAPHENE NANOPLATELET COMPOSITES** *B. Mayoral (Queen's University Belfast), E. Harkin-Jones (University of Ulster), N. Khanam (Qatar University), M.A. AlMaadeed (Qatar University), M. Ouederni (Qatar Petrochemical Company), A. Hamilton (Queen's University Belfast), D. Sun (Queen's University Belfast)* Polypropylene/graphene nanocomposites (PP/ GNP) were prepared by melt-mixing using an industrial-scale, co-rotating, intermeshing, twin-screw extruder with bespoke screw configuration. The effects of nanofiller content and biaxial stretching on the bulk properties of PP/ GNP nanocomposites have been investigated in details.	2402-3 **FABRICATION OF NANO Al$_2$O$_3$ REINFORCED PURE Al COMPOSITE WITH TRI-MODAL STRUCTURE BY A TWO STEP HIGH ENERGY MILLING** *Y. N. Zan, Q.Z. Wang, B. L. Xiao, Z. Y. Ma (Chinese Academy of Sciences)*	2403-3 **NEW DESIGN OF END TAB FOR THE TENSILE TEST OF UNIDIRECTIONAL THERMOPLASTIC COMPOSITES** *Mazlina Mohd Tahir (Kyushu University, Department of Polytechnic Educational Malaysia), Wen-Xue Wang (Kyushu University) , T. Matsubara (Kyushu University)* This study proposes a new design of end-tab for the tensile testing of unidirectional (UD) carbon fiber reinforced thermoplastic polyamide-6 (CF/PA6) to improve the estimation of tensile strength.	2404-3 **THE EFFECT OF PLY BLOCKING ON NEAR AND ON-EDGE IMPACT DAMAGE AND COMPRESSION FAILURE MECHANISMS** *S. Hua (University of Bath), A. Sandhu (University of Exeter), A.T. Rhead (University of Bath), N. Dutany (National Higher French Institute of Aeronautics and Space), C. Bouvet (National Higher French Institute of Aeronautics and Space)* Finite Element Analysis (DPFEA) and quasi-static in-situ X-ray Computed Tomography (CT) scan based approach is used to provide insight into the processes driving damage formation in near edge impact of a [(±45)3/(0)90]2/02] S laminate. Comparison of DPFEA and XRCT results highlight the significance of 0n/90 interfaces in the development of the most extensive delaminations.	2405-3 **A NEW APPROACH TO SYNTHESIS OF MICRO/ NANOSTRUCTURED SiOX/C COMPOSITE AS HIGH-PERFORMANCE ANODE MATERIAL FOR LITHIUM-ION BATTERIES** *Pengpeng Lv (University of Science and Technology Beijing, Chinese Academy of Sciences), Hailei Zhao (University of Science and Technology Beijing), Zhaolin Li (University of Science and Technology Beijing)* (1) Uniform niobium coating layer is formed on coated fuel particle of the very high temperature was fabricated via a fluidized bed chemical vapour deposition (FBCVD) process. (2) Citrate-nitrate gel combustion method was employed for the first time to synthesize micro/ nanostructured SiOx/C composite for Lithium-ion batteries.	2406-3 **EFFECT OF PRE-EXISTING MICROSTRUCTURAL DEFECTS ON ELASTIC AND FRACTURE PROPERTIES OF COMPOSITES** *Sathiskumar A PonnUnited States of Americaemi (University of Oxford, Delft University of Technology), Mehtab V Pathan (University of Oxford, Imperial College London), Nik Petinic (University of Oxford)* The present study deals with examining the effect of microstructural defects, such as matrix pores and interface precracks, on the mechanical properties of the composite materials. Representative Volume Element-based finite element analyses are conducted with random distribution of the defects in a realistic microstructure; their influence on elastic and fracture properties of the composite is quantified.	2407-3 **AEROELASTIC TAILORING OF THE COMPOSITE WING STRUCTURE VIA SHAPE FUNCTION APPROACH** *Wenmin Qian (Beijing Aeronautical Science & Technology Research Institute of COMAC), Jie Zeng (Beijing Aeronautical Science & Technology Research Institute of COMAC), Zhigang Zhou (ZONA Technology INC)* In this paper, an aeroelastic tailoring design study of a composite wing with the use of the bilinear Lagrange shape function approach is investigated. Through the study, it is demonstrated that aeroelastic tailoring is really effective to obtain an optimized structure through a trade-off study of the weight saving, flutter stability and composite ply-up manufacturing, and so on.	2408-3 **MULTISCALE MODELLING OF TEXTILE COMPOSITE STRUCTURES USING MECHANICS OF STRUCTURE GENOME** *Xin Liu, Khizar Rouf and Wenbin Yu (Purdue University)* Mechanics of structure genome is used to develop a novel multiscale modeling framework for textile composite structures so that the equivalent properties for 3D solids/beams/ plates can be directly computed in terms of the woven microstructure. Assumptions within the scales and invalid scale separation assumptions are avoided and results are compared with direct numerical simulations to demonstrate its accuracy and efficiency.	2409-3 **A NOVEL PARTICLEBOARD USING UNSATURATED POLYESTER RESIN AS A FORMALDEHYDE-FREE ADHESIVE** *Ran Li (Fujian Agriculture and Forestry University), Congrong Lan (Fujian Furen Group Co., Ltd), Zhenzeng Wu, Qingping Zhuang, Liao Yuehua, Ye Longfeng, Ln Xuduan, Yang Yuming, Yanmei Zheng, Yonggun Xie, Min Niu, Jinghong Liu (Fujian Agriculture and Forestry University)*	2410-3 **PVDF-BASED FLEXIBLE ENERGY HARVESTER FROM HUMAN MOTION** *Junyi Cao, Jian Yu, Yunlong Cai, Wei Wang, Lei Jing (Xi'an Jiaotong University)* This paper proposes design and modeling methods for flexible piezoelectric energy harvesting from human motions. A detailed fabrication process of PVDF-based vibration energy harvesters is discussed for performance enhancement in human motion.	2411-3 **EFFECT OF CARBON NANOTUBE ADDITION ON THE INTERFACE PROPERTY OF TITANIA-BASED FIBER METAL LAMINATES** *Xian Zhang, Yubing Hu, Jingming Tian, Jie Tao (Nanjing University of Aeronautics and Astronautics)* In this study, diverse weight fractions of multi-walled carbon nanotubes (MWCNTs) were dispersed in polymerized monomer reactant (PMR) polyimide adhesives by ultrasonic dispersion to improve bonding onto titanium sheets. MWCNT incorporation into the polyimide significantly improved the interlaminar shear strength by 36%.

Time	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
17:20	2412-2 **AIR PERMEABILITY OF BALSA CORE, AND ITS INFLUENCE ON DEFECT FORMATION IN RESIN INFUSED SANDWICH LAMINATES** *Richard K. Cullen, Stephen M Grove , John Summerscales (Plymouth University)* This paper considers the effect of cored sandwich laminate construction on the formation of defects. The primary focus is the characterisation of commonly used core materials and their interaction with liquid resin under high vacuum conditions.	2413-2 **DELTOID STRUCTURE** *Shinsaku Hisada, Kazunori Takagaki, Shu Minakuchi, Nobuo Takeda (The University of Tokyo)* We proposed residual deformation reduction method using asymmetric lamination and strength improvement method using atypical deltoid structure. We showed that great improvements were obtained in both of them.	2414-2 **EFFECT OF IN-PLANE WAVINESS IN UNIDIRECTIONAL CFRP COMPOSITES – MECHANICAL BEHAVIOR AND FAILURE CONSIDERATIONS** *Mariana P. Alves, Carlos A. Cimini Jr (Universidade Federal de Minas Gerais, UFMG), Sung K. Ha (Hanyang University), Pedro H. Cabral, Gustavo H. C. Silva, Alex P. Prado (Embraer S.A.)* This work consists of an investigation of the effects of in-plane waviness in key structural properties of carbon fiber reinforced composites under uniaxial stress by means of finite element modeling. Strength and stiffness knock-down effects were evaluated as a function of the peak misalignment angle and failure modes were predicted by Hashin failure criteria, proving to be sensitive to the defect severity.	2415-2 **EFFECT OF PARTICLE CLUSTERING ON FATIGUE BEHAVIOR OF MG-AMORPHOUS ALLOY COMPOSITE** *J. Nafar Dastgerdi, P. Lehto, H. Remes (Aalto University)* In this paper, effect of microstructure and particle distribution on fatigue properties of Mg-amorphous alloy composite is investigated. The difference of the microstructure is the cause for different crack initiation and propagation and this condition influenced fatigue life.	2416-2 **SMART SELF-HEALING ASPHALT COMPOSITE MATERIALS USING MICROCAPSULES CONTAINING REJUVENATOR** *Jun-Feng Su, Shan Han, Xiao-Long Zhang, Ying-Yuan Wang(Tianjin Polytechnic University)* The aim of this work was to directly observe the distribution and stability states of self-healing microcapsules containing rejuvenator in asphalt binders. Tests results indicate that these microcapsules can satisfy the requirements of using in asphalt binders.	2417-2 **EFFECT OF FRETTING WEAR ON PRELOAD RELAXATION IN BOLTED COMPOSITE JOINTS: THEORY AND SIMULATION (Invited Talk)** *Y. Z. Shen, Y. Xiao, Z. Zhang (Tongji University)* In this paper, preload relaxation behavior of a composite joint under a cyclic load was investigated by synergistically considering interfacial fretting wear in the assemble region and fatigue degradation of composite material.	2418-2 **NEEDLE PUNCHING EFFECT ON CARBON FIBER REINFORCED THERMOPLASTIC SANDWICH PANELS** *B. Xiao, Y. Wan, I. Ohsawa, J. Takahashi (The University of Tokyo)* The needle punching process improved the adhesion of carbon fiber reinforced thermoplastic sheets without scarifying the flexural property of the sandwich beams.	2419-2 **POLYMER NOCOMPOSITES FOR ELECTROCHEMICAL CAPACITORS** *Zhanhu Guo (University of Tennessee)* Multifunctional polymer nanocomposites were designed for electrochemical energy storage.	2420-2 **SELF-ASSEMBLY OF CORE-POLYETHYLENE GLYCOL-LIPID SHELL (CPLS) NANOPARTICLES FOR DRUG DELIVERY** *Ying Li (University of Connecticut)* The self-assembly of a new multifunctional formulation, referred to as a core-polyethylene glycol-lipid shell (CPLS) nanoparticle, has been studied through molecular simulations and experiments.	2421-2 **LOW-VELOCITY IMPACT PERFORMANCE OF CARBON FIBRE REINFORCED THERMOPLASTIC COMPOSITES FOR AUTOMOTIVE APPLICATIONS** *Muhammad Ameeq, Atrash Mohsin, Lorenzo Iannucci, Emile Greenhalgh (Imperial College London)* This paper reports and discusses the impact performance of the low-velocity impact (LVI) performance of carbon fibre reinforced thermoplastic (CFRTP) composites.	**Panel Session on Composite Regulation: MODERNISING COMPOSITE MATERIALS REGULATIONS – BARRIER TO INNOVATION AND AN EMERGING OPPORTUNITY**
17:40	2412-3 **EFFECT OF CORE MATERIALS ON COMPRESSION AFTER IMPACT STRENGTH OF COMPOSITE SANDWICH PANELS SUBJECT TO LOW VELOCITY IMPACT DAMAGE** *E. Jones, W. Liu (Cranfield University)* The paper presents a comparison of the behaviour and performance of composite sandwich panels with different types of cores in terms of compression after impact (CAI) strength following barely visible impact damage (BVID). Comparisons between the two core types demonstrate that the Nomex honeycomb core is more efficient at concealing damage at the low impact energies and exhibits better mechanical properties per unit mass than the PVC foam.	2413-3 **ARRESTING FATIGUE CRACK IN COMPOSITE BONDED JOINT USING INTERLOCKED FIBER FEATURE** *Shu. Minakuchi , Nobuo Takeda (The University of Tokyo)* This study conducted crack lap shear (CLS) fatigue tests to evaluate the performance of fiber-reinforcement-based crack arrester under a realistic condition. In addition, the arresting mechanism was clarified using finite element analysis.	2414-3 **STUDIES ON THE EFFECTS OF LAMINA THICKNESS AND ORIENTATION ON THE SHEAR RESPONSE OF COMPOSITE LAMINATES** *Haibao Liu , Brian G. Falzon , Giuseppe Catalanotti (Queen's University Belfast)* This paper presented an investigation on the effects of ply thickness and orientation on the material response of laminated composites under shear loading.	2415-3 **INFLUENCES OF FREQUENCY AND TEMPERATURE ON THE FATIGUE BEHAVIOR OF PLAIN-WEAVE CARBON/ EPOXY COMPOSITE MATERIAL WITH FLAW SUBJECTED TO PARTIALLY-REVERSED CYCLIC LOADING** *Marc-Claudel Deluy, Anh Dung Ngo, Martine Dubé (Ecole de technologie supérieure)* This paper presents the experimental results of a mechanical test program on plain weave CFRP loaded in partially reversed fatigue cycles under various environmental conditions.	2416-3 **PREPARATION OF NANOCOMPOITE SUPERHYDROPHOBIC SURFACE WITH EASY REPARABILITY BY ABRASION METHOD** *Xiao Xue (National Center for Nanoscience and Technology, Beijing, Tsinghua University), Hui Zhang (National Center for Nanoscience and Technology, Beijing), Zhong Zhang (National Center for Nanoscience and Technology, Beijing)*	2417-3 **SIGNIFICANT IMPROVEMENTS IN WEAR AND FRICTION OF EPOXY COMPOSITES FILLED WITH GRAPHENE NANOPLATELETS AND WAX-CONTAINING MICROCAPSULES** *Abolhassan Imani (National Center for Nanoscience and Technology, China; University of Chinese Academy of Science), Hui Zhang (National Center for Nanoscience and Technology, China), Jin Zhao (National Center for Nanoscience and Technology, China), Jinglei Yang (Hong Kong University of Science and Technology), Mohammad Owais (National Center for Nanoscience and Technology, China; University of Chinese Academy of Science), , Zhong Zhang (National Center for Nanoscience and Technology, China)*	2418-3 **DEFECT REDUCTION IN THE DOUBLE DIAPHRAGM FORMING PROCESS** *O.Pi., McGregor, S. Chen, L. T. Harper, A. Endruweit, N. A. Warrior (University of Nottingham)*	2419-3 **ARTIFICIAL IMPACT DAMAGE FOR ESTIMATING THE SHORT-TERM RESIDUAL BURST PRESSURE OF COPVS** *K. Lasn (Norwegian University of Science and Technology), N. P. Vedvik (Norwegian University of Science and Technology), A. T. Echtermeyer (Norwegian University of Science and Technology), F. Blanc-Vannet (Air Liquide Research and Development), Q. Bandzus (Air Liquide Research and Development), N. Alexandre (CEA, DAM), F. Nony (CEA, DAM), A. Maldachowska (Wroclaw University of Technology), M. Barczkowski (Wroclaw University of Technology), P. Breuer (Hexagon Composites), P.-S. Heggem (Hexagon Composites), F. Dahmene (Institut de Soudure), S. Bittendiebel (Institut de Soudure)*	2420-3 **CYCLIC LOADING EFFECTS ON CREASING BEHAVIOR OF SOFT SOLIDS** *Z. Li (Chongqing University), Z. Zhou (Chongqing University), S. Tang (Dalian University of Technology)* Mechanism of multiple creases formed on the surface of silicone rubber after the cyclic loading is understood through both experiments and finite element computations.	2421-3 **RESOURCE-EFFICIENT CFRP DESIGN METHODOLOGY FOR AUTOMOTIVE SYSTEMS** *Jonathan Schmidt, Anna-Lena Beger and Georg Jacobs (RWTH Aachen University.)* Within the automotive industry a design that implements composite parts where the function and location justify the higher costs and uses cost efficient materials where the weight saving potential is low, is key to a sufficient lightweight design. In order to support the development process of a resource-efficient multi-material system a new methodology is developed and presented in this paper, using a topology optimisation and the material selection process by Ashby.	

Tuesday 22 August

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18:00	2401-4 **CERAMIC/POLYMER COMPOSITES WITH HIGH THERMAL CONDUCTIVITY AND MECHANICAL STRENGTH FOR ELECTRONIC PACKAGING** *Guoping Du, Yong Hu, Nan Chen (Nanchang University)* A novel approach is presented to fabricate ceramic/polymer composites with high thermal conductivity and mechanical strength. Such insulating composites will be good candidate for electronic packaging materials.	2402-4 **SIMULATION OF DEFORMATION AND DAMAGE OF SiCP/AL COMPOSITES UNDER TENSILE LOADING** *J.F. Zhang, X.Y. Zhang, Q.Z. Wang, D. Wang, B.L. Xiao, Z.Y. Ma (Chinese Academy of Sciences)* Microscale finite element models are developed based on representative volume element with interface.	2403-4 **EFFECT OF SPRINGBACK RATIO ON BENDING AND IMPACT PROPERTY OF CARBON FIBER REINFORCED THERMOPLASTICS SANDWICH STRUCTURES** *Yungian Zhang, Yi Wan, Taro Nakamura, Jun Takahashi (The University of Tokyo)* For sandwich carbon fiber panels, the springback ratios influence the properties both in dynamic and static fracture. The optimal springback ratio for CPT sandwich structure is recommended by experiments.	2404-4 **STRESS-STRAIN RESPONSE AND FRATURE BEHAVIOUR OF PLAIN WEAVE CERAMIC MATRIX COMPOSITES UNDER INDIVIDUAL TENSION, COMPRESSION OR SHEAR** *Heyin Qi, Mingming Chen, Yonghong Duan, Daxu Zhang (Shanghai Jiao Tong University)* The paper presents a study on the stress-strain response and fracture behaviour of plain weave CMCs under uni-axial tension, compression or in-plane shear using a unit cell model and periodic boundary conditions.	2405-4 **JOULE HEAT TREATMENT ON CARBON NANOTUBE FILMS AT DIFFERENT ELEVATED TEMPERATURES** *Tianshu Li (Beihang University), Min Li (Beihang University), Yizhan Gu (Beihang University), Shaokai Wang (Beijing University), Qingwen Li (Suzhou Institute of Nano-Tech and Nano-Bionics), Zuoguang Zhang (Beihang University)* As a nanocomposite process method, the Joule heat on carbon nanotube film has many advantages such as rapid temperature rise, good temperature stability and linearity of power-heating temperature. But the unevenness of the heating temperature distribution is a serious problem. The structure and composition of the film change after heating.	2406-4 **NUMERICAL SIMULATION OF DAMAGE PROPAGATION FOR A CHANNEL STRUCTURE MADE OF SHORT GLASS FIBER REINFORCED COMPOSITES** *Xingsheng Li (Osaka University), T.Kurashiki (Osaka University), M.Zako (Osaka University), K.Kobayashi (ITOCHU Techno-Solutions Corp.), T.Yamamoto (ITOCHU Techno-Solutions Corp.), T.Sakakihara (ITOCHU Techno-Solutions Corp.)* An effective method to evaluate the mechanical property and to simulate the damage progress of FRP produced by injection molding has proposed.				2410-4 **HEMP HURD DERIVED ACTIVATED CARBON FOR CO_2 ADSORPTION** *Shan Liu (University of Southern Queensland, University of Queensland), Lei Ge (University of Queensland), Zhonghua Zhu (University of Queensland), Hao Wang (University of Southern Queensland)* Recycling bio-waste hemp hurd to produce useful end products would bring economic benefit to the industry. We prepared activated carbon by hemp hurd for gas adsorption application.	2411-4 **SUPERIOR RHEOLOGICAL AND THERMAL PROPERTIES OF HYBRID GRAPHENE AND BORON NITRIDE EPOXY NANOCOMPOSITES AT ULTRA LOW FILLER LOADING CONCENTRATION** *Mohammad Owais, (National Center for Nanoscience and Technology, University of Chinese Academy of Science), Jun Zhao (National Center for Nanoscience and Technology), Abolhassan Imani (National Center for Nanoscience and Technology, University of Chinese Academy of Science), Zhong Zhang (National Center for Nanoscience and Technology)* Functionalized hybrid GNP/BN epoxy nanocomposites were fabricated via facile chemical exfoliation and mechanical mixing method to for enhance thermal conductivity & electrical insulation property at low filler content.
18:30	Dinner										

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
2412-4 **FABRICATION AND THREE-POINT-BENDING BEHAVIOR OF GLASS FIBER REINFORCED THERMOPLASTIC CURVED CORRUGATED SANDWICH PANEL WITH INTERFACE ENHANCEMENT** *Bing Du, Jingyan Tan, Liming Chen (Chongqing University)* Three-point-bending behavior of glass fiber reinforced polypropylene curved corrugated sandwich panels taking account of the effects of core configurations were investigated by experimental method. Polypropylene glue stick reinforcement method was proposed to enhance the interface strength and effectively heightened the bending resistance of curved axial corrugated sandwich panel.		2414-4 **VIBRATION BEHAVIORS OF 1D LATTICE TRUSS STRUCTURES UNDER DIFFERENT CONSTRAINS** *Qiangian Sui (Hohai University),Hualin Fan (Nanjing University of Aeronautics and Astronautics)*			2417-4 **EVALUATION ON WEAR OF LONG-PITCH ROLLER CHAIN WITH COMPOSITES PIN** *Chang-Uk Kim, Dong-Woo Lee, Byung-Jin Park, Jung-Il Song (Changwon National University)* We developed high load long-pitch roller chain test equipment and produced composite material pins. And wear test of the roller chain. It was confirmed that the noise and vibration of the pin were reduced.	2418-4 **IN-SITU STRAIN MONITORING IN PREPREG PLACEMENT PROCESS USING DISTRIBUTED OPTICAL FIBER SENSOR** *Kosuke Tanogami, Shouma Niwa, Shu Minakuchi, Nobuo Takeda (The University of Tokyo)* We successfully measured the distribution of layup-induced tensile strain, which has significant impact on products made by AFP processes.			2421-4 **ASSESSMENT OF THE PEDESTRIAN PROTECTION PERFORMANCE OF A SANDWICH HOOD WITH ARCHITECTED LATTICE CORES** *Haoyu Chen (Beihang University), Yaobo Wu (Beihang University), Jun Xu (Beihang University, Xi'an Jiaotong University, Tsinghua University), Sha Yin (Beihang University, Xi'an Jiaotong University)* This study proposed a sandwich engine hood comprising outer and inner steel panels together with a composite pyramidal lattice structure core. The corresponding pedestrian protection capability was evaluated in finite element method.	
Dinner										

Wednesday 23 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
08:00	PLENARY LECTURE at Qujiang Auditorium: **Fabrication of Graphene Materials and Their Composite Applications** Huiming Cheng, Institute of Metal Research, Chinese Academy of Sciences, China										
09:05	Mini Oral Session										
11:45	Poster Exhibition and Reception										
12:35	Lunch										
13:35	PLENARY LECTURE at Qujiang Auditorium: **Creating Composites that Fail More Gradually** Michael Wisnom, University of Bristol, UK										
14:40	KEYNOTE at Qujiang Auditorium: **Recent Development of Metallic Nanocomposites for Structural Applications** Jian Lu, City University of Hong Kong, China KEYNOTE at Lily Hall: **Multiscale Hybrid Composites Reinforced with Interfacecontrolled Carbon Nanomaterials for Multifunctional Applications** Byung Sun Kim, Korea Institutes of Material Science, Korea KEYNOTE at Rose Hall: **Assessing and Improving the Crashworthiness of Composite Transportation Structures: Challenges and Opportunities** Brian G. Falzon Queen's University Belfast, UK										
15:15	Coffee Break										
15:35	3101 Polymer Matrix Materials 8	3102 Metal Matrix Composites 8	3103 Fiber-reinforced Composites 8	3104 Fracture and Damage 8	3105 Nano-Composites 8	3106 Fiber-reinforced Composites 19	3107 Structural Analysis and Optimization 8	3108 Ductile and Pseudo-ductile Composites 1	3109 Textile-Based Composites 1	3110 Energy Harvesting and Storage 3	3111 Dynamic Behavior 1
15:35	3101-1 **COMBINED DYNAMIC MECHANICAL ANALYSIS (DMA) AND CALORIMETRY FOR CURE MONITORING OF HOLLOW PARTICLE REINFORCED THERMOSET COMPOSITE** *M. Boulah (Ecole centrale de Lyon), M. Salvia (Ecole centrale de Lyon), I. Deschênes (Institut Textile et Chimique de Lyon), H. Baurier (ACOEM group)* This study focuses on the curing at room temperature of resol phenolic systems for composites using a thermal flux cell combined with a DMA; the effects of amounts of catalyst and resin volume were especially studied.	3102-1 **ON THE STOKES-BRINKMAN COUPLING WITH ANISOTROPIC NAVIER SLIP AND EFFECTIVE VISCOSITY FOR FLOW SIMULATIONS IN DUAL-SCALE FIBROUS POROUS MEDIA** *Jingang Lu, Thanh Tinh Tran, Wook Ryol Hwang (Gyeongsang National University)* In this work, the Stokes-Brinkman model has been applied to investigate a flow in a channel coupling with a flow in a fibrous porous medium. The effective viscosity in the Brinkman equation, which should also be anisotropic, was found to be as a function of the slip coefficient.	3103-1 **EXPERIMENTAL STUDY ON THE PERFORMANCE OF TWISTED FIBER REINFORCED COMPOSITE Z-PIN** *Xiangyang Zhang, Yong Li, Qixi Chu, Jun Xiao (Nanjing University of Aeronautics and Astronautics)* Z-pin pullout is one of the prevalent failure mode of Z-pin reinforced composites. In order to increase Z-pin/composites bonding strength, the twisted fiber reinforced composite Z-pin will be manufactured in this paper. And also the tensile, compressive and bonding performance of twisted fiber reinforced Z-pin will be evaluated in this paper.	3104-1 **ADAPTIVE FLOATING NODE METHOD FOR THE MODELLING OF DELAMINATION FRACTURE OF COMPOSITES** *X. Lu (National University of Singapore), B.Y. Chen (Institute of High Performance Computing Singapore), V.B.C. Tan (National University of Singapore), T.E. Tay (National University of Singapore)* An adaptive floating node method is presented and applied to modelling the delamination fracture of composite laminates. Without loss of accuracy, the present method greatly simplifies the modelling procedures and reduces the computational cost.	3105-1 **POLYLACTIC ACID/ MAGNESIUM OXIDE NANOCOMPOSITE FILMS FOR FOOD PACKAGING APPLICATIONS** *Chetan Swaroop (Motilal Nehru National Institute of Technology), Mukul Shukla (Motilal Nehru National Institute of Technology, University of Johannesburg)* This study aimed at the development of flexible films with reinforcement of MgO nanoparticles in Polylactic acid for food packaging applications. The study finds significant improvement in the mechanical and antibacterial properties along with an ability to block UV radiation without sacrificing the transparency of the films.	3106-1 **PREPARATION AND PROPERTIES OF GLASS FIBER REINFORCED IN SITU ANIONIC POLYAMIDE-6 COMPOSITES** *Wei Li (Hunan University, University of Southern Queensland), Guangzhi Liu (Hunan University), Hao Wang (University of Southern Queensland), Youying Fei (Hunan University)*	3107-1 **VARIABLE STIFFNESS COMPOSITE LAMINATES FOR DOUBLY CURVED PLATES USING LAMINATION PARAMETERS** *Matthew Thomas, Professor Paul M. Weaver, Professor Stephen R. Hallett (University of Bristol)* A methodology is presented for the optimisation of variable stiffness composite laminates for complex doubly curved geometries using spatially varying lamination parameters. As an example, this is here applied to a pre-twisted plate subjected to combined centrifugal and pressure loading.	3108-1 **EXPLORING THE USE OF FRICTION TO INTRODUCE DUCTILITY IN COMPOSITES** *O. Bacarreza, S. Maidl, P. Robinson, M. S. P. Shaffer (Imperial College London)* This paper describes an investigation to introduce ductility in composites by exploiting mechanisms which resist extension by friction. Strains at the maximum stress of between 15 ~ 20 % were obtained using these mechanisms.	3109-1 **STUDY ON GAS PERMEATION CHARACTERISTICS OF 3D BRAIDED SEAL** *Jiao Yanan , Jing Yuanyuan, Zhang Shihao (Tianjin Polytechnic University)* This paper studied the airtight of the 3D braided quartz fiber preform as sealing material. The gas permeability under different pressure and different compression ratio was tested and compared with predicted value, which showed good agreement.	3110-1 **STRUCTURAL BATTERY COMPOSITES – ROLES OF CONSTITUENTS AND DEVICE ARCHITECURE** *Leif E. Asp (Chalmers University of Technology)* This presentation gives an overview of recent progress in multifunctional composites for energy storage in Sweden. In addition, the relationship between carbon fibres microstructure and electrochemical performance is described in some detail.	3111-1 **VIBRATIONS OF SKEWED FGM PLATES WITH INTERNAL CRACKS VIA MLS-RITZ METHOD** *C. S. Huang, Y. C. Fu (National Chiao Tung University)*

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08:00	PLENARY LECTURE at Qujiang Auditorium: **Fabrication of Graphene Materials and Their Composite Applications** Huiming Cheng, Institute of Metal Research, Chinese Academy of Sciences, China										
09:05	Tsai Award Session at Room 22 (209+210) 1. Multi-scale internal geometry analysis and mechanical modeling of randomly oriented strands, *Y. Wan, J.Takahashi (University of Tokyo)* 2. A study on fiber-arrangement close to the root of a sharp notch, for short fiber-reinforced thermoplastics, *R. Pietrogrande (Robert Bosch GmbH, University of Padova)* 3. Understanding and modelling variability in modulus and strength of tow-based discontinuous composites, *Y. Li, S. Pimenta, C. Ottenwelter, M. Thierry (Imperial College London)* 4. Damage modelling of thin-ply nano-reinforced composite laminates, *C. Furtado (Universidade do Porto & Instituto de Ciencia e Inovacao em Engenharia Mecanica), X. C. Ni (Massachusetts Institute of Technology), E. Cohen (Massachusetts Institute of Technology), A. Arteiro (Universidade do Porto & Instituto de Ciencia e Inovacao em Engenharia Mecanica), B. L. Wardle (Massachusetts Institute of Technology), P. P. Camanho (Universidade do Porto & Instituto de Ciencia e Inovacao em Engenharia Mecanica)* 5. The investigations of multi-layer interface failure behavior for sisal fiber reinforced composites via acoustic emission and finite element method, *Q. Li (Tongji University, The Hong Kong Polytechnic University), Y. Li (Tongji University), L. M. Zhou (The Hong Kong Polytechnic University)* 6. Graphene nanocomposites a study on the failure behavior and scaling, *Y. Qiao, C. H. Mefford, M. Salviato (University of Washington Guggenheim Hall)* 7. Improvements to the mode I interlaminar fatigue resistance of epoxy nanocomposites with aligned graphene nanoplatelets, *M. Bhasin, S. Wu, R. B. Ladani (RMIT University), A. J. Kinloch (Imperial College London), C. H. Wang (University of New South Wales), A. P. Mouritz (RMIT University)*									
11:45	Poster Exhibition and Reception										
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15:15	Coffee Break										
15:35	3112 Sandwich Structures and Materials 4	3113 Joints 8	3114 Composite Structures 8	3115 Structural Design Criteria, Safety and Reliability	3116 Self-Healing and Bio-inspired Designs 4	3117 Tribology and Wear 2	3118 Processing-Preforming Technologies 2	3119 Additive Manufacturing 1	3120 Bio and Medical 6	3121 Aerospace 6	3122 Acoustic Meta-Composite 1
15:35	3112-1 **SOUND TRANSMISSION LOSS OF LATTICE SANDWICH PLATE WITH PYRAMIDAL TRUSS CORES** *Dong-Wei Wang, Li Ma (Harbin Institute of Technology)* Combining with currently feasible additive manufacturing process, a new variable cross-section design method is innovatively proposed. Under the same volume, mechanical properties of pyramid lattices with equal cross-section and variable cross-section are compared by both theoretical and numerical methods, and the following conclusions are obtained: (1) The stiffness of lattice with equal cross-section is the highest. (2) Only focusing on compressive strength, the lattice with equal cross-section is the most appropriate. (3) Considering both compressive strength and stability, the elliptic cross-section pyramid lattice is preferred for relative density lower than 0.03, and its carrying capacity can be increased by 31% over that with equal cross-section for the parameter ξ is 0.906.	3113-1 **COHESIVE MODELLING OF THIN ELASTO-PLASTIC PRESSURE-DEPENDENT ADHESIVE JOINTS** *Andrea Piccolroaz(University of Trento), Gennady Mishuris(Aberystwyth University)* An asymptotic model is proposed for the mechanical description of thin elasto-plastic pressure-sensitive adhesive joints together with its FEM implementation as a choesive element.	3114-1 **THERMAL RESIDUAL STRESSES IN THICK COMPOSITES** *Sara Mamani , Suong V. Hoa Concordia (Center for Composites Department of Mechanical and Industrial Engineering Concordia University Center for Research in Polymers and Composites)* The new technique of 4D printing of long fiber composites is proposed. Curved composite pieces can be made from flat composite prepregs, without having to use curved molds.	3115-1 **THE WAVE PROPAGATION MODEL OF DISTRIBUTED ENERGY ABSORBING SYSTEM FOR TRAINS** *Zhaoyang Ding, Zhijun Zheng, Jilin Yu(University of Science and Technology of China)*	3116-1 **IMPACT RESISTANT DESIGNS FROM THE CUTICLE OF THE MANTIS SHRIMP** *Nicholas A. Yaraghi, David Restrepo Arango, Jesus Rivera, Pablo Zavattieri, David Kisailus*	3117-1 **THE ROLE OF FRACTURE TOUGHNESS IN THE MECHANICS OF WEAR OF POLYMER (INVITED TALK)** *Li Chang, Hongjian Wang (The University of Sydney)*	3118-1 **MANUFACTURING PROCESS FOR W STRINGERS WITH HIGH CURVATURE IN PREIMPREGNATED CARBON FIBER** *M. Mora-Mendias, F. Chamorro-Alonso, A. Garcia-Garcia, P. Noguerales-Viñes (PIDAMC, Foundation for the Research, Development and Application of Composite Materials)*	3119-1 **FAILURE MECHANISMS OF INSTABILITY-ASSISTED 3D PRINTED MICROSTRUCTURED FIBERS** *Frederick P. Gosselin, Shibo Zou, Daniel Therriault (The Polytechnique Montréal)* We 3D print patterned fibers using a fluid mechanics instability. This patterning allows tailoring the mechanical properties of the fibers, but it also influences how the fiber fails. Here we explore the multiple failure modes of the fibers.	3120-1 **EFFECTS OF BENDING STIFFNESS AND SURFACE ROUGHNESS ON THE PEELING BEHAVIOR OF AN ELASTIC THIN FILM ON A RIGID SUBSTRATE** *Zhilong Peng, Shaohua Chen (Beijing Institute of Technology)* The relations between the peeling force and the distance of a thin film in contact with a smooth and a rough substrate are obtained theoretically with considering the effect of bending stiffness and roughness. The bending stiffness mainly influence the peeling force before the steady-state stage, which can be understood by the varying profiles of the film. While the surface roughness can improve the peeling strength significantly at different peeling angle.	3121-1 **SCALING EFFECTS IN THE IMPACT RESISTANCE OF FLAT AND CYLINDRICAL SAMPLES FROM COMPOSITE MATERIALS** *Karimbayev T.D., Chernyshov A.A., Echov A.Y. (Central Institute of Aviation Motors after Baranov P.I.)* The scaling parameters were established by the studies and a numerical experiment showed the possibility of their application in evaluating the impact resistance of layered structures of orthotropic materials. The obtained results allow us to proceed to develop the basics of similarity models in the problems of ensuring the safety of nonmetallic fan cases with the destruction of the fan blades of advanced turbojet engines.	3122-1 **BROADBAND CLOAK FOR UNDERWATER ACOUSTICS(INVITED TALK)** *Yi Chen, Xiaoning Liu, Gengkai Hu (Beijing Institute of Technology)*

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15:55	3101-2 **EFFECT OF TYPE OF DIAMINE MODIFIERS OF NANODIAMOND ON TRIBO-MECHANICAL PROPERTIES OF POLYAMIDE 6 COMPOSITES** *Pooria Karami, Akbar Shojaei (Sharif University of Technology)* Chemical surface modification of nanodiamond (ND) particles using two diamine modifiers improved tribo-mechanical properties of PA 6 composites due to desired surface termination of NDs which is compatible with PA6.	3102-2 **DYNAMIC DEFORMATION AND MICROSTRUCTURAL RESPONSE OF IN SITU TIBW/TI6AL4V COMPOSITES** *J. Sun (Zhejiang University), H. Wang (Zhejiang University), L-J. Huang (Harbin Institute of Technology), L.Geng (Harbin Institute of Technology), F.X. Qin (Zhejiang University), H.X. Peng (Zhejiang University)* Improved GNP distribution in GNP/Al composite was achieved by cold draw process, resulting in a more significant strengthening effect of Graphene nano platelets.	3103-2 **MODELING THREE-DIMENSIONAL ANISOTROPIC DAMAGE IN UNIDIRECTIONALLY REINFORCED COMPOSITES AT LARGE DEFORMATIONS** *Dominik Naake (RobertBoschGmbH), Fabian Welschinger (RobertBoschGmbH), Luise Kärger (Karlsruhe Institute of Technology(KIT)), Frank Henning (Karlsruhe Institute of Technology(KIT))* The work at hand introduces a three-dimensional constitutive model for the prediction of damage onset and growth in unidirectional reinforced plastics. Numerical use cases demonstrate the characteristics of the material response for different loading scenarios.	3104-2 **INTERLAMINAR REINFORCEMENT OF CFRP LAMINATES USING ZANCHOR PROCESS** *Ryoya Sughara (Ritsumeikan University), Kohei Konda (Ritsumeikan University), Takayuki Kusaka (Ritsumeikan University), Taishi Isono (Kyoto University), Masaki Hojo (Kyoto University), Toshifumi Fujii (Shikibo Ltd.), Kazuo Nakajima (Shikibo Ltd.), Yasuhiko Iwasaki (Shikibo Ltd.)* The effects of material properties of CFRP laminate on the fracture mechanism with the Zanchor process was investigated by DCB and 4ENF tests.	3105-2 **TENSILE PROPERTIES OF AEROGEL-BASED CARBON NANOTUBE/ POLY(VINYL ALCOHOL) COMPOSITE FIBERS** *Jialin Liu, Cuixia Zhang, Shuxuan Qu, Qingwen Li, Weibang Lu (Suzhou Institute of Nano-Tech and Nano-Bionics)* A new method of strengthening aerogel-based CNT fibers using PVA infiltration accompanied by post-densification and hot-stretching treatment was developed. The fiber fabricated by that shows potential in construction of high-performance structural composites.	3106-2 **MANUFACTURING OF PRE-IMPREGNATED DISCONTINUOUS PAEK/CF COMPOSITE** *Yuan Wang, Luke Savage (University of Exeter)*	3107-2 **INFLUENCE OF STRAND DISPERSION METHOD ON MECHANICAL PROPERTIES OF HOLLOW S-SHAPED MEMBER MADE OF RANDOMLY-ORIENTED CFRTP STRANDS** *Michimitsu Fujita, Yuto Nakashima , Jun Takahashi (The University of Tokyo)* In this work, the influence of strand dispersion method on mechanical properties of the hollow S-shaped member was investigated with compression tests and finite element analysis.	3108-2 **PSEUDO-DUCTILE BEHAVIOR OF GLASS/CARBON FIBER HYBRID COMPOSITE WITHCARBON/ EPOXY PLATELETS** *Ichenihi Amos Wang Ongtao, Md. Hasan Ikbal, Li Wei (Donghua University)* Pseudo-ductile behavior of glass/carbon fiber hybrid composite with carbon/ epoxy platelets was investigated.	3109-2 **STRUCTURAL CHARACTERIZATION OF HEXAGONAL BRADING ACHITECTURE BY 3D PRINTING** *Zhengning Li (Donghua University, University of British Columbia), Yugin Wan (University of British Columbia), Hewiae Yang (University of British Columbia), Ge Chen (Donghua University), Frank Ko (University of British Columbia)* By following the characteristics of repeatability and concentricity of hexagonal braided preform, the printed geometry structure was got and used to understand and optimize hexagonal geometry structure to make it more compact like braided geometry structure.	3110-2 **ORIENTED FERROELECTRIC EXTRUSION PROCESSED POLY (VINYLIDENE FLUORIDE)/ POLY (VINYLIDENE FLUORIDE -TRIFLUOROETHYLENE) BLENDED FILMS WITH STRONG INTERACTIONS** *Nan Meng, Xiaoqing Zhu, Rui Mao, Michael John Reece, Emiliano Bilotti (Queen Mary University of London)*	3111-2 **XFEM MODELING OF ULTRASONIC WAVE PROPAGATION IN POLYMER MATRIX COMPOSITES** *Zhanli Liu (Tsinghua University)*
16:15	3101-3 **CERAMIC/POLYMER COMPOSITE THERMAL INTERFACE MATERIALS FOR POWER ELECTRONICS APPLICATIONS** *Liangliang Li (Tsinghua University)* Polymer-based composites with high thermal conductivity were developed for thermal management of power electronics.	3102-3 **IMPROVING THE MECHANICAL PROPERTIES OF GNP REINFORCED ALUMINIUM COMPOSITES BY COLD DRAWING** *Jianchao Li, Yuexi Zhang, Lin Geng (Harbin Institute of Technology)* Improved GNP distribution in GNP/Al composite was achieved by cold draw process, resulting in a more significant strengthening effect of Graphene nano platelets.	3103-3 **STUDY ON THE RHEOLOGY AND TENSILE PROPERTY OF CCF300/PEEK COMPOSITES VIA POWDER IMPREGNATION METHOD** *Xuekiang Li (Beihang University)* A comparative experimental investigation is reported about the rheology of two kinds of PEEK resins and tensile property of CCF300 reinforced PEEK composites via powder impregnation.	3104-3 **TOUGHENING MECHANISMS OF NACRE** *Xi-Qiao Feng (Tsinghua University)* X. Q. Feng established a microstructure-based fracture mechanics model of nacre to reveal the toughening mechanisms and fracture features of nacre and biomimetic nanopapers. The optimal characteristic size ranges of microsized platelets and nanosized mineral bridges were determined.	3105-3 **THE EFFECT OF FUNCTIONALIZED REDUCED GRAPHENE OXIDE ON THE ELECTRICAL CONDUCTIVITY AND THERMAL STABILITY OF EPOXY** *Xiangiang Liu, Jing Ma, Xi Nan, Weihui Zhu, Wen Qin (Taiyuan University of Technology)* Reduced graphene oxide (RGO) was prepared by three different methods and further functionalized using sodium dodecyl benzene sulfonate (SDBS) and cetylpyridinium chloride (CPC); the epoxy composites that incorporate these RGO were fabricated to explore different RGO and functionalized RGO on the thermal stability of epoxy composites. performance structural composites.	3106-3 **LAYING SPEED EFFECT ON THERMOPLASTIC COMPOSITES THERMAL IN AUTOMATED TAPE LAYING PROCESS** *Wang Changchun (Beijing Aeronautical Science and Technology Research Institute), Yue Guangquan (Beijing Aeronautical Science and Technology Research Institute), Zhang Jiazhen (Beijing Aeronautical Science and Technology Research Institute), Liu Jianguang (Beijing Aeronautical Science and Technology Research Institute), Li Jin (Ningxia University)* The automated tape laying (ATL) process has regarded as a cost-effective method in obtaining the composite parts, which have widely used in the design of civil aircraft for the excellent specific strength and modulus properties. In this study, the effect of laying speed on the thermal field distribution of thermoplastic composites in the ATL process is studied with the simulation method, which can be used to determine the reasonable process parameters in the manufacture process.	3107-3 **DISCRETE STIFFNESS TAILORING FOR IMPROVED BUCKLING PERFORMANCE** *L. Culliford, R. S. Choudry, R. Butler, A.T. Rhead (University of Bath)* Discrete Stiffness Tailoring (DST) is an alternative way of varying fibre angle to increase buckling performance that is compatible with current high rate deposition methods such as Advanced Tape Laying (ATL). Compression testing of flat panels shows that DST can improve buckling stress up to 16% for the simple example of redistributing material in a standard angle quasi-isotropic [±45/90/0]2S laminate.	3108-3 **DESIGNING AND PROTOTYPING A MICROSTRUCTURE FOR CFRP INSPIRED BY THE STROMBUS GIGAS SHELL** *Rikka Hasa, Silvestre T. Pinho (Imperial College London)* We design and synthetise a Strombus gigas shell inspired microstructure for carbon/epoxy material system, with the aim of enhancing the material's damage tolerance.	3109-3 **NEW FRONTIERS FOR TEXTILE STRUCTURAL COMPOSITES** *Frank K. Ko, Lynn Y. Wan (University of British Columbia)*	3110-3 **THEORETICAL ANALYSIS OF A BISTABLE PIEZOELECTRIC ENERGY HARVESTER WITH STOPPERS** *Chunbo Lan (Northwestern Polytechnical University, University of Auckland), Lihua Tang (University of Auckland), Weiyang Qin (Northwestern Polytechnical University)*	3111-3 **SIMULATION OF ORTHOGONAL THREE-DIMENSIONAL WOVEN CARBON PLATES UNDER BALLISTIC IMPACT** *Tao Liu, Paul Turner (University of Nottingham)* Finite element simulations were conducted to investigate the dynamic response of a clamped orthogonal 3D woven carbon circular plate under ballistic impact with focus on the role of the through-the-thickness (TTT) reinforcement.

Time	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
15:55	3112-2 **COMPRESSIVE PROPERTIES OF PYRAMID LATTICE WITH VARIOUS NON-UNIFORM CROSS-SECTION** *Ji Bin Gu Chengzhang Zhengquan Hanhan(Aerospace System Engineering Shanghai)* Effect of sonicated MWCNT on mixed mode interfacial fracture toughness of sandwich composites is investigated through both Finite Element Analysis and experiments supported by FESEM and HRTEM analyses.	3113-2 **STATIC AND DYNAMIC FLEXURAL PROPERTIES OF IMPROVED NOVEL CFRP COMPOSITE LAMINATED JOINTS FABRICATED BY VACUUM ASSISTED RESIN TRANSFER MOLDING VARTM** *Mahmoud R. Abusrea(Kyushu University & Cairo University), Amir Asadi(Georgia Institute of Technology), Kazuo Arakawa(Kyushu University), Jonathan Colton, Kalaitzidou Kyriaki(Georgia Institute of Technology)*	3114-2 **MODELLING AND ANALYSIS OF WOVEN COMPOSITE MATERIAL TAPE SPRING** *Honjiing Ye, Yang Zhang, Peng Di, Qingsheng Yang(Beijing University of Technology)* The topological optimization model considering the stability and vibration characteristics of structure is investigated and the optimal solving method is discussed based on Independent Continuous Mapping Method.	3115-2 **MULTI-SCALE RELIABILITY BASED OPTIMIZATION OF LAMINATED COMPOSITE STRUCTURES BASED ON GENETIC ALGORITHM** *Yuanxiang Jiang (National University of Defense Technology)*	3116-2 **COMPRESSION RESISTANT DESIGNS FROM THE EXOSKELETON OF A TOUGH BEETLE** *Jesus Rivera, Nicholas A. Yaraghi, David Restrepo Arango, Pablo Zavattieri, David Kisailus*	3117-2 **MECHANICAL, PHYSICAL, AND WEAR PROPERTIES OF POLYPROPYLENE REINFORCED SHORT CARBON FIBER COMPOSITES WITH DIFFERENT FIBER LENGTH** *Hani Junaidi (King Saud University), Abdulrahman Alfawzan (King Saud University), Saitam Alotaini (King Saud University), Turki Almutairi (King Saud University), Abdulhakim Almaiet (King Saud University, Prince Sultan University)*	3118-2 **INVESTIGATING FLOW MECHANICS WITHIN A NOVEL NON-DESTRUCTIVE INJECTABILITY MEASUREMENT FOR FIBRE PREFORMS** *Hermann T. (University of Auckland), Mierre S. (University of Auckland), Henke T. (BMW Group), Kelly P.A. (University of Auckland), Bickerton S (University of Auckland)* The mass production of CFRP is still at an early stage, presenting challenges particularly for automation and process control. A novel non-destructive measurement method will be presented to enhance quality and process control for manufacturing semi-finished textiles within a mass production environment.	3119-2 **A NOVEL METHOD FOR FABRICATING C/C-SiC COMPOSITES VIA 3D PRINTING TECHNOLOGY** *Wei Zhu, Hua Fu, Zhongfeng Xu, Yusheng Shi, Xinyu Shao, Chunze Yan (Huazhong University of Science and Technology)* This paper present a new method to make near net shape C/C-SiC composite parts with complex structures through 3D printing technology.	3120-2 **SELF-POWERED HEART-DEFORMATION MONITOR WITH FLEXIBLE PIEZOELECTRIC FILMS** *Yangyang Zhang, Chaofeng Lü (Zhejiang University)*	3121-2 **DEVELOPMENT OF BREAKTHROUGH TECHNOLOGIES FOR CREATING NODES AND DETAILS FROM CERAMIC AND POLYMER COMPOSITE MATERIALS FOR SMALL** *D.Sc. T.D. Karimbaev, A.Y. Erzhov, M.A. Mezentsev (Central Institute of Aviation Motors by name P.I. Baranov)*	3122-2 **DESIGN OF ACOUSTIC HYPERBOLIC METAMATERIALS BASED ON TOPOLOGY OPTIMIZATION** *Hao-Wen Dong, Sheng-Dong Zhao, Yue-Sheng Wang(Beijing Jiaotong University), Qi Zhang(University of Siegen)* Topology optimization of a two-dimensional hyperbolic metamaterial is presented in this paper. The optimized metamaterial exhibits hyperbolic dispersions in a broad frequency range. It can supportsubwavelength imaging with extremely high resolution. We also discuss the mechanics of these exotic wave behaviors.
16:15	3112-3 **NUMERICAL EXPERIMENTAL STUDY ON INFLUENCE OF MULTIWALLED CARBON NANOTUBE ON MIXED MODE FRACTURE OF SANDWICH COMPOSITE** *Alak Kumar Patra, Nilanjan Mitra(Indian Institute of Technology Kharagpur)* The acoustic and low-velocity impact responses of natural fiber reinforced skins and balsa wood core based sandwich structures were investigated. This type of sandwich structure provided superior sound absorption and impact energy absorption capacity and has the potential to replace synthetic sandwich structures in applications aspects of load-bearing and sound absorption structures.	3113-3 **MITIGATING EDGE EFFECTS IN ADHESIVELY BONDED COMPOSITE TUBULAR LAP JOINTS UNDER AXIAL, PRESSURE AND TORSIONAL LOADING VIA STIFFNESS-TAILORING** *M. A. Khana, S. Kumara (Institute Centre for Energy (iEnergy) Department of Mechanical and Materials Engineering, Masdar Institute of Science and Technology)* This study focuses on mitigating edge effects in bonded composite tubular lap joints subjected to a combined axial, pressure and torsional loading via compliance-tailoring of the adhesive.	3114-3 **DESIGN AND MANUFACTURING OF LIGHTWEIGHT COMPOSITE STRUCTURES BASED ON CONTINUOUS FIBER REINFORCED COMPOSITES 3D PRINTING** *Zhanghao Hou, Xiaoyong Tian , Tengfei Liu, Dichen Li (Xi'an Jiaotong University)* The disadvantages of conventional forming processes for continuous fiber reinforced composite lightweight structure, such as complex process, long process period and high cost, have limited the wide applications of continuous fiber reinforced composite lightweight structure. This paper reviews the research status of composite lightweight structure 3D printing, and meanwhile presents a new integrated manufacturing process of high performance continuous fiber reinforced thermoplastic composites 3D printing.	3115-3 **STRUCTURAL STABILITY ANALYSIS OF RADOME WITH LIQUID TUNED FSS** *Byung Ryung You, Heoung Jae Chun(Yonsei Univ), Yong Bae Park(Ajou Univ), Ik Pyo Hong(Gongju Natl Univ) , Yoon Jae Kim(Agency for Defense Development)* Measurement of propagation characteristics and structural stability analysis of micro channel type FSS were carried out. Even though water is used as the fluid of the FSS, it can achieve the desired target frequency and stability at the same time.	3116-3 **SELF-HEALING CFRP COMPOSITES USING MULTIPLE SHORT-MICROVASCULAR-CHANNELS IN THROUGH-THICKNESS DIRECTION** *Yoshiki Kato(Department of Mechanical Engineering, Tokyo University of Science 2641 Yamazaki, Noda-shi, Chiba 278-8510, Japan), Shu Minakuchi(Department of Advanced Energy, Graduate School of Frontier Sciences, The University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa-shi, Chiba 277-8561, Japan), Shinji Ogihara (Department of Mechanical Engineering, Tokyo University of Science 2641 Yamazaki, Noda-shi, Chiba 278-8510, Japan) Nobuo Takeda (Department of Advanced Energy, Graduate School of Frontier Sciences, The University of Tokyo, 5-1-5 Kashiwanoha, Kashiwa-shi, Chiba 277-8561, Japan)* This study proposes a self-healing system using microvascular networks in the through-thickness direction.	3117-3 **STRUCTURAL, MECHANICAL AND WEAR PROPERTIES OF PALM WOOD AS A MODEL NATURAL COMPOSITE** *K. Friedrich, E. I. Akpan, B. Wetzel (Technical University Kaiserslautern)* The structure, hardness as well as the sliding and abrasive wear properties of black-fiber palm wood were studied. Additional impregnation of this natural composite in oil reduced significantly the sliding friction coefficient.	3118-3 **MINIMISING FORMING DEFECTS IN THE DIAPHRAGM FORMING PROCESS BY REDUCING INTERPLY FRICTION AND THE QUALITY AFTER CURE** *W.T. Wang, H. Yu, K.D. Potter, B.C. Kim (University of Bristol)* This research investigated the effect of interleaving toughening materials at prepreg ply interfaces on the forming quality as well as the mechanical performance after curing.	3119-3 **THE INFLUENCE OF CONSOLIDATION FORCE ON THE PERFORMANCE OF AFP MANUFACTURED LAMINATES** *Ebrahim Oromiehie (UNSW Australia), B. Gangadhara Prusty (UNSW Australia), Paul Compston (The Australian National University), Ginu Rajan (Engineering University of Wollongong)* In this paper, in order to establish and understand a correlation between the key parameters in AFP and the mechanical properties, several parametric experiments were performed. This is done through manufacturing uni-directional carbon fibre reinforced polymer laminates and identifying some of their main mechanical properties at different location along the length of samples.	3120-3 **POLYMERIZATION SHRINKAGE DISTRIBUTION OF METHACRYLATE-BASED AND SILORANE-BASED DENTAL COMPOSITES DURING DENTAL RESTORATION OBSERVED BY DIGITAL IMAGE CORRELATION METHOD** *J.H. Park (Hanyang University, Seongdong-gu), N.S. Choi (Hanyang University, Ansan)* Polymerization shrinkage distribution of methacrylate-based and siloxane-based dental composites during dental restoration was measured during curing using digital image correlation method. The average radial strain of resins by digital image correlation method on the resin/substrate interface rapidly shrank within 4 minutes, and then converged to a constant value with an increase of time.	3121-3 **COMPARATIVE STUDY OF ELECTRICAL PROPERTIES OF DIFFERENT CARBON NANOTUBE BUCKYPAPER FOR LIGHTNING STRIKE PROTECTION APPLICATIONS** *Evmorfia K. Diamanti (Queen's University Belfast), Brian G. Falzon (Queen's University Belfast), Stephen C. Hawkins (Queen's University Belfast, Monash University, Clayton)* In this study, we compare the electrical properties of buckypaper fabricated with three different methods (vacuum filtration method without surfactant, 'domino pushing' method and directly drawn CNT webs) as well as two species of hybrid buckypaper.	3122-3 **A HYBRID ELASTIC METAMATERIAL WITH TUNABLE BENDING STIFFNESS** *Yangyang Chen, Hussein Nassar, Hui Chen, Xianchen Xu, Andrew N. Norris, Guoliang Huang (Department of Mechanical and Aerospace Engineering, University of Missouri, Department of Mechanical and Aerospace Engineering, Rutgers University)* Topology optimization of a two-dimensional hyperbolic metamaterial is presented in this paper. The optimized metamaterial exhibits hyperbolic dispersions in a broad frequency range. It can support subwave length imaging with extremely high resolution. We also discuss the mechanics of these exotic wave behaviors.

Wednesday 23 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
16:35	3101-4 **A NUMERICAL METHOD FOR PREDICTING THE MECHANICAL PROPERTIES OF TIGHTLY PACKED SYNTACTIC FOAMS** *Mayall (Fergusson Advance Composites Technology), D. Carolan (Imperial College London, University College Dublin), A. Fergusson (Fergusson Advance Composites Technology, Imperial College London), J.P. Dear (Imperial College London)* A fully automated numerical modelling approach has been created to investigate the microstructural mechanics of syntactic foams. The approach allows for systematic investigation into the effects of complex microstructural parameters on the bulk behaviour of syntactic foam and provides insight into scatter observed in experimental data.	3102-4 **AN ENHANCED FEM MODEL ON THE DEFORMATION BEHAVIOR OF SIC-ALUMINUM COMPOSITES** *Xiang Gao, Xuexi Zhang, Lin Geng (Harbin Institute of Technology)*	3103-4 **MODIFICATION OF CHEMICALLY STABLE POLYMERIC MATERIALS 87. IMPROVEMENT IN THE ADHESION PROPERTY OF FRP, CFRP, AND CFRTP FOR CAR/ AIRCRAFT-USE.** *Hitoshi Kanazawa, Aya Ioada (Fukushima University)* Non-adhesive polymers such as polyolefin's, silicone resin and fluorocarbon resins were modified by our original DHM method. Their adhesion property was improved.	3104-4 **VALIDATION OF A NOVEL MODEL FOR THE COMPRESSIVE RESPONSE OF FRP: EXPERIMENTS WITH DIFFERENT FIBRE ORIENTATIONS** *T. Broj (Swerea SICOMP, Chalmers University of Technology), R. Olsson (Swerea SICOMP) , G.M. Vyas (Swerea SICOMP), S. Costa (Swerea SICOMP, Chalmers University of Technology)* This is an experimental study on the progressive failure of unidirectional laminates. The crush stress curves and the information on failure obtained by optical microscopy are of interest for the development of crash models for composite materials.	3105-4 **WELL-DISPERSED MULTI-WALLED CARBON NANOTUBE/PEEK NANO-COMPOSITES AND THEIR PHOTOLUMINESCENCE PROPERTIES** *Qing Zhang (Super C Inc., Shenzhen Cone Technology Co., Ltd.), Chunyen Hsu (Super C Inc., University of Delaware), Kathryn Scafford (Super C Inc.), Fei Deng (Super C Inc., Shenzhen Cone Technology Co., Ltd.)* Multi-walled carbon nanotubes (MWNTs) have never been observed with photoluminescence-related properties. By dispersing MWNTs in PEEK polymer, our MWNT/PEEK nanocomposite contains individualized MWNTs and exhibits unusual photoluminescence; further investigation has been carried out to study the underlying mechanism.	3106-4 **SIMULATION OF FIBER ALIGNMENT DURING THE INJECTION MOLDING PROCESS BY USING SHORT CARBON FIBER AND PDMS MIXTURE** *Dong-Wook Oh, Jun Yub Park (Chosun University)* Flow visualization of carbon fiber inside a polymeric matrix is performed in this paper. The flow medium and the channel simulate a molten polymer composite flow inside the injection mold.				3109-4 **ANALYSIS OF THREE-DIMENSIONAL WOVEN COMPOSITES** *M. Keith Ballard, J. Scott McQuien, John D. Whitcomb* A 3D orthogonally woven textile composite was investigated using finite element models that had up to 2 million nodes. The investigation focused on the convergence behavior and the locations and magnitudes of the most severe stress components.	3110-4 **DUAL RESONANT RECTILINEAR-TO-ROTARY OSCILLATOR FOR BROADBAND ELECTROMAGNETIC ENERGY HARVESTING WITH FREQUENCY UP-CONVERSION** *W. Deng, Y. Wang (Stony Brook University)*	3111-4 **A NEWLY-DEVELOPED FIXTURE AND TESTING METHOD FOR STRAIN RATE-DEPENDENT FLEXURAL PROPERTIES DETERMINATION OF CARBON/EPOXY COMPOSITES** *T. Schmack (Audi AG), R. Righi (Audi AG), D. Huelsbusch (TU Dortmund University), J. Rausch (Audi AG), D. Roguette (Audi AG), G. Deinzer (Audi AG), C. Kassapoglou (TU Delft), F. Walther (TU Dortmund University)* This study deals with a newly developed fixture to obtain strain rate-dependent properties of carbon fiber reinforced plastics (CFRP) under flexural loading. While the quasi-static method is mostly state of the art and covered in standards, the dynamic testing of CFRP is very demanding in terms of testing procedure, test rig and occurring failure mechanisms.
17:00	General Assembly										
18:30	Dinner										

Time	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
16:35	3112-4 **THE ACOUSTIC AND IMPACT RESPONSE OF SANDWICH STRUCTURES BASED ON NATURAL FIBER REINFORCED SKINS AND BALSA WOOD** *Y.O. Shen, J.C. Zhang , Y. Li (Tongji University)* This paper will provide an overview of work carried out to better understand how tufted sandwich structures behave during edgewise crushing failure. A series of novel experimental methods has been developed to test these structures and understand the complex mechanisms that take place during failure, with the aim of allowing performance improvements to be made.			3115-4 **AIR ACCIDENT INVESTIGATION AND AIRWORTHINESS ANALYSIS DUE TO FAILURE OF REAR PRESSURE BULKHEAD** *Li Zhongyang, Li Dong, Guo Xiang (Mailbox72-305, Yanliang District)* Some cases associated with the civil aircraft accidents due to failure of rear pressure bulkhead are investigated. And the corresponding airworthiness requirements are listed and the accident symptom airworthiness analysis is carried out. According to the analysis of these cases, the reasons why the failures of rear pressure bulkheads happen are concluded.		3117-4 **TRIBOLOGICAL BEHAVIORS OF EPOXY COMPOSITES MODIFIED WITH LUBRICANT-MICROCAPSULES AND SHORT CARBON FIBERS** *Jinglei Yang (Hong Kong University of Science and Technology), Nan Win Khun (Nanyang Technological University), He Zhang (Nanyang Technological University), Dawei Sun (Hong Kong University of Science and Technology)* The multifunctional novel tribomaterials were developed by combining wax and reactive reagents filled microcapsules and short carbon fibers in epoxy matrix.	3118-4 **PROCESS DESIGN CONCEPT FOR AUTOMATED PRE-ASSEMBLING OF MULTI-MATERIAL-PREFORMS** *S.R. Schnurr, J. Beuscher, K. Lippky, F. Dietrich, A. Müller, K. Dröder, K. Dilger* Decreasing bending stiffness, tacky surfaces and fast cooling of heated fiber reinforced thermoplastics (TP-FRP) leads to difficult handling conditions in automated processes. This paper shows potentials of multi-material lightweight design (TP-FRP and metal inserts) which not only affects the properties and functions of the final component, but also the manufacturing itself.	3119-4 **MANUFACTURING AND RECYCLING OF 3D PRINTED CONTINUOUS CARBON FIBER REINFORCED PLA COMPOSITES** *Xiaoyong Tian (Xi'an Jiaotong University)* Low-cost and high-efficiency manufacturing technologies for composite components are very important to further industrial applications. A novel 3D printing based fabrication method for continuous fiber reinforced thermoplastic composites (CFRTPCs) was put forward to overcome limitations of conventional forming process in expense and efficiency. Continuous fiber and thermoplastic filament were utilized as reinforcing phase and matrix, respectively, and simultaneously fed into the fused deposition modeling (FDM) process realizing the integrated preparation and forming of CFRTPCs without molds.		3121-4 **THE VERTEX PROGRAM: COMPLEX LOADING AND VALIDATION OF AERONAUTIC COMPOSITE STRUCTURES** *Bruno Castanié (Institut Clément Ader (ICA))* The VERTEX project proposes to develop a methodology of analysis and general validation of composite structures at the scale of "technological specimens". This means specimen large enough to represent scientific or design issues but which remain independent of a particular part of an aircraft. The choice of this scale allows an original positioning on the so-called structural scale (second level of the pyramid of the tests) and allows dealing with a very wide range of fundamental or industrial problems.	3122-4 **DYNAMIC HOMOGENIZATION FOR PHONONIC METASOLIDS WITH CONSIDERATION OF WILLIS COUPLING** *Yan-Feng Wang, Yue-Sheng Wang(Beijing Jiaotong University), Vincent Laude(Université de Bourgogne Franche-Comté)* Dynamic effective properties of phononic metasolids can be estimated based on the solution of definite boundary value problems. Are they valid to reproduce the band structures?
17:00	General Assembly										
18:30	Dinner										

Thursday 24 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
08:00	PLENARY LECTURE at Qujiang Auditorium: **Strong, Fast, Powerful, Durable, and Cheap Polymer Fiber and Hybrid Nanofiber Yarn Artificial Muscles and Their Applications** Ray Baughman, University of Texas at Dallas, USA										
09:05	4101 Polymer Matrix Materials 9	4102 Metal Matrix Composites 9	4103 Fiber-reinforced Composites 9	4104 Fracture and Damage 9	4105 Nano-Composites 9	Forum on Lightweight Structures and Composites	4107 Structural Analysis and Optimization 9	4108 Ductile and Pseudo-ductile Composites 2	4109 Textile-Based Composites 2	4110 Energy Harvesting and Storage 4	4111 Dynamic Behavior 2
09:05	4101-1 **INITIAL STUDIES TO CHARACTERISE A POLYMER MATRIX FOR USE IN COMPOSITE WIND TURBINE BLADES** *Bethany Russell (University of Bristol), Carwyn Ward (University of Bristol), Shinji Takeda (Hitachi Chemical Company. Ltd), Ian Hamerton (University of Bristol)* A new anhydride-cured epoxy resin, developed by Hitachi Chemical Co. Ltd., has been evaluated to access its interlaminar properties in comparison to an existing amine cured epoxy system. Preliminary studies have encompassed both resin characterisation and some mechanical testing of GFRP laminates.	4102-1 **WEAR PROPERTIES OF SiCw+CNTS/ AL COMPOSITES PREPARED BY PRESURE INFILTRATION** *X.-Y. Zhang, R. F. Yan, L. Geng (Harbin Institute of Technology)*	4103-1 **IMPROVEMENT OF THE FLEXURAL STRENGTH OF LAMINATED CFRP COMPOSITE ADHESIVE JOINTS FABRICATED BY VACUUM ASSISTED RESIN TRANSFER MOLDING VARTM** *Mahmoud R. Abusrea (Kyushu University, Cairo University), Seung-Wook Han (Hanyang University), Kazuo Arakawa (Kyushu University), Nak-Sam Choi (Hanyang University)*	4104-1 **A BENCHMARKING EXERCISE FOR THREE LONGITUDINAL STRENGTH MODELS FOR UNIDIRECTIONAL FIBRE-REINFORCED COMPOSITES** *Yentl Swolfs (KU Leuven), Soraia Pimenta (Imperial College London), Alain Thionnet (CNRS UMR 7633, University of Burgundy), Anthony Bunsell (CNRS UMR 7633), Larissa Gorbatikh (KU Leuven), Hannah Morton (University of Southampton), S. Mark Spearing (University of Southampton)* Three longitudinal strength models for unidirectional composites were benchmarked against each other and experiments, leading to vital insights for future developments of such models.	4105-1 **THE DAMPING PROPERTIES OF DIFFERENT CNT FILMS CHARACTERIZED BY CYCLIC TENSILE TESTING** *Min Li (Beihang University), Qianli Liu (Beihang University), Shaokai Wang (Beihang University), Qingwen Li (Suzhou Institute of Nano-Tech and Nano-Bionics), Zuoguang Zhang (Beihang University)* The vacuum filtration (VF) CNT film (also called buckypaper) and floating catalyst chemical vapor deposition (CVD) CNT film were fabricated to study the damping properties by cyclic tensile testing with the reference of commercial damping rubber produced by 3MTM. The results imply that the CVD-grown CNT film could be a promising damping material in complex structural systems, such as electronic devices and aerospace vehicle.	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4107-1 **DYNAMICAL AND HARVESTING CHARACTERISTICS OF A NOVEL PENTA-STABLE ENERGY HARVESTER** *Zhiyong Zhou, Weiyang Qin, Pei Zhu (Northwestern Polytechnical University)*	4108-1 **Experimental investigation of ductile behaviour and damage mechanisms of woven composites under bending** *Himayat Ullah, Vadim V. Silberschmidt (Loughborough University)* This research investigates experimentally the ductile behavior of woven CFRP and GFRP laminates under bending loads. Subsequently, the induced damage mechanisms in laminates are examined using X-ray micro-CT.	4109-1 **TENSILE STRENGTH AND STRUCTURAL EFFECT OF WOVEN COMPOSITES IN BIAS DIRECTIONS** *Song Yu (Jiangnan University), Dantang Zhang (Jiangnan University), Kun Qian (Jiangnan University), Na Jia (Shanghai Composites Science & Technology Co.,Ltd)*	4110-1 **FUNCTIONALIZED HIGH-K NANOWIRES POLYMER NANOCOMPOSITES WITH ENHANCE ENERGY STORAGE CAPABILITY** *Guanyao Wang, Xingyi Huang, Pingkai Jiang (Shanghai Jiao Tong University)*	4111-1 **INCORPORATING DIC IN HIGH STAIN RATE TESTING OF FIBROUS COMPOSITE WITH THE SPLIT HOPKINSON BAR TECHNIQUE** *Amos Gilat, Jeremy D. Seidt, Peiyu Yang (Ohio State University)* Strain rate sensitivity of T800/F3900 composite is investigated using digital image correlation for strain measurement in dynamic and quasi-static tests.
09:25	4101-2 **EFFECTS OF GRAPHENE OXIDE WITH DIFFERENT OXIDATION DEGREE ON THE PROPERTIES OF EPOXY NANOCOMPOSITES** *Wanshuang Liu, Xiaoyu Hu, Yi Wei (Donghua University)* The structure evolution of graphene oxide with increasing oxidation degree was investigated. The effects of GO structure on the properties of epoxy/ GO composites were systematacally studied.	4102-2 **THE ANALYSIS OF SURFACE MODIFICATION OF SiCP AND INTERFACE OF SiCP/Al A390 COMPOSITES** *Aijun Wang (Henan University of Science and Technology)* SiC particles were washed by clear water and then treated at high temperature of 1000 ℃. Powder mixture of A390 Al and heated SiC particles and non-heated SiC particles were prepared into 20% (mass fraction) SiCp/Al composites, consolidating by high-energy ball mill and powder metallurgy. The microstructure of SiC particles before and after pretreatment and interface of SiCp/ Al composites were observed by using transmission electron microscopy (TEM). The chemical compositions of surface substance of SiC particles and SiCp/Al composites were studied through X-ray photoelectron spectroscopy (XPS). The results show that the surface of SiC particles after washing by water was grown to relatively obvious ripple and corners, presenting a small amount of the adsorption C or free C, free O and very few of the SiO on the surface, no SiO2. The surface of heated SiC particles has obvious changes, the surface roughness is deep, existing for a lot of adsorption of carbon adsorption or free C, free O, most amount of SiO2 and a little of SiO. The interface microstructure of SiC and Al of non-heated SiCp reinforced Al composite was clean interface, appearing a little Al2O3, no harmful phase Al4C3. The interface microstructure of SiCp and Al of heated SiCp/Al composite was clean, no holes and cracks at the interface interface, producing obvious chemical reaction between the interface of SiCp and Al, improved the tensile strength and elongation of the composites. In addition, the mechanism of oxidation behavior and calculation of film thickness of SiC particles were discussed.	4103-2 **STUDY ON THE INTERFACIAL PROPERTIES OF CARBON FIBER/ EPOXY COMPOSITES UNDER THE HYGROTHERMAL CONDITION** *Shu-Xong Yang, Yan Zhao (Beihang University)* Study on the interfacial properties of carbon fiber/ epoxy composites under the hygrothermal condition.	4104-2 **FAILURE ANALYSIS OF THICK LAMINATES UNDER OUT-OF-PLANE SHEAR** *Jia Liyong (First Aircraft Institute of AVIC), Jia Yuming (First Aircraft Institute of AVIC), Li Miao (First Aircraft Institute of AVIC), Yu Long (Imperial College London), Zhang Kuangai (Imperial College London), J. P. Dear (Imperial College London)* This paper provides a multi-scale progressive damage model for thick composite laminate and an improved cohesive zone model which considers the resistance of inter-laminar compressive stress.	4105-2 **EFFECT OF GRAPHENE SHEET SIZE ON ELECTRICAL CONDUCTIVITY AND PERCOLATION OF GRAPHENE AEROGEL/ EPOXY COMPOSITES** *Ne Myo Han, Zhenyu Wang, Xi Shen, Ying Wu, Xu Liu, Qingbin Zheng, Jang-Kyo Kim (The Hong Kong University of Science and Technology)* Unidirectional graphene aerogel assembled using ultralarge graphene oxide sheets (1595.8 μm2) form epoxy composites with high fracture toughness (1.68 MPa m1/2), high electrical conductivity (0.135 S cm-1) and ultralow percolation threshold (0.0066 vol.%).	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4107-2 **NUMERICAL ANALYSIS ON BEARING BEHAVIOR OF COMPOSITE BEAM WITH OPEN-HOLE** *Wenxuan Xie, Fa Zhang, Jubin Gao, Chuanjun Liu (Beijing Aeronautical Science & Technology Research Institute of COMAC)* This study investigates the numerical analysis of bearing behaviour on C section beam with different types of open-hole on web.	4108-2 **IMPROVING DAMAGE TOLERANCE OF CARBON FIBRE LAMINATES VIA BIO-INSPIRED MICRO-STRUCTURAL DESIGN** *Silvestre T. Pinho, Gianmaria Bullegas, Marine Charrier, Soraia Pimenta (Imperial College London)* We design, prototype and test bio-inspired CFRP composites with an engineered translaminar fracture surface, leading to significant increases in notched strength and energy dissipated during fracture.	4109-2 **THE IN-PLANE MECHANICAL PROPERTIES OF 2.5D WOVEN POLYMERIC MATRIX COMPOSITES** *W. Kong (AECC Commercial Aircraft Engine CO.LTD, University of Nottingham), R. Brooks (University of Nottingham), E. Stinikova (University of Nottingham), C. Yu (AECC Commercial Aircraft Engine CO.LTD, University of Nottingham), C. Yu (AECC Commercial Aircraft Engine CO.LTD, University of Nottingham), S. Li (University of Nottingham)* This paper presents the mechanical behavior of four types of 2.5D woven polymeric matrix composites under quasi-static tensile, compressive and shear loadings.	4110-2 **GIANT ELECTROSTRICTION OF SOFT NANOCOMPOSITES FOR MECHANICAL ENERGY HARVESTING** *Jinkai Yuan, Alan Luna, Wilfrid Neri, Cécile Zakri, Annie Colin, Philippe Poulin (Universite de Bordeaux)* We demonstrated that the soft nanocomposites based on liquid crystalline graphene show giant electrostriction, thus hold great promise for vibrational mechanical energy harvesting.	4111-2 **MEASUREMENT OF DYNAMIC STRAINS ON COMPOSITE T-JOINT SUBJECTED TO HYDRODYNAMIC RAM USING PVDF SENSORS** *Eun-Su Go (Chungnam National University), Dong-Geon Kim (Chungnam National University), Kyeongsik Woo (Chungbuk National University), Jong-Heon Kim (Agency for Defense Development, Republic of Korea)*

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08:00	PLENARY LECTURE at Qujiang Auditorium: **Strong, Fast, Powerful, Durable, and Cheap Polymer Fiber and Hybrid Nanofiber Yarn Artificial Muscles and Their Applications** Ray Baughman, University of Texas at Dallas, USA										
09:05	4112 Sandwich Structures and Materials 5	4113 Joints 9	4114 Actuation and Dynamic Response	4115 Processing-Manufacturing Technologies 1	4116 Self-Healing and Bio-inspired Designs 5	4117 Acoustic Meta-Composite 2	4118 Process Induced Effects 1	4119 Additive Manufacturing 2	4120 Bio and Medical 7	4121 Automotive and Rail 3	
09:05	4112-1 **IMPROVING THE PERFORMANCE OF TUFTED COMPOSITE SANDWICH STRUCTURES** *Jamie Hartley, Matthew Dyson, Carwyn Ward (University of Bristol)* The short summary of this paper are: The arrangement of the graded foam has a significant influence on the deformation and damage modes of the sandwich plate with graded aluminum foam core. The graded sandwich plates with the high density core towards the blast source have an outstanding blast-resistance under moderate and low intensity blast loading while the opposite result is given under high intensity blast loading.	4113-1 **NUMERICAL AND EXPERIMENTAL INVESTIGATION OF PROGRESSIVE FAILURE OF BOLTED SINGLE-LAP JOINTS OF WOVEN REINFORCED COMPOSITE** *X.F. Hu, A. Hanis, M. Ridha, V.B.C. Tan, T.E. Tay(National University of Singapore)* This study presents a 3D explicit FE analysis for the bearing failure of the bolted joint of woven composites, and the numerical results have been validated by experimental tests.	4114-1 **PREDICTION OF FATIGUE LIFE OF COMPOSITE LAMINATES USING LASER ULTRASONIC METHOD** *Chongcong Tao, Jinhao Qiu, Hongli Ji, Chao Zhang, Zhan Wang, Weixing Yao(Nanjing University of Aeronautics and Astronautics)* A physical damage based stiffness degradation model combined with laser ultrasonic method for life prediction of composite laminates.	4115-1 **A METHOD FOR DISPERSING PARTICLE FILLERS IN THERMOPLASTIC COMPOSITES USING COMMINGLED YARNS** *Joanna C. H. Wong, Nadine Hertaeg, Paolo Ermanni (ETH Zurich)* Particle-filled thermoplastic composites are produced by dispersing ceramic nanoparticles into a non-consolidated woven textile of commingled yarns. The effects of the particles on the toughness of the matrix and the consolidated fibre-reinforced thermoplastic composite material are studied.	4116-1 **DEVELOPMENT OF SELF-HEALING TECHNIQUES FOR FIBER REINFORCED COMPOSITES: RECENT ADVANCES ON INTRINSIC SELF-HEALING MECHANISM** *A. Kotzebos, S. Tsantzalis,P. Tsokanas , V. Kostopoulos (University of Patras)* The current investigation describes recent advances in the field of intrinsic self-healing mechanism for structural composites by utilizing three different self-healing agent types according to their chemistry.	4117-1 **THE SEARCH FOR EDGE STATES IN MECHANICAL METAMATERIALS (INVITED TALK)** *Massimo Ruzzene (Georgia Institute of Technology)*	4118-1 **EFFECTS OF FAST PREPREG PRESSING ON LAMINATE QUALITY AND MECHANICAL PROPERTIES** *Oliver Rimmel (University of Kaiserslautern), David Becker (University of Kaiserslautern), Christian Gemperlein (all ahead composites GmbH), Peter Mitschang (University of Kaiserslautern)* Investigations of the dependency of laminate properties on curing temperature and degree of cure have been conducted by producing sample plates and testing their mechanical properties. In conclusion, it was found that laminate properties comparable to those achieved in autoclave processes can be reached with fast prepreg pressing while strongly enhancing process speed and economic efficiency.	4119-1 **TEMPERATURE CONTROL OF CONTINUOUS CARBON FIBRE REINFORCED THERMOPLASTIC COMPOSITES BY 3D PRINTING** *Jing Pu (Beihang University, University of Nottingham), Peng Zhao (University of Nottingham, AVIC Composites Corporation, Ltd.), Shuguang Li (University of Nottingham), Ian Ashcroft (University of Nottingham), Arthur Jones (University of Nottingham)* This paper describes the design of a high temperature heating system for a 3D printing application of continuous carbon fibre reinforced thermoplastic composites FDM process. The purpose of this system is to use PEEK carbon fibre prepreg material as the printing material for continuous carbon fibre reinforced thermoplastic composites manufacturing.	4120-1 **MECHANICAL MODEL OF BIOLOGICAL SUTURES WITH FIBROUS JOINTS** *Yaning Li, Kateryna Miroshnichenko, Igor TsUnited Kingdomov (University of New Hampshire)* Composite mechanical model of the zigzag shaped suture is developed. The model includes presents of the aligned collagen fibers in soft connective tissue between two skeletal components.	4121-1 **DYNAMIC MECHANICAL BEHAVIOR OF FLAX FIBER REINFORCED COMPOSITE LATTICE CORES: EXPERIMENT** *Chong Zhang (Beihang University), Dayong Hu (Beihang University, Aircraft/Engine Integrated System Safety Being Key Laboratory), Jun Xu (Beihang University, Xi'an Jiaotong University)*	
09:25	4112-2 **DEFORMATION AND DAMAGE OF SANDWICH PLATES WITH GRADED ALUMINUM FOAM CORES SUBJECTED TO BLAST LOADING** *T. Wang(Xi'an Jiaotong University&Xi'an Research Institute of High-Tech), Q. H. Qin(Xi'an Jiaotong University), W. L. Yu, M. L. Zhu(Xi'an Research Institute of High-Tech) , T. J. Wang(Xi'an Jiaotong University)* For the analysis of impact damages and the damage tolerances because of honeycomb sandwich structures experiments are increasingly replaced by numerical simulation using explicit finite element solver and detailed numerical simulation models. In this paper a one-step and a step-by-step residual strength simulation approach are investigated and show a good agreement to residual strength test data of honeycomb sandwich structures.	4113-2 **A MODIFIED ARCAN TEST FOR MIXED-MODE LOADING OF BOLTED JOINTS IN COMPOSITE STRUCTURES** *Garth M Pearce, Yong H E Quek, Cong Y Tao(UNSW)* A novel modified Arcan test rig has been developed for testing the mixed-mode performance of bolted joints in composite laminates, complementing existing ASTM standards. This paper presents results which show a complex interaction between bearing and pull-through failure for both UD and fabric composite laminates.	4114-2 **AN INVESTIGATION OF THE VISCOELASTIC BEHAVIOUR OF INTERLEAVED COMPOSITES WITH SHAPE MEMORY** *R. Zhang (Imperial College London), P. Robinson (Imperial College London), A. Bismarck (Imperial College London, University of Vienna), C. Burgstaller (Transferzentrer für Kunststofftechnik(TCKT))* This paper reports on an experimental and modelling investigation into the viscoelastic behaviour of an interleaved carbon fibre/ epoxy composite. This has a significant effect on the re-shaping this interleaved composite and on the deployment time of structures made of this material.	4115-2 **INVESTIGATION OF PROCESSING PARAMETERS IN CONTINUOUS LATTICE FABRICATION** *Martin Eichenhofer, Joanna C. H. Wong, Paolo Ermanni (ETH Zurich)* Experimental investigation of processing parameters on porosity in Continuous Lattice Fabrication (CLF), a novel additive manufacturing technique invented at ETH Zurich for the cost efficient deposition of fiber-reinforced thermoplastic composites.	4116-2 **MECHANICAL PROPERTIES OF ADDITIVELY MANUFACTURED COMPOSITE MATERIALS WITH ULTRASONICALLY ASSEMBLED REINFORCEMENT** *Thomas M. Llewellyn-Jones (University of Bath), Bruce D. Drinkwater (University of Bristol), Richard S. Trask (University of Bath)* 3D printed dogbone samples were manufactured with ultrasonically assembled glass microfibre reinforcement, and subsequently loaded in tension to failure. The change in tensile modulus and ultimate tensile strength were determined with respect to the angle between fibre orientation and the loading axis.	4117-2 **AN EXPERIMENTAL STUDY OF THE EFFECT OF PHONONIC CRYSTALS GEOMETRICS ON UNIDIRECTIONAL TRANSMISSION** *Jia-Hao He, Chao-Nan Wang , Hsin-Hao Huang(National Taiwan University)*	4118-2 **SIMULATION AND ANALYSIS OF PROCESS INDUCED DEFORMATION FOR COMPOSITE STRUCTURES** *Liu Kai (Beihang University), Ye Jinrui (Beihang University), Zhang Boming (Beihang University), Tang Zhanwen (Beihang University), Jiang Tian (Beihang University), Liu Weiping (Shanghai Aircraft Manufacturing CO)* This work aims at developing a simulation method of process-induced distortions (PID) for unidirectional thermoplastic composites in the thermoforming process and analyzing the effects of fiber orientations and stamping residual stresses.	4119-2 **INFLUENCE OF PARAMETERS ON MECHANICAL PROPERTIES OF THERMOPLASTIC POLYMERS OBTAINED BY FUSED FILAMENT FABRICATION (FFF)** *S. Terekhina (Ecole Nationale Supérieur d'Arts et Métiers), M.L. Hattali, (University of Paris-Sud, University of Paris-Saclay), L. Guillaumat (Ecole Nationale Supérieur d'Arts et Métiers)* In this research three parameters for Fused Filament Fabrication: layer height, pattern geometry and infill density were examined at three variable settings for building test parts. The Taguch's method and full factor design were used for determining the optimum parameters that affect the output characteristic responses i.e., Young Modulus and Yield stress of ABS and PLA thermoplastic materials.	4120-2 **STRUCTURE DESIGN AND ANALYSIS OF THE MULTILAYER STACK CONSISTING BOTH HARD AND SOFT LAYERS FOR FLEXIBLE ELECTRONICS** *Shuang Li (Chinese Academy of Sciences), Rui Li (Dalian University of Technology), Yewang Su (Chinese Academy of Sciences)* Composite structures, such as stacks consisting both hard and soft layers are widely adopted in the design of flexible electronics. These works prove that shear deformation dominates in the soft adhesive layers of the laminated structure when it is bent and give some analytic expressions of displacements and strains for engineers to use.	4121-2 **LIGHTWEIGHT COMPOSITE COMPONENTS FOR A RALLY COMPETITION CAR** *Gabriel Fortin, Yasumasa Komaki, Fukunaga Osamu, Akio Ohtani, Hiroyuki Hamada*	

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Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
09:45	4101-3 **UNDERSTANDING THE MECHANISM OF POSITIVE THERMAL COEFFICIENT IN CONDUCTIVE POLYMER COMPOSITES** *Harshit Porwal (Queen Mary University of London)* In this work we will be studying model conductive polymer composite (CPC) systems with different filler shapes and sizes to understand the mechanism of positive temperature coefficient in CPCs.	4102-3 **EFFECTS OF GRAPHENE SHEETS ON MICROSTRUCTURE AND PROPERTIES OF GRAPHENE/CU COMPOSITES** *Jinfeng Leng, Shaochen Zhang, Yi Liu, Qi Wang (University of Jinan)*	4103-3 **SYNERGETIC EFFECTS OF THIN PLY AND NANOSTITCHING STUDIED BY SYNCHROTRON RADIATION COMPUTED TOMOGRAPHY** *Espele Kallon, Cohen Reed Kopp, Yinchen Ni, Nathan Fritz (Massachusetts Institute of Technology), Alberting Artero (University of Porto), Gregor Borstnar, (University of Southampto), Mark N. Mavrogordato (University of Southampto), S. Mark Spearing (University of Southampto), Pedro P. Camanho (University of Porto), Brian L. Wardle(Massachusetts Institute of Technology)* Here, we report the interlaminar reinforcement of thin ply laminate using carbon nanotubes nanostitching. Damage accumulation and progression with increasing tensile load are visualized using synchrotron radiation computed tomography (SRCT).	4104-3 **CAPTURING SUBTLE FEATURES OF DELAMINATION SHAPES IN CROSS-PLY LAMINATES DUE TO LOW SPEED IMPACT** *Elena Sitnikova (The University of Nottingham), Shuguang Li (The University of Nottingham), Dafei Li (The University of Nottingham), Xiaosu Yi (Beijing Institute of Aeronautical Materials)* Pointed delamination tips and the intact zone between the lobes of delamination are consistently observed in impact experiments on cross-ply laminates. The definitive modelling factors responsible for those subtle features are identified, thus building up the level of confidence of theoretical prediction of delamination in a much broader sense.	4105-3 **NANOSTRUCTURED INTERLAMINAR REINFORCEMENT OF AEROSPACE LAMINATES WITH RADIALLY-ALIGNED CARBON NANOTUBES** *Richard Li, Hayden Cornwell, Erica F. Antunes, Andrew H. Liotta, Christian G. Parschau, Brian L. Wardle (Massachusetts Institute of Technology)*	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4107-3 **A NEW FOURIER-RELATED DOUBLE SCALE ANALYSIS TO MODEL THE WRINKLING OF CIRCULAR THIN FILMS RESTING ON COMPLIANT SUBSTRATES** *Wei Huang (Ecole Polytechnique. Wuhan University), François Trochu (Ecole Polytechnique), Heng Hu (Wuhan University)*	4108-3 **UNIDIRECTIONAL HYBRID COMPOSITE OVERLOAD SENSORS** *Tamas Rev, Gergely Czél, Meisam Jalalvand, Michael R. Wisnom (University of Bristol)* A purpose-designed, thin-ply interlayer glass/carbon hybrid composite overload sensor concept is presented, which can be used for structural health monitoring (SHM) of composite structures, with potential for safer operation in service.	4109-3 **INFLUENCE OF 3D WEAVING PARAMETERS ON PREFORM COMPRESSION AND LAMINATE MECHANICAL PROPERTIES** *D. Patel, V. Koncherry, A. Youssif, P. Potluri (University of Manchester)* This research work presents the influence of binder density and tow tensions for different 3D weave architectures namely orthogonal, angle interlock and layer-to-layer, on the preform compaction and laminate mechanical properties. Meso-scale geometrical features have been extracted by Microscopy and X-ray computed tomography (CT).	4110-3 **FLEXIBLE SELF-POWERED SENSORS USING ORGANIC THERMOELECTRIC EFFECT** *P. Taroni Junior (Queen Mary University of London, Imperial College London), Natalie Stingelin-Stutzman (Imperial College London), Martin Heeney (Imperial College London), Mark Baxendale (School of Physics and Astronomy, UK), Giovanni Santagiuliana (Queen Mary University of London), Emiliano Bilotti (Queen Mary University of London)* The energy absorbing capability of Zanchor reinforced CFRP were investigated by using SHPB method. As results, the delamination area decreased with increasing Zanchor density and consequently, the energy absorbing capability increased.	4111-3 **EFFECT OF ZANCHOR REINFORCEMENT ON ENERGY ABSORBING CAPABILITY OF COMPOSITE LAMINATES UNDER IMPACT LOADING** *Nur Amira Mohammad, Ryota Haruna, Suzuki Tomoki, Takayuki Kusaka (Ritsumeikan University)* The energy absorbing capability of Zanchor reinforced CFRP were investigated by using SHPB method. As results, the delamination area decreased with increasing Zanchor density and consequently, the energy absorbing capability increased.
10:05	4101-4 **MANUFACTURING PROCESS AND MECHANICAL PROPERTIES OF CARBON FIBER/CARBON NANOTUBE BUCKYPAPER INTERPLY HYBRID COMPOSITE** *Ayou Hao, Songlin Zhang, Nam Nguyen, Lyu Dong, Claire Jolowsky, Jin Gyu Park, Zhiyong Richard Liang (Florida State University)* This paper reports on a study of CNT thin film or buckypaper (BP), integrated into carbon fiber (CF) composites to create hybrid composite materials with high mechanical properties and excellent electrical conductivity performance.	4102-4 **MICRO STRUCTURE AND MECHANICAL BEHAVIOUR OF ALUMINIUM MATRIX COMPOSITES REINFORCED WITH GRAPHENE OXIDE AND CARBON NANOTUBES** *Fei Lin, Robert J Young, Ian A Kinloch (University of Manchester)* We aim to investigate the microstructure and mechanical behaviour for Al matrix composites reinforced with GO and CNT.	4103-4 **SIMULATION ON DAMAGE IN QUASI-ISOTROPIC UNIDIRECTIONALLY ARRAYED CHOPPED STRANDS LAMINATES UNDER OPEN-HOLE TENSION** *Jun Feng Hu (Nanjing Tech University), Xiang Ling (Nanjing Tech University), Hang Li (Hunan University), Wen Xue Wang (Kyushu University)* In this study, we simulate the progressive damage and mechanical properties of open-hole UACS laminates with stacking sequences of [45/0/-45/90]s and [45/0/-45/90]2s using finite element analysis. To accurately simulate the progression of delamination and other damage modes occurring in the UACS laminates near the hole, intra-laminar cohesive elements and inter-laminar cohesive elements are inserted into the slits and the interfaces, respectively.	4104-4 **QUASI-STATIC AND IMPACT DAMAGE OF THERMOPLASTIC COMPOSITES: MICRO- MACRO EXPERIMENTAL APPROACH** *A. Yudhanto (King Abdullah University of Science and Technology (KAUST)), H. Wafai (KAUST), G. Lubineau (KAUST), R. Yaldiz (SABIC), N. Verghese (SABIC)* We developed a micro-macro experimental approach to understand the damage and fracture behaviour of cross-ply thermoplastic composites subjected to out-of-plane loading. Firstly, cross-ply laminates were subjected to quasi-static loading in order to evaluate the damage pattern. Next, we performed low-velocity impact at various impact energies, and observed the damage due to impact. Since it is difficult to track the damage behaviour at plate level, we developed a micro-scale test device (micro-3-point-bending or micro-3PB) to capture the principal damage mode (transverse crack and delamination) through the use of unsymmetrical-unbalanced cross-ply laminate. We found that the physics of degradation (damage mechanism) at macro-scale can be qualitatively captured with our micro-3PB setup.	4105-4 **ALIGNMENT STUDY OF CARBON NANOTUBE VEILS AND THE INFLUENCE ON THEIR COMPOSITES** *Eileen Brandley, Qiangian Li, Emile S. Greenhalgh, Milo S.P. Shaffer (Imperial College London)*	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**		4109-4 **EXPERIMENTAL INVESTIGATION OF THE VIBRATION PROPERTIES OF 3D BRAIDED COMPOSITES** *Dong Apeng, Li Shu, Pu Jing (Beijing University of Aeronautics and Astronautics)* This paper is to investigate the vibration characteristics of three-dimensional(3D) braided composites with different braiding parameters consisting of braiding structure, braiding angle and fiber volume fraction.		4111-4 **ON THE DAMPING PROPERTIES OF LOAD-BEARING BIOLOGICAL MATERIALS** *Zuoqi Zhang (Wuhan University), Mahan Qwamizadeh (Nanyang Technological University), Kun Zhou (Nanyang Technological University), Yongwei Zhang (Institute of High Performance Computing, Singapore)* A key function of load-bearing biological materials, such as bone and sea shell, is to protect their inside fragile organs by effectively damping dynamic impact. How those materials achieve this remarkable function remains largely unknown. Through the finite element simulation and theoretical modeling, we systematically studied the stress wave propagation and attenuation in the load-bearing biological materials and investigated the roles of biopolymer viscosity, structural arrangement, mineral volume fraction and hierarchical design.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
4112-3 **STRATEGIES TO INVESTIGATE THE RESIDUAL STRENGTH OF IMPACT DAMAGED HONEYCOMB SANDWICH STRUCTURES USING DETAILED NUMERICAL MODELS** *Chris Fischer, Falk Hähnel, Andreas Hauffe, Klaus Wolf(Technische Universität Dresden)*	4113-3 **NUMERICAL INVESTIGATION OF A HYBRID MECHANICAL-ADHESIVE JOINING TECHNOLOGY FOR APPLICATION IN LIGHTWEIGHT COMPOSITE-METAL STRUCTURES** *Michael C. Corbett, Conor T. McCarthy(University of Limerick)* A novel concept for jointing composites to metals in lightweight, hybrid structures is presented. The concept employs interlocking morphology, formed on the surfaces of male and female adherends which are coupled with a layer of adhesive. Herein, the concept it explored through finite element analysis, incorporating damage in the composite material and the adhesive. The geometry of the interlocking morphology is subsequently parameterised and optimised in order to maximise the concept's structural performance.	4114-3 **MORPHING AIRCRAFT BASED ON SMART MATERIALS AND STRUCTURES (INVITED TALK)** *Jian sun (Harbin Institute of Technology), Xiaobo Gong (Harbin Institute of Technology), Jinhao Qiu(Nanjing University of Aeronautics and Astronautics), Yanju Liu (Harbin Institute of Technology), Jinsong Leng(Harbin Institute of Technology)* Morphing technologies offer aerodynamic benefits for an aircraft over a wide range of flight conditions.In this article, recent developments in the application of smart materials and structures to morphing aircraft are reviewed.	4115-3 **HOW COBOTS BUILD TAILORED BLANKS: MATERIALS AND PROCESS QUALIFICATION FOR ADVANCED THERMOPLASTIC COMPOSITES** *Frederic J.C. Fischer, Manfred Schönheits, Thomas Stefani, Manuel Engelschall, Arthur-Hans Thellmann, Philipp Gänswürger, Michael Kupke (German Aerospace Center (DLR))*	4116-3 **INVESTIGATION ON EXCELLENT ENERGY ABSORPTION CAPABILITY OF POMELO PEEL** *Wen Zhang (Beihang University), Sha Yin (Beihang University, Xi'an Jiaotong University), Jun Xu (Beihang University, Xi'an Jiaotong University, Tsinghua University)*	4117-3 **TUNABLE BAND STRUCTURES IN A PRESTRESSED BEAM WITH MULTI-LEVEL RESONATORS** *Weiqiu Zhou Weiqiu Chen(Zhejiang University,)* The flexural wave propagation in a pre-stressed beam periodically attached with double smart resonators is investigated theoretically by using transformation matrix method. Broadband tunable pseudo-gap is achieved in the system. The pseudo-gap is a combination of two extremely neighboring band gaps, and in the pseudo-gap the there is a extremely narrow pass band.	4118-3 **INFLUENCE OF TOOL-PART FRICTONAL INTERACTION ON THE CURE-INDUCED DEFORMATIONS IN THERMOSET-BASED COMPOSITE PARTS** *Antoine Parmentier, David Dumas (Camanro ASBL)* The present study aims at determining the influential parameters when predicting cure-induced warpage of flat plates. The sensitivity analysis results have shown the importance of accurately measuring the parameters of the Coulomb's law to evaluate the warpage magnitude by simulations.	4119-3 **3D PRINTING OF CONTINUOUS FIBRE REINFORCED THERMOPLASTIC COMPOSITES** *Feng Zhuo (The University of Nottingham, AVIC Composites Corporation, Ltd), Shuguang Li (The University of Nottingham), Ian Ashcroft (The University of Nottingham), Arthur Jones (The University of Nottingham), Xiangshu Hou (The University of Nottingham), Jing Fu (The University of Nottingham)* A desktop Fusion Deposition Modelling (FDM) printer was modified for printing continuous fibre reinforced composites, and compared with a commercial composites printer. The mechanical property and the microstructure of the specimens were investigated.	4120-3 **PRINTING OF TOUGH HYDROGELS INTO STRUCTURES WITH TITIN-LIKE DOMAINS** *JIN QIAN (ZHEJIANG UNIVERSITY)* This study employed a molecular-level paradigm in titin for the macroscopic gel structures with desired extensibility and toughness, using the strategy of 3D printing.	4121-3 **OPPORTUNITIES FOR THE USE OF COMPOSITE MATERIALS IN RAIL APPLICATIONS – A CASE STUDY** *EM Keating, N Raath, J Winnett, DJ Hughes (University of Warwick), G Hope, M Ravaioli, S Cozien-Cazuc (Far UK Ltd)* Opportunities for the Use of Composite materials in Rail Applications – A Case Study. A review of the lightweight technologies currently in application in the rail sector, and an insight into the feasible use of Axontex™ composite braided beams.	
4112-4 **A NEW TRIGGER MECHANISM FOR CRUSHING SQUARE CFRP TUBES** *Rafea Dakhil Hussein(Swinburne University of Technology& Al-Muthanna University), Dong Ruan, Guoxing Lu (Swinburne University of Technology)*		4114-4 **A BENDING ACTUATOR BASED ON EXTENSILE PAM AND ITS APPLICATION IN SOFT ROBOTICS** *Qinghua Guan, Jian Sun, Yanju Liu, Jinsong Leng (Harbin Institute of Technology)* In this study, a kind of bending actuator based on extensile Pneumatic Artificial Muscles (PAMs) was proposed, built, tested, modeled and applied to a soft gripper and a humanoid hand. The larger stroke of bending motion and soft but stable configurations make Bending Extensile PAMs good candidates for soft robotics and wearable devices.	4115-4 **TOWARDS HIGH-QUALITY MULTI-SPOT-WELDED JOINTS IN THERMOPLASTIC COMPOSITES STRUCTURES** *Tian Zhao, Genevieve Palardy, Irene Fernandez Villegas, Rinze Benedictus (Delft University of Technology)* This paper mainly investigates the impact of changes in boundary conditions on the welding process and the variability of the created spot-welded joints. The experimental results provides a good base for manufacturing and investigation of the ultrasonic multi-spot welded joints in thermoplastic composites.		4117-4 **ELECTRICAL CONTROL OF ELASTIC WAVE IN RANDOMLY DISORDERED PHONONIC CRYSTALS BY EXTERNAL PIEZOELECTRIC CIRCUIT** *Yi-Ze Wang, Qi Luo, Yue-Sheng Wang (Beijing Jiaotong University)*	4118-4 **UNDERSTANDING THE EFFECT OF VOID MORPHOLOGY AND CHARACTERISTICS ON LAMINATE MECHANICAL PROPERTIES** *Ivma Gajavic, Luiz F. Kawashita, Stephen R. Hallett (University of Bristol)* This research focuses on developing a void statistical analysis in order to understand the effects of void features on the mechanical performance of composites. To achieve this, a novel heat and pressure controlled manufacturing process was applied to introduce inter-ply voids, and micro X-Ray Computed Tomography was used to characterise the voids.	4119-4 **CONSTRUCTION OF 3D PRINT OF GLASS COMPOSITE MATERIAL USING LIGHT-CURING RESIN AND EVALUATION OF MECHANICAL PROPERTIES** *Yukako Sano, Ryosuke Matsuzaki (Tokyo University of Science)* Construction of a 3-D printed continuous fiber by using light- curing resin, and the evaluation of the mechanical properties of the fiber.		

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10:25	Coffee Break										
10:50	KEYNOTE at Qujiang Auditorium: **Computational Modeling for Manufacturing and Certification of Future Aerostructures** Anthony M. Waas, University of Washington, USA KEYNOTE at Lily Hall: **Highly-Aligned 2D and Cellular Interconnected 3D Graphene/Polymer Composites with Exceptional Multi-Functional Properties** Jang Kyo Kim, The Hong Kong University of Science and Technology, China KEYNOTE at Rose Hall: **Additional Solid Phases in Textile Preforms for Liquid Composite Molding: Influence on Permeability and Capillary Effects** Véronique Michaud, Ecole Polytechnique Fédérale de Lausanne, Switzerland										
11:35	4201 Polymer Matrix Materials 10	4202 Metal Matrix Composites 10	4203 Fiber-reinforced Composites 10	4204 Fracture and Damage 10	4205 Nano-Composites 10	Forum on Lightweight Structures and Composites	4207 Structural Analysis and Optimization 10	4208 Ductile and Pseudo-ductile Composites 3	4209 Textile-Based Composites 3	4210 Process Modelling 1	4211 Dynamic Behavior 3
11:35	4201-1 **ALIGNMENT AND GRAPHITE CRYSTAL PACKING FOR HIGH STRUCTURAL PERFORMANCE OF CNT NANOCOMPOSITES** *Claire Jolowsky, Rebekah Downes, Liyu Dong, Songlin Zhang, Nam Nguyen, Ayou Hao, Jin Gyu Park, Richard Liang (Florida State University)* In this research, the CNT network is aligned using a mechanical stretching technique with the assistance of resin systems to achieve 60-80% stretching strain. TEM, SEM, and Raman analyses are used to characterize the packing and alignment degree of the CNT network as the stretch strain increases.	4202-1 **CHARACTERIZATION OF THE LOCAL DEFORMATION BEHAVIOR OF AMC BY IN SITU SEM METHODS** *Schuff, Sebastian; Bailie, Frank; Beck, Tillmann; Elfer, Dietmar (University of Kaiserslautern)* The focus of this paper lies on the characterization of the local deformation behavior of aluminum matrix composites (AMC) reinforced with SiC particles by advanced in situ SEM methods. By analysis of high-resolution micrographs and additional mathematical image processing, a comprehensive study from local micro crack mechanisms to macroscopic damage behavior will be discussed.	4203-1 **CHANGES IN THERMAL EXPANSION COEFFICIENT OF CFRP LAMINATE DUE TO THERMAL CYCLE** *Akifumi Kato, Ken Goto, Yasuo Kogo (Tokyo University of Science), Ryo Inoue (Tokyo University of Science)* This study examined change of coefficient of thermal expansion (CTE) of CFRP laminates by thermal cycling during the operation as a precise structure of a satellite.	4204-1 **AN ALTERNATIVE METHOD FOR MEASURING THE MODE I INTERLAMINAR FRACTURE TOUGHNESS** *Z.Z. Guo (Shanghai Jiao Tong University), W. Xu (Shanghai Jiao Tong University), Y.G. Qian (Xi'an Jiao Tong University), H.X. Wang (Xi'an Jiao Tong University), X.J. Zhang (Shanghai Jiao Tong University), Y. Yu (Shanghai Jiao Tong University)* A simple test method is proposed to measure the mode I interlaminar fracture toughness of composite. The fracture toughness measured from the present method is consistent well with those determined from the methods recommanded by the ASTM standard.	4205-1 **DESIGN AND FABRICATION OF MECHANICALLY FLEXIBLE THREE-DIMENSIONAL GRAPHENE/ POLYMER NANO COMPOSITES FOR MULTIFUNCTIONAL APPLICATIONS** *Long-Cheng Tang, Li Zhao, Li-Li Hu, Li-Zhi Guan, Li-Xiu Gong, Nai Xu, Qian Wu (Hangzhou Normal University)* We reported a facile low-cost and scalable-compatible silane/silicone modification for the fabrication of macroscopic porous graphene nanoribbon (GNR) composite materials with tunable surface property and multi-functionality. The lightweight 3D porous GNR based composites showed super mechanical performance, outstanding cyclic resilient property, good electrical conductivity, extremely high sensitivity of elasticity-dependent conductivity, excellent hydrophobicity, and outstanding oil/water separation efficiency.	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4207-1 **NONLINEAR ASYMPTOTIC HOMOGENIZATION METHOD FOR PERIODIC ELASTIC MATERIAL WITH LARGE DEFORMATION** *Yu Huan, Shutian Liuand, Jian Zhao (Dalian University of Technology)*	4208-1 **DEMONSTRATION OF PSEUDO-DUCTILITY IN ALL FIBRE DIRECTIONS OF HIGH PERFORMANCE QUASI-ISOTROPIC THIN PLY CARBON/ GLASS HYBRID COMPOSITES** *Mohamad Fotouhi, Meisam Jalalvand, Michael R. Wisnom (University of Bristol)* This work introduces high performance quasi-isotropic composite laminates that show pseudo ductility in all the fibres orientations under tensile loading.	4209-1 **CARBON PLAIN WEAVE TEXTILE REINFORCED EPOXY MODIFIED WITH CELLULOSE NANO FIBERS: EFFECT OF CNF LENGTH** *Valter Carvelli (Polytechnic University of Milan), Aya Tanaka (Doshisha University), Toru Fujii (Doshisha University), Kazuya Okubo (Doshisha University)* The investigation considers the effects of hybrid epoxy resins, enhanced with cellulose nano fibers (CNF), on the mechanical performance of carbon fibers plain weave textile composites.	4210-1 **NUMERICAL SIMULATION OF DRILLING CARBON FIBER REINFORCED PLASTICS IN THE MACROSCOPIC AND MICROSCOPIC LEVEL** *Fuji Wang, Xiaonan Wang, Zhenguan Jia, Rao Fu, Yu Bai, Youjiang Su (Dalian University of Technology)* Numerical simulation of the drilling of carbon fiber reinforced plastics on the macroscopic and microscopic scales. And the study of the drilling induced burring.	4211-1 **IN-PLANE DYNAMIC CRUSHING OF HONEYCOMBS WITH DIFFERENT SIZED REGULAR HEXAGONAL CELLS ARRANGEMENTS** *Naveed Ahmed (Northwestern Polytechnical University), Xue Pu (Northwestern Polytechnical University), Muhammad Kamran (Northwestern Polytechnical University), Naeem Zafar (CESAT)* In this study, the effect of insertion of multiple arrangements of smaller sized regular hexagonal cells which are placed inside an otherwise uniform cellular structure is studied under in-plane dynamic axial crushing. The insertion is proposed in number of arrangements including row, column or diagonal form of addition and the response is determined for the densification, energy absorption and deformation patterns of modified honeycomb.
11:55	4201-2 **CHARACTERISATION AND CURE KINETICS OF MULTI-AROMATIC TETRA-FUNCTIONAL EPOXY RESINS** *Russell J. Varley (CSIRO Manufacturing, Deakin University), Buu Dao (CSIRO Manufacturing), Tri Nguyen (CSIRO Manufacturing), Takashi Nishino (Kobe University)* Impact of aromatic substitution on the reaction rate and network properties of tetrafunctional tri-phenyl ether epoxy resins cured with two different anhydride hardeners. Increasing para substitution increased reaction rate, epoxide conversion and promoted the onset of vitrification.	4202-2 **EFFECT OF REINFORCEMENT SIZE AND REINFORCEMENT OXIDATION ON WEAR BEHAVIOR OF HIGH VOLUME FRACTION SiC/AL MMC** *Taegyu Lee (KAIST)* In this study, wear behavior of high volume fraction SiC particle reinforced MMC was investigated. Furthermore, surface oxidation effect of SiC particle on wear behavior was investigated.	4203-2 **CARBON BLACK MODIFIED EPOXY-CARBON FIBER PREPREG LAMINATES. EFFECT OF ADDITIVES ON THE Z-DIRECTION ELECTRICAL CONDUCTIVITY** *Gökhan Bakis, Christin Pawelski, Corinna Fischer, Alper Aksit, Volker Altstädt (University of Bayreuth)*	4204-2 **DAMAGE PREDICTION FOR CFRP MATERIALS SUBJECTED TO A LIGHTNING STRIKE** *Timothy M Harrell (University of Southampton), Ole Thybo Thomsen (University of Southampton), Janice M Dulieu-Barton (University of Southampton), Søren F Madsen (Global Lightning Protections Services A/S), Lisa Carloni (Global Lightning Protections Services A/S)*	4205-2 **HIGH THERMAL CONDUCTIVITY COMPOSITE WITH SHEAR-INDUCED ALLIGNED BORON NITRIDE NANOSHEETS** *Junchao Liu, Hui Zhang, Zhong Zhang (National Center for Nanoscience and Technology)* Our work obtained BN/ TPU composites with BN alignment structure via a simple FDM 3D printing method. The composites exhibit high thermal conductivity and volume resistivity which is great potential for microelectronics packaging.	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4207-2 **A SCALED BOUNDARY FINITE ELEMENT FORMULATION FOR COMPOSITE BEAMS OF ARBITRARY CROSS-SECTION** *Jonathan Daniel Jung, Wilfried Becker (TU Darmstadt)* As an effective computational analysis method the so-called scaled boundary finite element method is extended and adapted to the situation of composite beams of arbitrary cross-section.	4208-2 **CRACK ARREST IN FINGER JOINTED THERMOPLASTIC PES INTERLEAVED CFRC** *David B. Anthony, Omar R. Bacarreza Nogales, Milo S.P. Shaffer, Alexander Bismarck, Paul Robinson, Soraia Pimenta (Imperial College London)* The effect of introducing polyethersulfone (PES) interleaves, in the overlapped region of pre-cut finger joint architecture composites, showed a crack arrest mechanism in tension. The strain-to-failure of thick PES interleaved samples was over 3.2%, an increase of 85% compared to the baseline samples, and catastrophic failure was delayed in the majority of instances.	4209-2 **FIBRE WAVINESS INDUCED BENDING IN COMPRESSION TESTS OF UNIDIRECTIONAL NCF COMPOSITES** *Dennis Wilhelmsson (Chalmers University of Technology), Leif E. Asp (Chalmers University of Technology), Renaud Gutkin (Durability CAE Body & Trim, Volvo Car Corporation), Fredrik Edgren (GKN Aerospace Sweden AB)* A governing mechanism for bending in compression tests of laminates with high out-of-plane waviness has been investigated.	4210-2 **THREE-DIMENSIONAL FLOW SIMULATION OF RESIN TRANSFER MOLDING FOR COMPOSITE WHEEL RIM** *Zheng Min Huang (Seoul National University), So Yun Lee (Seoul National University), Young Seok Song (Dankook University), Jae Ryoun Youn (Seoul National University)*	4211-2 **HIGH VELOCITY IMPACT DAMAGE ASSESSMENT IN NATURAL FIBRE BIOCOMPOSITES** *Karthik Ram Ramakrishnan, Stéphane Corn, Nicolas Le Moigne, Pierre Slangen (Ecole des mines d'Alès)* The aim of the paper was to investigate the impact response of thermoplastic and thermoset biocomposites reinforced with flax fibres. The different modes of damage and the critical energy for complete penetration were identified for the composite.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
Coffee Break										
KEYNOTE at Qujiang Auditorium: **Computational Modeling for Manufacturing and Certification of Future Aerostructures** Anthony M. Waas, University of Washington, USA KEYNOTE at Lily Hall: **Highly-Aligned 2D and Cellular Interconnected 3D Graphene/Polymer Composites with Exceptional Multi-Functional Properties** Jang Kyo Kim, The Hong Kong University of Science and Technology, China KEYNOTE at Rose Hall: **Additional Solid Phases in Textile Preforms for Liquid Composite Molding: Influence on Permeability and Capillary Effects** Véronique Michaud, Ecole Polytechnique Fédérale de Lausanne, Switzerland									
4212 Sandwich Structures and Materials 6	4213 X-Ray Computed Tomography 1	4214 Constitutive Models 1	4215 Processing-Manufacturing Technologies 2	4216 Civil Engineering	4217 Acoustic Meta-Composite 3	4218 Process Induced Effects 2	4219 Additive Manufacturing 3	4220 Fibers 1	4221 Automotive and Rail 4	
4212-1 **SWELLING BEHAVIOUR OF EPOXY RESINS IN VARIOUS SOLVENT SYSTEMS** *Felix Wolff, Prof. Chun Gon Kim(Korean Advanced Institute for Science and Technology)* This research is about the impact localization for composite tube based on fiber Bragg grating (FBG) sensor using normalized cross-correlation. The composite tube which describe the cylindrical structure was targeted for the impact localization.	4213-1 **COMPARISON OF VOLUMETRIC AND 2D-DIC ON COMPOSITES** *T. Rief (Institute for Composite Materials Germany), N. Motsch (Institute for Composite Materials Germany), J. Hausmann (Institute for Composite Materials Germany), P. Mäckel (isi-sys GmbH)* The objective of this work is to compare the two measurement techniques since the overall measurement errors and the repeatability of the volumetric image correlation are not well known yet. By examining the volumetric image correlation in combination with two-dimensional digital image correlation this study aims to provide knowledge about the differences of the techniques as well as the use of volumetric image correlation for short-fiber reinforced polymers and their damaging behavior.	4214-1 **VISCOELASTIC CONSTITUTIVE MODEL CONSIDERING TEMPERATURE EFFECT OF FABRIC REINFORCED RUBBER COMPOSITES (INVITED TALK)** *Xue-Feng Yao, Heng Yang, Ying-hua Liu (Tsinghua University)* This study develops an anisotropic hyper-viscoelastic constitutive model with the temperature effect for fabric reinforced rubber composites, which will provide an effective model to characterize and predict the hyperelastic and viscoelastic behaviors of fabric reinforced rubber composites at different temperatures.	4215-1 **GRAPHENE COATED SMART FABRICS FOR VARTM PROCESS MONITORING** *Muhammad A Ali (Khalifa University of Science, Technology and Research (KUSTAR)), Rehan Umer (KUSTAR), Kamran A. Khan (KUSTAR), Yaqian A Samad (The University of Cambridge)* Thin graphene coating on the glass fiber reinforcement has been used to monitor the VARTM process and fiber compaction. The advancement of resin flow front, as well as mechanical and vacuum compaction of the fabrics is detected through the peizoresistive nature of the graphene coating.	4216-1 **STRUCTURAL BEHAVIOUR AND ROBUSTNESS ASSESSMENT OF AN INFRACORE® INSIDE BRIDGE DECK SPECIMEN SUBJECTED TO STATIC AND DYNAMIC LOCAL LOADING** *Wouter De Corte (Ghent University), Arne Jansseune (Ghent University), Wim Van Paepegem (Ghent University), Jan Peeters (FiberCore Europe bv)* The paper presents static and dynamic test results for specimens taken from a GFRP InfraCore® Inside bridge deck panel loaded in fatigue. After a cumulative damage substantially exceeding the FEA-based calculated value, the specimens failed but maintained integrity, corroborating to the robustness claim of the InfraCore® technology.	4217-1 **WAVE PROPAGATION IN PLATE WITH PERIODIC ARRAY OF IMPERFECT ACOUSTIC BLACK HOLES** *Bing Han, Hongli Ji, Jinhao Qiu (Nanjing University of Aeronautics and Astronautics)* This research analyzed the band structure of the phononic crystal plate embedded with periodic array of imperfect Acoustic Black Holes (ABHs). Some specific phenomena observed in locally resonant phononic crystal also exist in proposed structure, including flat mode and mode hybridization.	4218-1 **UTILIZING STRESS-BASED FAILURE CRITERIA FOR PREDICTION OF CURING INDUCED DAMAGE IN 3D WOVEN COMPOSITES** *Igor Tsukrov (University of New Hampshire), Bonys Drach (New Mexico State University), Anton Tsiftsoy (New Mexico State University), Andrew Drach (University of Texas at Austin), Todd Cross (University of New Hampshire)* Finite element models to predict curing-induced damage in 3D woven carbon/epoxy composites are developed and validated.	4219-1 **OPTIMIZING MECHANICAL PROPERTIES OF ADDITIVELY MANUFACTURED FRPC** *Matthias Domm, Jens Schlimbach, Peter Mitschang (University of Kaiserslautern)* A novel additive manufacturing process for continuous FRPC, the so called Fiber Integrated Fused Deposition Modeling (FIFDM) process, was developed. To characterize the process and optimize process output and stability as well as quality of the printed parts, a theoretical process evaluation was executed and a test methodology was developed.	4220-1 **TAILORING AND EVALUATING FIBRES AND COMPOSITE INTERPHASES: CURRENT APPROACHES (Invited Talk)** *Y. Förster, C. Scheffler, E. Mäder, C. Bellmann (Institute of Polymer Research in Dresden)*	4221-1 **CELLULOSE NANOMATERIALS AND BASALT FIBERS: AN APPROACH TOWARDS LIGHT-WEIGHTING IN SHEET MOLDING COMPOUNDS** *Amr Asadi (Georgia Institute of Technology), Ferdinand Baaij (Georgia Institute of Technology), Hendrik Mainka (Volkswagen Group of America Inc), Michael Rademacher (Volkswagen Group of America Inc), Jeffrey Thompson (Mafic SA), Robert J. Moon (U.S. Forest Service, Georgia Institute of Technology), Kyriaki Kalaitzidou (Georgia Institute of Technology, Georgia Institute of Technology)*	
4212-2 **LOW-VELOCITY IMPACT LOCALIZATION OF THE COMPOSITE TUBE USING A NORMALIZED CROSS-CORRELATION METHOD** *Hyunseok Kwona, Yurim Parka, Pratik Shresthaa, Chun-Gon Kim*a (Korea Advanced Institute of Science and Technology)* A electroless nickel coated glass/epoxy composite is fabricated for radar absorbing structure and its mechanical properties are measured.	4213-2 **FLEXURAL FATIGUE LIFE AND 3D DAMAGE IN CARBON FIBRE REINFORCED POLYMER LAMINATES** *Zhe Liu (Nanyang Technological University), Peifeng Li (University of Glasgow)* This work statistically analysed the flexural fatigue life of the [+45/-45/0]2s CFRP laminates with the 3D fatigue damage quantitatively characterised by x-ray microtomography.	4214-2 **MODELING THE ANISOTROPIC DEFORMATION AND DELAMINATION IN LAMINATED PAPERBOARD** *Yujun Li (RWTH Aachen University), Scott Edward Stapleton (University of Massachusetts Lowell), Stefanie Reese (RWTH Aachen University), Jaan-Willem Simon (RWTH Aachen University)* To describe the inelastic material behavior of paper sheet, a structural tensor-based approach was applied to model the elastic deformation, while a multi-surface based yield criterion was adopted to describe the yielding behavior.	4215-2 **EFFECT OF THE PRE-CONSOLIDATION PROCESS ON QUALITY AND MECHANICAL PROPERTIES OF MONO AND MULTI-MATERIAL LAMINATES BASED ON THERMOPLASTIC UD-TAPES** *Michael Kropka, Johann Reichstein, Thomas Neumeyer (Neue Materialien Bayreuth GmbH), Volker Altstaedt (Neue Materialien Bayreuth GmbH, University of Bayreuth)* The effect of the pre-consolidation process on the quality and mechanical properties of mono and multi-material (glass/carbon fiber) laminates based on thermoplastic (Polyamide 6) UD-tapes is investigated.	4216-2 **BREAKING ADVANCED FIBER DEVELOPMENT PARADIGM: CONTINUOUS SUPERNANOFIBERS WITH LOW CRYSTALLINITY** *Dmitry Papkov, Yuris Dzenis (University of Nebraska-Lincoln)*	4217-2 **ANALYTIC MODEL OF ACOUSTIC SUPERABSORPTION INDUCED BY METAMATERIALS** *Yong Cheng, Yanfen Jiang, Linlin Geng, Yunhong Liao, Jianzhu Dong, Xiaoming Zhou(Beijing Institute of Technology)* We study comprehensively acoustic superabsorption phenomenon in an analytic model consisting of a lossy acoustic medium embedded with thin-plate metamaterial inclusions. It is numerically verified that effective acoustic damping of composites can be greater than that of constituents.	4218-2 **VOIDS IN FIBER REINFORCED THERMOSETTING POLYMERS: FORMATION, STRUCTURE AND MECHANICAL BEHAVIOUR** *Ivan V. Sergeichev, Sergey S. Abaimov, Svyatoslav S. Chugunov (Skolkovo Innovation Center), Eduard S. Baburshin (Bashkir State University), Almir I. Mullyanov (Bashkir State University), Iskander Sh. Akhatov (Skolkovo Innovation Center)* The present work is focused on experimental research of void formation during impregnation of unidirectional glass fiber reinforcement with thermosetting polymer resin. Composite samples were fabricated at a variety of pressure conditions at inlet and outlet of the mold, replicating injection and infusion processes.	4219-2 **3D PRINTED COMPOSITES – BENCHMARKING THE STATE-OF-THE-ART** *Lourens Blok (University of Bristol)* In this work, a new approach to composite manufacture is investigated using an additive manufacture (AM) technique. This may enable low cost production for highly tailorable structures with excellent mechanical properties compared to traditional 3D printed parts.	4220-2 **AXIAL AND RADIAL SHRINKAGE OF POLYACRYLONITRILE-BASED STABILIZED FIBERS DURING LOW-TEMPERATURE CARBONIZATION TO CARBON FIBERS** *Patrick Gutmann, Judith Moosburger-Will, Samet Kurt, Siegfried Horn (University of Augsburg)* Polyacrylonitrile-based, stabilized precursors of carbon fibers have been carbonized under various mechanical tensions over the temperature range up to 1000°C to investigate the impact on fiber length and diameter.	4221-2 **EXPERIMENTAL AND NUMERICAL INVESTIGATION OF THE CRUSHING PROCESS OF COMPOSITE CRASH BOX** *Mehmet Engül, Nuri Ersoy (Boğaziçi University)* Due to pressure for price limitations, the attempts for using composite materials in automotive sector mostly concentrate on the high priced elements per unit mass and the parts having significance in security. Crash box, one of the components of vehicle's frontal bumper system, has those conditions.	

Thursday 24 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
12:15	4201-3 **TOWARDS THE DEVELOPMENT OF A COUPLED FIRE-STRUCTURE MODEL FOR FLAX/ PP COMPOSITE BEAMS** *Swagata Dutta (The University of Auckland), Raj Das (RMIT University), Debes Bhattacharyya (The University of Auckland)* The paper develops a coupled fire-structural model combining the finite volume (FV) and finite element (FE) methods that captures the essential physics of the combustion process and the resultant thermo-mechanical response of the structure subjected to fire conditions. The model predicts the temperature, stress distribution and deformation behaviour of composite beams under combined thermal and mechanical loads.	4202-3 **IN-SITU SYNTHESIS OF UNDULATED NI ANCHORED TO GRAPHENE/AL WITH ONE-STEP METHOD** *Xinghai Liu (Tianjin University), Jiajun Li (Tianjin University), Junwei Sha (Tianjin University), Enzuo Liu (Tianjin University, Collaborative Innovation Center of Chemical Science and Engineering), Qunying Li (Tianjin University), Chunnian He (Tianjin University, Collaborative Innovation Center of Chemical Science and Engineering), Chunsheng Shi (Tianjin University), Naiqin Zhao (Tianjin University, Collaborative Innovation Center of Chemical Science and Engineering)* Here we present a new approach for synthesizing the graphene nanosheets (GNS) on aluminum matrix by an in-situ chemical vapor deposition process assisted with the precursors of epoxy resin template and Ni catalysts as well as glucose carbon source.	4203-3 **THE EFFECT OF PLY SCHEME ON THERMAL CONDUCTION OF FIBER REINFORCED POLYMER COMPOSITES** *Zenong Fang, Min Li, Shaokai Wang, Yizhuo Gu, Yanxia Li, Zuoguang Zhang (Beihang University)* The heat transfer process of carbon fiber reinforced composite was investigated by finite element mode. A hybrid structure was developed to improve thermal conduction property of PAN-based fiber reinforced polymer composite.	4204-3 **MODELLING FATIGUE DAMAGE IN FIBRE METAL LAMINATE ADHESIVE JOINTS** *Ahmad S.M. Al-Azzawi (Cardiff University, University of Babylon), L.F. Kawashita (University of Bristol), C.A. Featherston (Cardiff University)* This paper outlines the development of a novel cohesive zone model using a trapezoidal traction-separation law which enables the definition of cohesive interfacial properties representative of those observed for Glare® fibre-metal laminates (FMLs) at the metal fibre interface under high-cycle fatigue loading. The model is implemented through a user-defined VUMAT subroutine in the Abaqus/ Explicit software.	4205-3 **INTERFACIAL CONTROL IN GRAPHENE- AND TRANSITION METAL DICHALCOGENIDE-POLYMER NANOCOMPOSITES** *Mark Bissett, Fang Wang, Andinet Aynalem, Robert A.W. Dryfe, Daniel Wolverson, Reshef Tenne, Robert J. Young, Ian A. Kinloch (University of Manchester, University of Bath, Weizmann Institute)*	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4207-3 **VOID FORMATION AND DISTRIBUTION DURING CFRP CURING PROCESS** *Dongkangkang Chen, Yumin Zhang, Yufeng Zhou (Harbin Institute of Technology)* This paper establishes void formation and grow model on the basis of former researches, analyzing the parameter that influences void, the exponential distribution of void number in different sizes is found and analyzed.	4208-3 **DUCTILITY OF PLATELET COMPOSITES INSPIRED BY NACRE DESIGN** *Anil R. Ravindran (RMIT University), Raj B. Ladani (RMIT University), Shuying Wu (RMIT University), Adrian P. Mouritz (RMIT University), Chun H. Wang (RMIT University, University of New South Wales)*	4209-3 **MESO-MECHANICAL FINITE ELEMENT MODEL FOR TEXTILE COMPOSITES** *Chao Zhang (Northwestern Polytechnical University)* This paper is a conclusive study on the methodology of meso-mechanical model for textile composites, with specific focus on the applying of boundary conditions. The potential application of meso-mechanical model on visual testing are deomonstrated through simulating two special specimen designs.	4210-3 **2D NUMERICAL MODELLING OF THE RESIN INJECTION PULTRUSION PROCESS INCLUDING EXPERIMENTAL RESIN KINETICS AND TEMPERATURE VALIDATION** *F. S. Rasmussen (Technical University of Denmark), M. R. Sonne (Technical University of Denmark), M. Larsen (Fiberline Composites A/S), J. Spangenberg (Technical University of Denmark), L. Lilleheden (Fiberline Composites A/S), J. H. Hattel (Technical University of Denmark)*	4211-3 **DYNAMIC ANALYSIS OF 3D BRAIDED COMPOSITES** *Yongqi Yang (Harbin Institute of Technology)* Both experimental and numerical simulation methods are used to study the dynamic mechanics of 3D braided composites.
12:35	Lunch										
13:35	PLENARY LECTURE at Qujiang Auditorium: **Composite Material Applications to Industries in China** Zhongmin Xue, Sinoma Science & Technology Co., Ltd, China										
14:40	KEYNOTE at Qujiang Auditorium: **Smart Materials and Structures: From Morphing Aircraft to Nanoscale Magnetoelectricity** Christopher S. Lynch, University of California, Los Angeles, USA KEYNOTE at Lily Hall: **Static and Fatigue Study of Aircraft Composite Structures in the Post-Buckling Field** Chiara Bisagni, Delft University of Technology, Netherlands KEYNOTE at Rose Hall: **Hierarchical Composite Materials: Structural and Multifunctional Opportunities** Milo Shaffer, Imperial College London, UK										
15:15	Coffee Break										
15:40	4301 Polymer Matrix Materials 11	4302 Metal Matrix Composites 11	4303 Fiber-reinforced Composites 11	4304 Fracture and Damage 11	4305 Nano-Composites 11	Forum on Lightweight Structures and Composites	4307 Green Composites 1	4308 Ductile and Pseudo-ductile Composites 4	4309 Textile-Based Composites 4	4310 Process Modelling 2	4311 Dynamic Behavior 4
15:40	4301-1 **ABLATION PROPERTIES OF ONE PHTHALONITRILE-BASED COMPOSITE** *Heng Zhou (Chinese Academy of Sciences, Graduate University of the Chinese Academy of Sciences), Feng Liu, (Zhengzhou University), Yuehai Li (Chinese Academy of Sciences), Weijian Han (Chinese Academy of Sciences), Hao Li (Chinese Academy of Sciences), Songlian Kuang (China Academy of Launch Vehicle Technology), Tong Zhao (Chinese Academy of Sciences)*	4302-1 **EFFECT OF TIC REINFORCEMENT ON THE TRIBOLOGICAL BEHAVIOR OF AL-7075 ALLOY** *Yaping Bai, Yongchun Guo, Jianping Li, Zhong Yang, Feng Xia, Wei Yang (Xi'an Technological University)*	4303-1 **BIAS EXTENSION MEASUREMENTS ON CROSS-PLIED UNIDIRECTIONAL THERMOSET PREPREG** *Y.Q. Zhao, T. Zhang, B.M. Zhang (Beihang University)* The presented study aims to investigate the deformation mechanism of prepreg stack at elevated temperatures using bias extension method.	4304-1 **FLEXURAL DAMAGE ASSESSMENT OF CARBON-EPOXY COMPOSITES WITH AND WITHOUT RESIN FLOW CHANNELS** *Kanjasna M. Karumbaiah (University of Auckland), Christoph. Kracke (BMW Group), Mark Battley (University of Auckland), Simon Bickerton (University of Auckland), Tom Allen (University of Auckland)*	4305-1 **BREAKING THE COMPROMISE BETWEEN NANOFILLER LOADING AND DISPERSION IN POLYMER NANOCOMPOSITES** *Giovanni Santagiuliana (Queen Mary University of London), Olivier T. Picot (Queen Mary University of London, Nanoforce Technology Limited), Luca Rubini (University of Trento), Maria Crespo , Harshit Porwal , Yan Li , Hao Zhang (Queen Mary University of London, Nanoforce Technology Limited), Nicola M. Pugno, (University of Trento), Ton Peijs (Queen Mary University of London, Nanoforce Technology Limited), Emiliano Bilotti (Queen Mary University of London, Nanoforce Technology Limited)*	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4307-1 **BIOCOMPOSITES FROM HEMP FIBERS AND ACRYLATED EPOXIDIZED SOYBEAN OIL-BASED REINS** *Wendi Liu, Ming-en Fei, Fenhui Qiu (Fujian Agriculture and Forestry University)* Green composites were developed from hemp fibers and soybean oil-based thermosetting resins, and a bifunctional isosocyanate monomer was used to improve the properties of the composites.	4308-1 **FATIGUE BEHAVIOR OF PSEUDO-DUCTILE THIN PLY HYBRID COMPOSITES** *Putu Suwarta (University of Bristol), Mohamad Fotouhi (University of Bristol), Gergely Czel (Budapest University of Technology and Economics, University of Bristol), Michael R. Wisnom (University of Bristol)* The fatigue behavior of pseudo-ductile thin ply hybrid composites in two loading conditions, before and after the Fragmentation initiation load level is being studied in this paper.	4309-1 **UNIT CELLS FOR THERMAL CONDUCTION CALCULATION OF TEXTILE REINFORCED COMPOSITES** *Jian-Jun Gou (Xi'an Jiaotong University), Xing-Jie Ren (Xi'an Jiaotong University), Shuguang Li (University of Nottingham), Wen-Quan Tao (Xi'an Jiaotong University)* Formulation rules of unit cells for thermal calculations of textile reinforced composites is proposed and clarified.	4310-1 **TOWARDS A DESIGN GUIDELINE FOR CORNERS IN COMPOSITE PARTS (INVITED TALK)** *Pascal Hubert (McGill University), Jan Schubert (University of Auckland), Simon Bickerton (University of Auckland), Chris Hickey (Southern Spars)* In this paper, a practical design development approach is proposed that can be complemented in a structural design tool for the sizing of laminates with corners and their tooling.	4311-1 **PREDICTIONS AND MEASUREMENTS OF THE VISCOELASTIC RESPONSE OF UNIDIRECTIONAL FIBER COMPOSITES** *Menah V. Pathana, Vasilios Pataxias, Vito L. Tagarielli (Imperial College London)* Numerical predictions of the anisotropic viscoelastic response of fibre composites are obtained using analysis of representative volume elements and are compared to the experimental results and theoretical models. A new analytical formulation is proposed to predict the anisotropic response of fibre composites with similar accuracy as the numerically intensive Monte-Carlo simulations.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
4212-3 **MECHANICAL PROPERTIES OF RADAR-ABSORBING STRUCTURE WITH NICKEL-ELECTROLESS-PLATED GLASS FABRIC** *Min-Su Jang, Young-Woo Nam, Ike-Hyun Cho, Chun-Gon Kim(Korea Advanced Institute of Science and Technology)* This paper discusses the effectiveness of using CNT as a filler on a surface coating in improving the resistance to environmental effects of a space structure employed in the Low Earth Orbit. The structures are tested for environmental parameters like Atomic Oxygen, Thermal Cycling, High Vacuum, Ultraviolet Radiation and Hypervelocity Debris Impact.		4214-3 **A REPAIR METHOD OF DELAMINATED COMPOSITE STRUCTURES USING MICRO BOLTS** *Sang-Seon Park, Goo-Seok Kang, Jin-Hwe Kweon(School of Mechanical and Aerospace Engineering, Gyeongsang National University, Jinju, Gyeongnam 660-701, Korea)* A new method for repairing composite with delamination has been proposed. Micro bolts were used for repair. The strength recovery rate of the repaired composite laminates was verified through the FEA and tensile test.	4215-3 **STUDY ON PRODUCTION TECHNOLOGY AND PERFORMANCE OF THE CARBON FIBER REINFORCED COMPOSITE PLATE BY PULTRUSION FOR POWER BLADES** *Haichao Huang (Weihai Guangwei Composites Co.,Ltd)* In this paper,the application of carbon fiber composites for wind power is analyzed, and the pultrusion process of composites is briefly introduced. This paper explores the difficulties and problems encounted in the production of the carbon fiber reinforced composite palte by pultrusion. The carbon beam products with uniform and orderly structure were developed by the improved pultrusion technology, and the mechanical properties test proves that this carbon fiber reinforced composite plate can meet the performance requirement.	4216-3 **A STUDY ON FATIGUE CHARACTERISTICS OF SCARF JOINT REPAIRED COMPOSITE LAMINATE UNDER VARIOUS TEMPERATURE ENVIRONMENTS** *Hyeon-seok Choe, Gwang-eun Lee and Byeong-su Kwak, Jin-hwe kweon (School of Mechanical and Aerospace Engineering, Gyeongsang National University, Jinju, Gyeongnam 660-701)* In this study, the fatigue behaviors of scarf adhesive joints are examined with the focus on various thermal conditions and adhesive bonding methods. Four considered environmental conditions were RTD (23±5), 45~55% relative humidity (RH), 75°C, 100°C and 125°C. Two bonding methods were co-bonding and secondary bonding method. All test data are compared with the strength of reference specimen without thermal exposure and repaired. We believe the test results could serve as the important data to design the composite structures exposed to thermal environment.	4217-3 **AN EXPERIMENTAL EVIDENCE OF THE WILLIS-FORM EQUATIONS AND THE RELATED APPLICATIONS** *Zhi Xiang , RW Yao, HX Gao, YX Sun , XD Yuan (Tsinghua University)* 1. The experimental evidence of static Willis-form equations is presented. 2. Based on the Willis-form equations, one can identify the initial stress through plate thickness.	4218-3 **EFFECT OF DEGREE OF CURE AND TIME ON VISCOELASTIC POISSON'S RATIO** *Sibin Sseeendran (Swerea SICOMP), Maciej Wysocki (Swerea SICOMP), Janis Varna (Luleå University of Technology)* The effect of degree of cure and time on the viscoelastic Poisson's ratio of a neat resin is investigated in this work by relaxation testing of specimens.	4219-3 **ON A FEW ADDITIONAL CONSIDERATIONS FOR APPLYING DENSITY-TYPE TOPOLOGY OPTIMIZATION TO THE CASE OF ADDITIVE MANUFACTURING OF FIBER REINFORCED COMPOSITES** *Kohji Suzuki (China Institute of Technology)* In this study, the present author tries to raise awareness of this issue and also attempts to formulate an extension or a generalization of the existing density-based topology optimization scheme.	4220-3 **KNITTABILITY AND OXYGEN PLASMA TREATMENT ON POLYIMIDE FIBERS** *Fangbing Lin, Jinhua Jiang, Nanliang Chen, Xiaodong Du, Chuanli Su (Donghua University)* In order to improve the knittability of the high-performance polyimide fibers, it was used oxygen plasma to treat the fiber surface to enhance the interfacial compatibility between the fiber and resin and a traditional method of coating polyimide resin on the fiber. Furthermore, the fibers with better knittability and the fabric with good appearance characteristics were obtained.		
Lunch										
PLENARY LECTURE at Qujiang Auditorium: **Composite Material Applications to Industries in China** Zhongmin Xue, Sinoma Science & Technology Co., Ltd, China										
KEYNOTE at Qujiang Auditorium: **Smart Materials and Structures: From Morphing Aircraft to Nanoscale Magnetoelectricity** Christopher S. Lynch, University of California, Los Angeles, USA KEYNOTE at Lily Hall: **Static and Fatigue Study of Aircraft Composite Structures in the Post-Buckling Field** Chiara Bisagni, Delft University of Technology, Netherlands KEYNOTE at Rose Hall: **Hierarchical Composite Materials:Structural and Multifunctional Opportunities** Milo Shaffer, Imperial College London, UK										
Coffee Break										
4312 Sandwich Structures and Materials 7	4313 X-Ray Computed Tomography 2	4314 Constitutive Models 2	4315 Processing-Manufacturing Technologies 3	4316 Sensing and Self-Diagnosis 1	4317 Acoustic Meta-Composite 4	4318 Process Induced Effects 3	4319 Additive Manufacturing 4	4320 Fibers 2	4321 Smart Structures 1	
4312-1 **INDENTATION FAILURE OF FOAM CORED SANDWICH STRUCTURES SUBJECTED TO ELEVATED TEMPERATURES** *Tobias Laux, Ole Thybo Thomsen(University of Southampton)* The paper explores the detrimental effect of elevated temperatures on local indentation failure of polymer foam cored sandwich structures.A simple analytical model to predict the local top face shed deflections and interfacial normal stresses at elevated temperatures is presented and validated against experimental observations and finite element models.	4313-1 **DIGITAL VOLUME CORRELATION ANALYSIS FOR A CROSS-PLY LAMINATED COMPOSITE STRUCTURE USING A FULLY 3D-BASED CORRELATION ALGORITHM** *Sooyoung Lee, Eonyeon Jo, Wooseok Ji (Ulsan National Institute of Science and Technology)* In this research, fully 3D-based in-house DVC algorithm was developed and applied for the displacement field mapping on the whole volume of interest of unidirectional Carbon-Epoxy laminated composite specimen under in situ tensile loading imaged in a high-resolution X-ray microscope.	4314-1 **AN INVARIANT-FREE FORMULATION OF ANISOTROPIC *HYPERELASTICITY*** *David C. Kellermann, Mario M. Attard (UNSW Sydney)*	4315-1 **MOLDING CONDITION FOR SHORTENING MOLDING TIME DURING PULTRUSION MOLDING OF THERMOPLASTIC COMPOSITES** *Asami Nakai, Kyuso Morino (Gifu University)* The purpose of this study is to increase the pultrusion speed by decreasing the pultrusion force for continuous fiber reinforced thermoplastic composite pipes.	4316-1 **DAMAGE DETECTION FOR COMPOSITES USING A BAYESIAN REGULARIZATION-BASED ELECTRICAL IMPEDANCE TOMOGRAPHY TECHNIQUE** *Gang Yan (Nanjing University of Aeronautics and Astronautics), Zhoujie Yang (Nanjing University of Aeronautics and Astronautics), Yiu-Wing Mai (The University of Sydney), Hao Sun (Massachusetts Institute of Technology)*	4317-1 **DEEP-SUBWAVELENGTH SOUND ABSORBING ACOUSTIC METAMATERIALS (INVITED TALK)** *Xiaobing Cai , Jun Yang(The University of Western Ontario)*	4318-1 **THE INFLUENCE OF RESIN STARVED AREA MANUFACTURING IMPERFECTIONS ON THE MECHANICAL PERFORMANCE OF NON-CRIMP FABRIC CFRP LAMINATE** *Susanne Hörmann, Ayk Adumitroaie, Christoph Kralovec, Martin Schagerl (Johannes Kepler University Linz)* Resin starved areas or dry spots are considered a severe manufacturing defect in resin transfer molded composite parts, thus often leading to rejects. In this work, the damage processes of specimens with introduced resin starved and dry areas are investigated under static and fatigue loading using 3D digital image correlation.	4319-1 **PREPARATION AND PROPERTIES OF SLA AND FDM 3D PRINTED POLYMER NANOCOMPOSITES** *Lixin Wu, Zixiang Weng, Yu Zhou (Chinese Academy of Sciences)*	4320-1 **BASALT FIBER WITH PYROLYTIC CARBON COATING FOR SENSORY APPLICATIONS** *Bin Hao, Peng-Cheng Ma (Chinese Academy of Sciences)* Basalt fiber with a thin layer of pyrolytic carbon coating was developed, and the material could be used as both reinforcement for FRPs and sensor to monitor the damage in composites.	4321-1 **DESIGNING ULTRASENSITIVE AND STRETCHABLE STRAIN SENSORS BY TAILORED FRAGMENTATION OF CARBON-BASED CONDUCTORS (INVITED TALK)** *G. Lubineau, Y. Xin, X. Xu, J. Zhou (King Abdullah University of Science and Technology (KAUST))* Stretchable sensors are needed for emerging applications such like wearable electronics, artifical e-skins. They should show good perfromance in sensitivity, stretchability and linearity. Our strategy here is to develop a new family of sensors taking advantage of the special properties of fragmented carbon-nanoparticles based geometries.	

Thursday 24 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
16:00	4301-2 **THE EFFECT OF BOUNDARY CONDITIONS ON THE GENERAL MECHANICAL BEHAVIOR OF SOFT MATERIALS** *Mengzhou Chang, Zhengjing Wang* (Harbin Engineering University) In this work, a model is proposed extending the basic concept of particle of continuum mechanics combining electric properties. The Gaussian statistics which is used for the single entropic chain, is used for the derivation of the models consisting of complex geometry (internal bubble, crack and particle).	4302-2 **IN-SITU SYNTHESIS OF GAMMA AL2O3 WHISKERS REINFORCED ALUMINUM MATRIX COMPOSITE** *Xiaojun Du, Fucheng Wang, Tianshuai Wang, Chunsheng Shi, Naiqin Zhao* (Tianjin University) In our work, AMCs reinforced by in situ generated gamma AlO3 whiskers were fabricated from a single Al-H3BO3 system through reaction hot pressing (RHP) or sintering after cold pressing (SCP) techniques. We compared the merits and demerits of different methods, and investigated the influence of ball milling parameters, temperature and raw material proportion on the morphology of gamma-AlO3 whiskers.	4303-2 **COMPRESSION FATIGUE OF WIND TURBINE BLADE COMPOSITES MATERIALS AND DAMAGE MECHANISMS_A FRAISSE_P BRONDSTED** *Anthony Fraisse, Povl Brondsted* (Technical University of Denmark) The current paper focuses on the compression fatigue properties for wind turbine blades. An optimization study and compression damage mechanisms are presented for two different laminates architectures, leading to low variance test results which allow improved design values.	4304-2 **MULTI-IMPACT DAMAGE AND CAI CAPABILITY ON COMPOSITE LAMINATES** *Xiaoyu Zhang, Fei Xu, Weiyang Li* (Northwestern Polytechnical University) This paper focus on the hail impact damage and bearing capacity after impact for composite laminate under multi-impact. A numerical model is established for predicting the damage evolution of laminates and CAI capacity is also obtain with these models.	4305-2 **THE USE OF 3D GRAPHENE NETWORKS FOR THE CREATION OF BIO-INSPIRED SELF-MONITORING TOUGH CERAMIC NANOCOMPOSITES** *Olivier T. Picot* (Queen Mary University of London), *Victoria G. Rocha* (Imperial College London), *Claudio Ferraro* (Imperial College London), *Na Ni* (Imperial College London), *Eleonora D'Elia* (Imperial College London), *Sylvain Meille* (Université de Lyon), *Jerome Chevalier* (Université de Lyon), *Theo Saunders* (Queen Mary University of London, Nanoforce Technology Limited), *Mike J. Reece* (Queen Mary University of London, Nanoforce Technology Limited), *Tom Peijs* (Queen Mary University of London) Bioinspired design concepts have been employed to promote toughness in ceramic-based composites using graphene as a means to engineer a fine 3D network of weak interfaces that provide fracture resistance throug mechanisms such a crack deflection, electrical conductivity, and damage sensing capability.	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4307-2 **EFFECT OF FUNGI ON THE PROPERTIES OF JUTE/POLY(LACTIC ACID) COMPOSITES** *Ding Ding,Tao Yu, Yan Li* (Tongji University) Effect of fungi on jute/PLA composites prepared by extrusion and injection moulding were studied by mechanical test,GPC,SEM etc.	4308-2 **COMBINING NON-LINEARITY OF ANGLE-PLIES AND FIBRE FRAGMENTATION IN CARBON FIBRE LAMINATES UNDER COMPRESSIVE LOADING** *X. Wu, J.D. Fuller, M.R. Wisnom* (University of Bristol) A thin ply angle-ply laminate with internal cracks has been experimentally tested via an indirect compressive test method using a sandwich beam. The laminate exhibited a non-linear compressive response and the single complete delamination within the laminate was inhibited.	4309-2 **SCALING EFFECTS IN THE LOW VELOCITY IMPACT RESPONSE OF CFRP LAMINATES** *Z.W. Xu* (University of Liverpool), *F.J. Yang* (University of Liverpool), *Z.W. Guan* (University of Liverpool, South China University of Technology), *W.J. Cantwell* (Khalifa University) This paper presents an experimental investigation of scaling effects in the low velocity impact response of plain woven CFRP laminates. It is found that impact damage in this type of material does not obey simple scaling laws, with damage becoming more severe in the larger scale sizes.	4310-2 **WARPAGE PREDICTION IN OVER-INFUSION PROCESS OF GLASS/POLYESTER COMPOSITE LAMINATES (INVITED TALK)** *Ismet Baran* (University of Twente) The current work presents a combined experimental and modelling effort to develop a fundamental understanding of the warpage formation during the over-infusion process.	4311-2 **INITIAL CRUSH STRESS OF CELLULAR MATERIALS UNDER DYNAMIC LOADINGS** *Zhijun Zheng* (University of Science and Technology of China), *Peng Wang* (University of Science and Technology of China), *Shilong Wang* (University of Science and Technology of China), *Changfeng Zhu* (University of Science and Technology of China), *Yuanyuan Ding* (Ningbo University), *Jilin Yu* (University of Science and Technology of China) The controversial issue on the initial crush stress of cellular materials is solved by using the direct local stress and strain information obtained from cell-based finite element models.
16:20	4301-3 **INTERFACIAL MICROSTRUCTURE AND PROPERTIES OF MODIFIED CARBON FIBER REINFORCED HYBRID MATRIX COMPOSITES** *Salman Khalid, M. N. Prabhakar, Gibeop Nam, Jung-il Song* (Changwon National University) The research focused on fabrication of flame retardant thermoplastic starch green composites by utilizing low cost starch, flax fabric and chitosan through compression molding technique.	4302-3 **PROCESSING AND MECHANICAL PROPERTIES OF IN-SITU MAGNESIUM MATRIX COMPOSITES CONTAINING NANO-SIZED POLYMER DERIVED SiCNO PARTICLES** *Nagaraj M Chellaih* (Indian Institute of Technology Ropar), *M.K. Surappa* (Indian Institute of Science) A liquid polymer is injected into molten magnesium to produce in-situ SiCNO particles by stir casting method. These in-situ particles are homogenously dispersed by friction stir processing for enhacing the mechanical properties of the Mg matrix composites.	4303-3 **THERMO-MECHANICAL BEHAVIOR OF A THERMOPLASTIC REINFORCED WITH DISCONTINUOUS GLASS FIBERS** *B Lopez* (University of Southern Brittany, Renault SAS), *S. Thuillier* (University of Southern Brittany), *Y. Grohens* (University of Southern Brittany) In order to have a reliable virtual design of industrial parts it is necessary to find a good representation of the non-linear thermo-mechanical behavior of injected thermoplastics reinforced with discontinuous fibers. Two phenomenological models are considered and the material parameters are identified using an inverse methodology over an experimental database at further temperatures.	4304-3 **TORSIONAL FAILURE OF BRAIDED COMPOSITE TUBES STUDIED BY X-RAY COMPUTED TOMOGRAPHY** *Yuan Chai, Ying Wang, Keshari Yogesh Prasad, Potluri, Phillip I. Withers* (University of Manchester) In this project, the braid structure and the damage modes of composite tube under torsion were assessed by X-ray CT, which allows to establish relations between micro-damage mechanisms and micro-structure of tubular composites.	4305-3 **IMPROVING THE MECHANICAL, THERMO-MECHANICAL PROPERTIES AND THERMAL CONDUCTIVITY OF CARBON FIBER/ EPOXY LAMINATES BY INCORPORATING HALLOYSITE/ CARBON NANOCOMPOSITES** *Xueping Wu* (Hefei university of technology) HNT/CS was introduced into carbon fiber/epoxy composites to improve dispersion of HNT/CS and interface bonding between HNT/CS and epoxy, there by, the mechanical, thermo-mechanical properties and thermal conductivity of carbon fiber/epoxy composites were improved.	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4307-3 **FLEXURAL BEHAVIOR OF A BIO-BASED SANDWICH STRUCTURE MANUFACTURED BY LIQUID RESIN INFUSION** *Arthur Monti* (Université du Maine), *Abderrahim El Mahi* (Université du Maine), *Zouhaier Jendli* (Ecole Supérieure des Techniques Aéronautiques et de Construction Automobile), *Laurent Guillaumat* (Ecole nationale supérieure d'arts et métiers) Bio-based sandwich structures are good material candidates to face further industrial challenges, especially if high stiffness or strength to mass ratios are expected. In this context, this paper presents the manufacturing and the flexural properties of a sandwich made up with thermoplastic skins reinforced with flax fibres and a balsa core.	4308-3 **THREE-DIMENSIONAL SIMULATION OF PSEUDO-DUCTILE BEHAVIOR OF ANGLE-PLY AND CROSS ANGLE-PLY LAMINATES** *Xi Deng, Wen-Xue Wang, T. Matsubara* (Kyushu University) This paper proposes a three-dimensional (3-D) mesoscale model for the finite element analysis of CFRP angle-ply [±q]2s and cross angle-ply [0/-q/ (90- q)/(90- q)]s laminates, of which one ply contains three fiber layers. Nonlinear behaviors and pseudo ductility of the laminates loaded under quasi-static tension are well simulated.	4309-3 **FABRICATION OF PD/SiOC NANOFIBER WITH EXCELLENT MECHANICAL PROPERTY** *Nan Wu* (National University of Defense Technology), *Yingde Wang* (National University of Defense Technology), *Frank Ko* (University of British Columbia) The robust flexible SiOC-xPd nanofibrous membranes were successfully prepared through electrospinning followed by pre-oxidation and pyrolysis process. The smaller pore size and pinning effect by the formed Pd@PdO core-shell nanoparticles contributed mostly to the enhanced mechanical properties.	4310-3 **THERMAL MODELLING OF EXTRUSION BASED ADDITIVE MANUFACTURING OF COMPOSITE MATERIALS** *M. L. JENSEN, M. R. SONNE, J. SPANGENBERG, J. H. HATTEL, H. N. HANSEN* (Technical University of Denmark)	4311-3 **FABRICATION OF FIBER-STEEL LAMINATES BY OPTIMIZING MANUFACTURING PROCESS PARAMETERS AND STUDY THE IMPACT BEHAVIOUR** *Byung-Jin Park, Dong-Woo Lee, Jung-Il Song* (Changwon National University).

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
4312-2 **ANALYSIS OF NONLINEAR BEHAVIOR ON HONEYCOMB CORES** *J.D.D. Rodriguez Ramirez, B. Castanié, C. Bouvet* (Université de Toulouse)	4313-2 **IN SITU OBSERVATION OF MULTIPLE FAILURE MODES IN CARBON-EPOXY LAMINATED COMPOSITES USING 3D MICRO-COMPUTED TOMOGRAPHY** *Eimyeon Jo, Woosegk Ji, Sooyoung Lee* (Ulsan National Institute of Science and Technology) In situ mechanical behabior on the laminated composite material was investigated using 3D micro-computed tomography.	4314-2 **APPLICATION OF A MULTI-SCALE CONTINUUM DAMAGE MECHANICS MODEL FOR THE PREDICTION OF DAMAGE IN TEXTILE COMPOSITES** *T. YU* (AECC COMMERCIAL AIRCRAFT ENGINE CO.LTD), *S. LI* (POLYMER COMPOSITE RESEARCH GROUP), *E. SITNIKOVA* (POLYMER COMPOSITE RESEARCH GROUP)	4315-2 **DEVELOPMENT OF BENDING PROCESS FOR FRTP PIPE** *TATSUYA BANNO, YAGI MASAOKI, KYUSO MORINO, ASAMI NAKAI* (GIFU UNIVERSITY) The integrity of the composite structure have been investigated in the case of glass fiber reinforcement is examined by light intensity measurement and in case of carbon fiber reinforcement it is achieved by electrical resistance measurement.	4316-2 **HEALTH MONITORING OF HIGH PERFORMANCE POLYMER COMPOSITES WITH MULTIFUNCTIONAL FIBERS** *Tibor Czigany, Norbert Fiorimo, Gergely Hegedus* (Budapest University of Technology and Economics) The integrity of the composite structure have been investigated in the case of glass fiber reinforcement is examined by light intensity measurement and in case of carbon fiber reinforcement it is achieved by electrical resistance measurement.	4317-2 **TRANSMISSION PROPERTIES OF ANISOTROPIC PENTAMODE MATERIAL AND FILTERING APPLICATION ON ELASTIC WAVE** *Mingye Zheng, E Song , Xiaoning Liu* (Beijing Institute of Technology)	4318-2 **GFRP MECHANICAL BEHAVIOUR INDUCED BY A MESOSCOPIC SHAPING DEFECT** *C. Cruanes* (Tours university), *A. Shanwan* (Orléans university), *S. Allaoui* (Orléans university), *S. Méo* (Tours university), *M.-P. Deffarges* (Tours university), *E. Lacroix* (Tours university), *G. Hivet* (Orléans university) This experimental research investigated the effect of mesoscopic defects of shaping processes on composite properties. A protocol was developed to fabricate specimens with calibrated defects that were tested in fatigue and the results were compared to healthy ones.	4319-2 **INNOVATIVE PROCESS CHAIN FOR THE PRODUCTION OF FIBER-REINFORCED FUNCTIONAL COMPONENTS BASED ON SANDWICH STRUCTURES BY ADDITIVE MANUFACTURING** *Christian Dörsch, Heiko Roemann, Matthias Lindemann* (Fraunhofer IWES) In the research project Additive Sandwich Manufacturing (ASAM) an innovative generative manufacturing process for large light weight parts and componentswill be developed using additive and subtractive technologies for fiber reinforced thermosets on the basis of polyurethane (PUR) which have to be adapted to the new process. A complete new process chain has to be developed including material mixing and application head, integrated printing and CAM software for 6-axis application and multi material application.	4320-2 **CONDUCTIVE GLASS FIBER COATED WITH GRAPHENE PREPARED BY DIP COATING METHOD** *Minghe Fang, Yabin Hao, Xuhai Xiong, You Zeng* (Chinese Academy of Science) Continuous and compact graphene coating was successfully obtained via dip-coating. The volume conductivity of such graphene coated glass fiber is approximately 3 S/cm.	4321-2 **A PROBABILISTIC APPROACH TO STRUCTURAL HEALTH MONITORING OF AIRCRAFT NACELLES: IMPLEMENTATION AND VALIDATION (INVITED TALK)** *Nazih Marchal, Marc Rebillat, Mikhail Guskov* (UMR CNRS 8006, Arts et Métiers ParisTech (ENSAM)) The present work aims to assess the implementation of an embedded structural health monitoring (SHM) system enabling condition-based maintenance of composite aircraft nacelles. It describes the complete process from the choice of the active elements to the implementation of the SHM strategy by means of elastic waves on an A380 nacelle and analysis of the results obtained after experimentation on substructures with actual size preparing a flight test campaign.	
4312-3 **LARGE DEFORMATION OF SANDWICH PLATE WITH MIURA-ORI FOLDED CORE UNDER QUASI-STATIC LOADING** *X.M. Xiang*(Swinburne University of Technology)&*Tianjin Chengjian University*), *G. Lu**, *D. Ruan*(Swinburne University of Technology), *Z. You*(University of Oxford) Large deformation of sandwich panels with Miura-ori foldcore under three point bending and uniformly distributed pressure loading was investigated by means of finite element analysis. Performance of such panels was found to be comparable with sandwich panels with honeycomb core.	4313-3 **IMAGING OF COMPOSITES BY HELICAL X-RAY COMPUTED TOMOGRAPHY** *Ying Wang* (University of Manchester), *Kristine M. Jespersen* (Technical University of Denmark), *Grzegorz Pyka* (FEI Czech Republic s.r.o.), *Lars P. Mikkelsen* (Technical University of Denmark), *Philip J. Withers* (University of Manchester) Helical X-ray CT could provide extended information in one direction with sufficient details, allowing to observe overall macro-damage and locate local micro-damage simultaneously. This strategy proves effective to track fatigue damage evolution in unidirectionally reinforced fibre composites and could be applicable to time-lapse study of fibre reinforced composites under a wide range of testing scenarios.	4314-3 **EXPERIMENTAL INVESTIGATION ON STRAIN-RESISTANCE CHARACTERISTICS OF CARBON NANOTUBE FIBERS AND THEIR MULTI-PLY WIRES** *Fu-Qing Liu, Qing-Sheng Yang, Xia Liu* (Beijing University of Technology) Experimental investigation on strain-resistance characteristics of carbon nanotube fibers and their multi-ply wires, demonstrating potential application in sensing technology.	4315-3 **EFFECT OF MOLDING CONDITION ON MECHANICAL PROPERTIES IN INJECTION AND COMPRESSION HYBRID MOLDING** *Masahiro Funahashi, Kenya Morie, Asami Nakai, Masaki Ohishi* (GIFU University) Hybrid molding is a molding method combining injection molding and press molding. Mechanical properties of molded articles were evaluated by changing molding conditions.	4316-3 **FLEXIBLE STRAIN SENSOR BASED ON CMS/SILICONE COMPOSITE FOR HUMAN HEALTH AND MOTION DETECTION** *X. G. YU, Y. Q. LI, S. Y. FU* (CHONGQING UNIVERSITY) In this work, the fabrication of wearable strain sensor for human motion detection is first demonstrated with commercial available nano-sponge as starting material.	4317-3 **TUNABLE ACOUSTIC METAMATERIAL WITH AUXETIC BEHAVIOR** *Jia-Hao He , Hsin-Haou Huang* (National Taiwan University)	4318-3 **INFLUENCE OF STRAND DIMENSION AND DISPERSION METHOD ON RIGIDITY AND ITS SCATTER OF HAT SHAPED SPECIMENS MADE OF RANDOMLY-ORIENTED STRANDS** *Hideki Toyoda, Hirofumi Suganuma, Shinichiro Yamashita, Takahiro Hayashi, Michinobu Fujita, Jun Takahashi* (The University of Tokyo) Rigidity of hat shaped specimens made of randomly-oriented CFRTP strands was investigated. Sheet stacking method reduced scatter of rigidity and thinner tapes improved flexural rigidity and reduced its scatter.	4319-3 **THREE-DIMENSIONAL PRINTING OF CONTINUOUS CARBON FIBER REINFORCED THERMOPLASTICS BY IN-NOZZLE IMPREGNATION WITH COMPACTION ROLLER** *Ryo Omuro* (Nihon University), *Masahito Ueda* (Nihon University), *Ryosuke Matsuzaki* (Tokyo University of Science), *Akira Todoroki* (Tokyo Institute of Technology), *Yoshiyasu Hirano* (Japan Aerospace Exploration Agency) 3D printing technique for continuous carbon fiber reinforced thermoplastic (CFRTP) has been developed based on fused deposition modeling. The tensile and bending tests were performed to investigate the mechanical properties of the 3D printed unidirectional CFRTP specimens.	4320-2 **PROFILING STRUCTURE–MECHANICAL HETEROGENEITY OF PAN CARBON FIBER ALONG RADIUS DIRECTION** *Lifeng Hao, Ping Peng, Weicheng Jiao, Rongguo Wang, Xiaodong, He* (Harbin Institute of Technology) We report the study of the correlation between the structure and mechanical property of T700 carbon fiber monofilaments via radius profiling. It is found that, the maximum of the modulus is at a radius of 1.8μm, instead of at the surface as usually assumed.	4321-3 **FLEXIBLE PIEZOELECTRIC DEVICE BASED ON HIGH-QUALITY PIEZOELECTRIC NANOFIBERS** *Feifei Wang, Yanxue Tang, Xianyoung Zhao, Zhihua Duan, Tao Wang, Wangzhou Shi* (Shanghai Normal University)	

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Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
16:40	4301-4 **GRAPHENE FOAM/ CONDUCTIVE POLYMER COMPOSITES FOR LIGHTWEIGHT ELECTROMAGNETIC INTERFERENCE SHIELDING** Ying Wu, Zhenyu Wang, Xu Liu, Xi Shen, Qinghin Zheng, Jang-Kyo Kim, (The Hong Kong University of Science and Technology) Ultralight graphene foam/poly(3,4-ethylenedioxythiophene): poly(styrenesulfonate) composites with excellent electromagnetic interference shielding are developed. The excellent electrical conductivities, the porous structure, and the effective charge delocalization are mainly responsible for the predominant contribution to microwave attenuation by absorption.	4302-4 **RESIDUAL STRESS IN NB3SN SUPERCONDUCTOR STRAND INTRODUCED BY STRUCTURE AND STOICHIOMETRIC DISTRIBUTION AFTER HEAT TREATMENT** *Peng Jin (Tsinghua University), Lankai Li (Chinese Academy of Science) , Xide Li (Tsinghua University), Qiuliang Wang (Chinese Academy of Science), Junsheng Cheng, (Chinese Academy of Science)* This work highlights the importance of component distribution on the stress status of a superconducting strand, and can supplement the thermal mismatch model.	4303-4 **MECHANICAL PERFORMANCES OF PEKK COMPOSITE MATERIALS LINKED TO THE PROCESSING PARAMETERS** *T. Choupin (CNRS, Airbus Group Innovations), B. Fayolle (CNRS), G. Regnier (CNRS), C. Paris (Airbus Group Innovations), J. Cinquin (Airbus Group Innovations), B. Brulé (Arkema)* Crystallization modelling of PEKK thermoplastics composite has been investigated to predict crystallinity during composite part manufacturing. The impact of crystallinity on mechanical properties has been studied to determine best processing parameters for PEKK composite parts.	4304-4 **PROGRESSIVE FAILURE STRAIN MEASURMENT OF A COMPRESSION LOADED CARBON FIBER LAMINATE** *Jonas J. A. D'haen (BMW AG), Sebastian Kilchert, (Fraunhofer Institute for High-Speed Dynamics), Octavian Knoll (BMW AG), Michael May (Fraunhofer Institute for High-Speed Dynamics), Stefan Hiermaier (Fraunhofer Institute for High-Speed Dynamics)* A new approach to measure strain after initial failure in compressive loaded laminates using digital image correlation is presented.	4305-4 **EFFECT OF GRAPHENE NANOPLATELET THICKNESS AND CONCENTRATION ON THE TENSILE PROPERTIES OF EPOXY RESIN** *Zoi S. Metaxa (National Technical University of Athens), Philippe Poulin (University of Bordeaux), Zafeiroula Papakyriakou (University of the Aegean), Stavros K. Kourkoulis (National Technical University of Athens), Nikolaos D. Alexopoulos (University of the Aegean)* In the present work, the effect of graphene nanoplatelets (GNPs) addition on the mechanical and fracture characteristics of the resulting polymer nanocomposites is investigated. The results indicate that the GnPs type and concentration play an important role on the mechanical performance of the nanocomposites.	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4307-4 **IS HIERARCHY USEFUL IN NATURAL FIBRE COMPOSITES?** *Marta Fortea-Verdejo (University of Vienna), Elias Bumbaris (University of Vienna), Alexis Tonneau (University of Vienna), Koon-Yang Lee (Imperial College London), Alexander Bismarck (University of Vienna, Imperial College London)*		4309-4 **EFFECTS OF YARN PATH AND SUB-UNIT CELLS ON THE CHARACTERIZATION OF MECHANICAL PROPERTIES OF 3D BRAIDED COMPOSITE MATERIALS** *Aktürk, D., Ayranci, C., (University of Alberta)* This paper provides a new method and model for analyzing 3D Braids that accounts for undulations, and investigates the effects of the sub-unit cells on the mechanical properties of a 3D braided composite structure.	4310-4 **EXPERIMENTAL AND NUMERICAL ANALYSIS OF LASER REFLECTION FOR OPTICAL-THERMAL PROCESS MODELLING OF TAPE WINDING** *Amin Zaami, Ismet Baran, Remko Akkerman (University of Twente)* An experiment regarding the reflection pattern at the melting temperature has been reported, and the simulation for complex setup configurations of a LATW process is performed. The main goal is to have an accurate model for inline monitoring and quality assurance.	4311-4 **EXPERIMENTAL INVESTIGATION OF FREE OSCILLATION OF CARBON FIBER REINFORCED PLASTICS** *Hevik, Torsten; Motsch, Nicole; Hausmann, Joachim (Institute for Composite Materials (IVW GmbH))* Within this paper the free oscillations of carbon fiber reinforced plastics are measured by means of a torsion oscillating test.
17:00	4401 Polymer Matrix Materials 12	4402 Metal Matrix Composites 12	4403 Fiber-reinforced Composites 12	4404 Fracture and Damage 12	4405 Damage Tolerance of Composites Structures 1	Forum on Lightweight Structures and Composites	4407 Green Composites 2	4408 Ductile and Pseudo-ductile Composites 5	4409 Textile-Based Composites 5	4410 Process Modelling 3	4411 Dynamic Behavior 5
17:00	4401-1 **EFFECT OF SILYLATION OF CELLULOSE MICRO FIBRES ON THE MECHANICAL PROPERTIES OF POLYDIMETHYL SILOXANE COMPOSITES** *Aistė Lasauskaitė, Kristina Zukienė, Yrginija Jankauskaitė, (Kaunas University of Technology)*	4402-1 **ENHANCED TENSILE DUCTILITY OF METALLIC GLASS MATRIX COMPOSITES WITH NOVEL MICROSTRUCTURE** *Yunpeng Jiang (Nanjing University of Aeronautics and Astronautics)* A novel microstructure was designed to improve the tensile plasticity of bulk metallic glass.	4403-1 **MECHANICAL BEHAVIOUR OF GLASS FIBRE REINFORCED THERMOPLASTIC TAPES MADE OF RECYCLED POLYMERS** *F. Repel (Saxion University of Applied Sciences), N. Claussnitzer (Saxion University of Applied Sciences, Chemnitz University of Technology), F.W.J. van Hattum (Saxion University of Applied Sciences)* Feasibility study on glass fibre reinforced thermoplastic tapes made of post-consumer and post-industrial PP recyclates.	4404-1 **A COUPLED FEM/ PD BASED ON SUBSTRUCTURE METHOD FOR PROGRESSIVE DAMAGE ANALYSIS OF COMPOSITE LAMINATE** *Liu Shuo, Fang Guodong, Liang Jun (Harbin Institute of Technology, Beijing Institute of Technology)* A new method of coupling finite element method (FEM) and state-based peridynamic is proposed to analyze the progressive damage of fiber reinforced composite laminate.	4405-1 **STRUCTURAL REPONSE OF AEROSPACE-GRADE THIN-PLY WOVEN AND NON-CRIMP FABRICS** *Alberto Arteiro (Universidade do Porto), Giuseppe Catalanotti (Queen's University Belfast), Jose Xavier (Instituto de Ciencia e Inovacao em Engenharia Mecanica e Engenharia Industrial), Universidade de Tras-os-Montes e Alto Douro), Peter Linde (AIRBUS Operation GmbH), Pedro P.Camanho (Universidade do Porto & Instituto de Ciencia e Inovacao em Engenharia Mecanica e Engenharia Industrial)* An experimental test campaign was carried out to study the structural response of spread-tow fabrics (STFs) and thin-ply non-crimp fabrics (NCFs). Thin-STF laminates exhibited an improved tensile unnotched strength and superior performance in compression, while thin-ply NCFs exhibited improved structural response when the 0° plies were grouped together.	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4407-1 **THE HIGH PERFORMANCE DISCONTINUOUS FIBRE (HIPERDIF) METHOD FOR CARBON-FLAX HYBRID COMPOSITES MANUFACTURING** *Marco L. Longana, HaNa Yu, Kevin D. Potter (University of Bristol)* The High Performance Discontinuous Fibre (HiPerDiF) Method is used to produce flax and reclaimed carbon fibres hybrid composites. The produced material offers advantages in terms of vibration damping and wight and cost reduction.	4408-1 **PSEUDO DUCTILITY IN QUASI-ISOTROPIC CFRP THROUGH PLY WEAKENING** *J. Sun, D. Bacarreza, P. Robinson (Imperial College London)* Investigation on the potential of achieving pseudo-ductility in quasi-isotropic composite laminates through introduction of ply cuts.	4409-1 **EXPERIMENTAL INVESTIGATION OF THE TUFTED 3-DIMENSIONAL COMPOSITE REINFORCEMENT FORMING** *Peng Wang , Xavier Legrand, Damien Soulat, Lingshan Liu, Matthieu Tricaud (University of Lille)* To compared with multilayered composite reinforcement forming, the preforming behaviours of tufted 3D reinforcement in the hemispherical stamping process are studied and the significant influence of tufting yarns on the interply sliding and on the forming defects are analysed.	4410-1 **WINDING PROCESS MODELLING – VALIDATION THROUGH SPRING-IN PREDICTION** *Patrick Pirès, Jean Marc Dupillier, Lynam Corey (Airbus Safran Launchers)* This study proposes a winding process model where the behavior of the tow is more properly represented in order to better predict residual stresses which generate spring-in deformation. Sensitivity of some process parameters are studied and compared to experimental results.	4411-1 **PLY THICKNESS INFLUENCE IN IMPACT DAMAGE ON CAI CARBON/ EPOXY TEST SPECIMENS** *Thiago H. L. Pinto (UFVJM), Carlos A. Cimini Jr. (UFMG), Sung K. Ha (Hanyang University), Pedro H. Cabral (Embraer S.A.), Gustavo H. C. Silva (Embraer S.A.), Alex P. Prado (Embraer S.A.)* The aim of this study is to evaluate the effects of damage generated due to low velocity impact in carbon/epoxy composite laminates. Specifically, this study aims to map the ply thickness influence on the impact damage in carbon/epoxy composite compression after impact (CAI) test specimens, so that further predictions can be made for after impact loading schemes.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
4312-4 **NOVEL CRACK STOPPER CONCEPT FOR LIGHTWEIGHT FOAM CORED SANDWICH STRUCTURES – EXPERIMENTAL VALIDATION, FE-MODELLING AND POTENTIAL FOR USE IN STRUCTURES** *Georgios Martakos(Siemens Wind Power), Jens H. Andreasen(Aalborg University), Christian Berggreen (Technical University of Denmark), Ole Thybo Thomsen (University of Southampton)* The presents a novel peel stopper device for foam cored composite sandwich structures that is capable of arresting propagating face-sheet/core interface cracks. The validation is demonstrated through fatigue tests and fracture mechanics simulations.		4314-4 **STUDY ON GLASS TRANSITION TEMPERATURE OF GRAPHENE REINFORCED SHAPE MEMORY POLYMER BY MOLECULAR DYNAMICS SIMULATIONS** *Xueliao Zhang, Qingsheng Yang, Xia Liu (Beijing University of Technology)* In this work, the glass transition temperature and shape memory behaviors of epoxy SMPs with graphene reinforced were investigated using a molecular dynamics (MD) method. The mechanical properties under uniaxial tension at different temperatures were obtained.	4315-4 **SYSTEM IMPROVEMENT FOR LASER-BASED TAPE PLACEMENT TO DIRECTLY MANUFACTURE METAL / THERMOPLASTIC COMPOSITE PARTS** *Tilo Peters, Christian Kukla, Henning Janssen, Christian Brecher (Fraunhofer Institute for Production Technology IPT)* The present work focuses on the flexible manufacturing of hybrid metal-UD tape parts. The combination of laser-textured high-strengths steel and GF-PA6 6 UD tape using the thermal joining process of laser-based in-situ tape placement with the aim to realise a part with optimum weight reinforcement and performance profile is discussed.	4316-4 **A HYBRID DAMAGE DETECTION METHOD FOR COMPOSITE PRESSURE VESSEL** *Tianxiang Huang, Kai-Uwe Schroder (RWTH Aachen University)* This paper reviews current structural health monitoring methods which are used for COPVs. In addition, a hybrid method which combining the mode shape curvature node method andstrain monitoring method is proposed and validated with FEM.	4317-4 **MEASUREMENT OF SURFACE ACOUSTIC WAVE USING AIR COUPLED TRANSDUCER AND LASER DOPPLER VIBROMETER** *Weitao Yuan, Dongbo Zhang, Jinfeng Zhao(Tongji University), Bernard Bonello(Institut des NanoSciences de Paris), Yongdong Pan, Zheng Zhong (Tongji University)* An air-coupled transducer is used to excite surface acoustic waves on an aluminium block, while another air-coupled transducer is adopted to record the leaky waves in association to the out-of-plane displacement. Measurements derived from the air-coupled ultrasonic method have good accordance as compared to the results attained by using a laser Doppler vibrometer.	4318-4 **MODELLING WRINKLING ONSET IN TEXTILE FORMING USING MEMBRANE ELEMENTS** *M. Y. Matveev, A. Endruweit, N. A. Warnior, D. S. A. De Focatiis, A. C. Long (University of Nottingham)* Textile forming simulations using membrane element models have lower computational cost compared to shell element models but may be inaccurate in predicting wrinkling occurrence. In this paper, an analytical approach is coupled with a membrane element model to predict the wrinkling onset in textile forming.	4319-4 **3D PRINTING OF INTEGRATED COMPOSITE HONEYCOMB SANDWICH STRUCTURES WITH CONTINUOUS CARBON FIBER** *Kentaro Sugiyama (Tokyo University of Science), Ryosuke Matsuzaki (Tokyo University of Science), Masahito Ueda (Nihon University), Akira Todoroki (Tokyo Institute of Technology), Yoshiyasu Hirano (Japan Aerospace Exploration Agency)*	4320-4 **STUDY OF CO-SOLVENT EFFECT ON THE DISSOLUTION OF CELLULOSE IN IONIC LIQUID AND THE PROPERTIES OF REGENERATED CELLULOSE FIBRES** *Chimchen Zhu, Anastasia Koutsomitopoulou, Jeroen Van Duijneveldt, Kevin Potter (University of Bristol)* We have dissolved a high concentration of microcrystalline cellulose in ionic liquid using dimethyl sulfoxide (DMSO) as co-solvent, and produced strong regenerated cellulose fibres from the optically anisotropic solution through dry-jet wet fibre spinning. This process presents a novel and economic route to convert a high concentration of microcrystalline cellulose into strong fibres, while reduces the processing time and cost significantly, which can potentially be used as high-performance fibres for composite materials as well as precursors for carbon fibres.	4321-4 **INTEGRATED STRUCTURAL HEALTH MONITORING OF LAMINATED COMPOSITES USING CARBON NANOTUBE FIBERS: STATIC AND DYNAMIC LOADING, AND VALIDATION** *J. L. Abot, J. C. Anike, J. H. Bills, D. Gonzalez, T. Kvisvikshvili, M. S. Atsubhani, K. Alba, S. P. Martin, V. C. Gonzaga, G. N. Oliveira, P. R. O. Silva, R. B. A. Navarro, V. R. Barbosa (The Catholic University of America), K. Belay (Florida A&M University), G. P. Behrmann (The Catholic University of America), E. Akay (The Catholic University of America)* This paper presents the results of an experimental study about localized damage detection in laminated composite plates using carbon nanotube (CNT) yarn sensors and its validation using integrated optical fibers monitored through optical time-domain reflectometry (OTDR) and post-mortem, by x-ray tomography imaging of the composite samples.	
4412 Sandwich Structures and Materials 8	4413 X-Ray Computed Tomography 3	4414 Constitutive Models 3	4415 Processing-Manufacturing Technologies 4	4416 Sensing and Self-Diagnosis 2	4417 Acoustic Meta-Composite 5	4418 Process Induced Effects 4	4419 Micro- and Nano-Scale Test Methods	4420 Fibers 3	4421 Smart Structures 2	
4412-1 **THE EFFECT OF ENTRAPPED AIR ON THE DYNAMIC RESPONSE OF NOMEX HONEYCOMB SANDWICH STRUCTURES UNDER FLATWISE COMPRESSION** *Han Feng, Longguan Liu (Shanghai Jiao Tong University)* Investigation of the effect of entrapped air on the dynamic response of Nomex honeycomb sandwich structures under flatwise compression. It is found that the entrapped air has little effect on the collapse strength and stiffness of the Nomex honeycomb, however, it has significant effect on the energy absorption capacity of the Nomex honeycomb.	4413-1 **MICROSTRUCTURE DEPENDENT DAMAGE MECHANISMS IN 3D USING X-RAY TOMOGRAPHY (INVITED TALK)** *M. Jerabek (Borealis Polyolefine GmbH), A. Amirkhanov (University of Applied Sciences Upper Austria), D. Salaberger (University of Applied Sciences Upper Austria), J. Kastner (University of Applied Sciences Upper Austria)* Computed tomography was utilized to determine fibre orientation, local displacement and damage mechanisms in interrupted tensile tests for two different fibre orientations.	4414-1 **PROBABILISTIC MULTISCALE METHOD CONSIDERING MULTIPLE RANDOM PARAMETERS IN CONSTITUTIVE MODELS OF MATERIAL PHYSICAL PROPERTIES** *Rn Wen, Hongling Ye, Qingsheng Yang (Beijing University of Technology)* In the paper, a general formulation of the first-order perturbation based stochastic homogenization(FPSH) method was presented in a discretized form by finite element method in order to consider multiple random parameters of the mechanical properties in the constitutive models in the numerical prediction of the homogenized macroscopic properties of arbitrary heterogeneous material with periodic microstructure.	4415-1 **LAMINATES WITH UNDER-OVER LACING MADE BY AUTOMATED FIBER PLACEMENT** *Minh Duc Hoang, Jeffrey Fortin-Simpson, Suong Van Hoa (Concordia University, Center for Research in Polymers and Composites (CREPEC))* In this paper, procedure to make triaxial composite laminates by Automated Fiber Placement (AFP) was introduced. Some mechanical properties for two types of tow-interlacing laminates made by AFP were measured and compared with traditional unidirectional layer laminate.	4416-1 **NANO-ENGINEERED FIBRE-REINFORCED COMPOSITES WITH A CAPABILITY OF SELF-MONITORING USING ULTRASONIC-WAVES** *Yehai Li, Yaozhong Liao , Zhongqing Su (The Hong Kong Polytechnic University)* In this paper we present a nano-engineered composite with a "dispersed" self-sensing network. The self-sensing capability of this composite is tested and verified by capturing guided ultrasonic waves.	4417-1 **PLATE TYPE ACOUSTIC METAMATERIALS** *Fuyin Ma, Juhui Wu(Xi'an Jiaotong University)* The experimental realization and theoretical understanding of ultrathin lightweight plate-type acoustic metamaterials structures have been presented and discussed in-depth, where in broadband excellent sound attenuation ability at low frequencies is realized by employing locally resonant effect. Some plate-type acoustic metamaterial structures with lumped coupling bending resonance effects are experimentally and theoretically proposed, which have excellent low frequency ultra-wideband sound insulation ability, and even without any mass block, strong sound attenuation up to nearly 99% is experimentally achieved.	4418-1 **PLY INTERFACE ANGLES TO PROMOTE AUTOMATED FORMING OF AEROSPACE STRUCTURES** *K. Johnson, R. Butler, E. G. Loukaides (University of Bath)* Avoiding wrinkle defects in automated forming processes using optimised ply interface angles within the laminate stacking sequence. Experimental work is supported by a theoretical model to predict ply deformation.	4419-1 **NANOSCALE ANALYSIS OF HUMAN HAIR BY AFM-IR NANOSPECTROSCOPY** *Lucien Bilstein (L'Oréal Research & Innovation), Ariane Denoet-Besseau, (University Paris-Sud), Alexandre Dazzi (University Paris-Sud), Nawel Baghdadli (L'Oréal Research & Innovation)*	4420-1 **STATIC ANODIC OXIDATION OF CARBON FIBERS USING VARIOUS ELECTROLYTES AND SUBSEQUENT CHEMICAL ANALYSIS OF THE CARBON FIBER SURFACE** *Matthias Bauer, Sergei Beratz, Fabian Schubert, Judith Moosburger-Will, Siegfried Horn (University of Augsburg)* The results in this work demonstrate the potential of sulfuric acid as alternative electrolyte solution in the anodic oxidation process of carbon fibers. The elemental and functional composition of the resulting carbon fiber surfaces is investigated by XPS.	4421-1 **HIGH PERFORMANCE PIEZO ELECTRIC NANOCOMPOSITE SENSOR NODES FOR STRUCTURAL HEALTH MONITORING** *Mohammad Fotouhi, Bill Xiao, Thomas Pozegic, Meisam Jalalvand, Ian Hamerton, Michael R Wisnom (University of Bristol)* This work presents an experimental study on improving the mechanical and electrical behaviour of AE sensors as embedded piezoelectric sensor nodes for SHM systems.	

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Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
17:20	4401-2 **RHEOLOGICAL CHARACTERIZATION OF THERMOSETTING RESIN SYSTEM WITH THERMOPLASTIC FUNCTIONAL LAYER** *W. Surjosejutro, G. Ziegmann (Clausthal University of Technology)* The research focused on the formation of semi interpenetrated polymer networks (SIPN) layer between thermoplastic and thermosetting polymers and its characterization using rheological approach.	4402-2 **SIMULATION OF COMPRESSIVE BEHAVIOUR OF GRAPHENE REINFORCED ALUMINIUM MATRIX COMPOSITES MICROPILLARS** *Yishi Su, Yang Yu, Zan Li, Qiang Guo, Zhiqiang Li, Genlian Fan, Dingbang Xiong, Di Zhang (Shanghai Jiao Tong University)* For the purpose of revealing the structural deforation mechanism of graphene/Al composites microplllars, numerical simulations compared with experimental results are carried out to indicate the effects of pillar size, base size, slope angle and graphene content on interfacial behavior of graphene/Al composites.	4403-2 **SURFACE FUNCTIONALIZED CNTS GRAFTED SHORT CARBON FIBERS IN CFRP COMPOSITES AS INTERLEAVING TOUGHENER AND DAMAGE SENSOR** *Xusheng Du (Jinan University, The University of Sydney), Heleci Zhou (The University of Sydney, Huazhong University Science and Technology), Hong-Yuan Liu (The University of Sydney), Huimin Zhou (Huazhong University Science and Technology), Yiu-Wing Mai, (The University of Sydney)* The carbon structures with functionalized CNTs grafted onto short carbon fibers were fabricated by one step flame synthesis method and their performance as toughener and crack sensor in CFRPs were reported.	4404-2 **EXPERIMENTAL STUDY ON THE LOW VELOCITY IMPACT RESPONSE OF CARBON-ARAMID HYBRID BRAIDED COMPOSITES** *Ying Sun, Shuguan Tian, Mengyun Tang, Zhijun Rong, Li Chen (Tianjin Polytechnic University)* Experimental study on the low velocity impact response of three different types of carbon-aramid hybrid braided composites was conducted.	4405-2 **HIGH-FIDELITY MODELLING OF DAMAGE MECHANISMS IN THROUGH-THICKNESS REINFORCED COMPOSITES** *A.R. Melro(Advanced Composites Centre for Innovation and Science University of Bristol),H.Cui,N. Petrinic(University of Oxford) ,I.K.Partridge,S.R.Hallett(Advanced Composites Centre for Innovation and Science University of Bristol)* A high-fidelity model of a composite through-thickness reinforced with a z-pin was generated in order to study and characterise the increase in damping tolerance brought by this type of reinforcement. Different mixed mode loading conditions (tension and/ or shear) were applied to the model and the apparent increase in toughness, as well as the different phenomena leading to this increase, were captured.	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4407-2 **OPTIMIZATION STUDIES ON THE SYNTHESIS AND CHARACTERIZATION OF BIO-BASED EPOXIDIZED SOYBEAN OIL (ESBO)** *Shaton Meadows, Mahesh Hosur, Alfred Tcheto-Narteh, Shaik Jeelani (Tuskegee University)* Cellulose and lignin were extracted from different plants by acid hydrolysis process. Cellulose was used to reinforced epoxy resin to improve its properties while lignin was used for the preparation of phenolic resin.	4408-2 **GROUPING SIMILAR FIBRE TYPES IN HYBRID DISCONTINUOUS COMPOSITE MATERIALS** *James Finley (Imperial College London), HaNa Yu (University of Bristol), Marco Longana (University of Bristol), Soraia Pimenta, (Imperial College London), Milo S.P. Shaffer (Imperial College London)* New experiments and modelling show that increasing the level of random intermingling prevents large clusters of broken fibres from forming, which maximises the strength and pseudo-ductility of hybrid discontinuous composites.	4409-2 **FORMABLE NANOCOMPOSITE MEMBRANES FOR ENERGY RECOVERY VENTILATORS** *Taesik Chae (University of British Columbia), Ryan Huizing (University of British Columbia, dPoint Technologies Inc), Frank Ko (University of British Columbia)* This study explored the development of a next generation energy recovery ventilator membrane with high heat and moisture transport, to improve the efficiency of energy recovery and savings while maintaining a high quality of indoor air.	4410-2 **NUMERICAL MODELLING OF THE BONDING PROCESS FOR WIND TURBINE BLADES: MODEL VALIDATION** *A. Ugal (Technical University of Denmark), J. Spangenberg (Technical University of Denmark), M. W. Nielsen (LM Windpower), M. R. Sonne (Technical University of Denmark), J. H. Hattel, (Technical University of Denmark)* In this study, a 3-D numerical model is developed in order to analyse adhesive propagation in squeeze flow problems with 3-D flow effects. The model is validated by comparison with an experiment where a rectangular prism shaped adhesive sample is squeezed between two parallel plates.	4411-2 **FEASIBILITY OF THE NVH SIMULATION OF REPRESENTATIVE CFRP AUTOMOTIVE BODY STRUCTURES** *T. Courtois (Autoneum Management AG), R. Stelzer (Autoneum Management AG), O. Chesa (Inspire ICS / ETH Zürich), M. Zogg (Inspire ICS / ETH Zürich), D. Golombowski (Dow Europe GmbH)* The introduction of CFRP components in the composition of vehicle bodies has an effect on structure borne noise disturbance. In that case, the FEM simulation can be used to anticipate and design specific countermeasures for body NVH.
17:40		4402-3 **DISLOCATION EMISSION RENDERS PLATE-REINFORCED METAL- MATRIX COMPOSITES SUPERIOR TO SPHERICAL AND FIBROUS REINFORCEMENTS** *Zhibo Zhang, Herbert M. Urbassek (University Kaiserslautern)* Through atomistic simulations, we observe dislocation emission from nanoplate reinforcements in metal matrix composites (MMCs). This underlying mechanism, almost absent in nanoparticle and nanofiber reinforcements, could contribute to both strength and ductility of MMCs and thus render plate reinforced MMCs superior to spherical and fibrous reinforcements.	4403-3 **MONITORING THE DELAMINATION OF LAMINATED STRUCTURES BY USING CNT BUCKYPAPER** *L. Liu, I. L. Shen (Tongji University)* Monitoring the delamination of laminates by using porous CNTs networks.	4404-3 **DAMAGE REPRESENTATION AND DAMAGE EVOLUTION FOR TRANSVERSE CRACKING OF LINEAR VISCOELASTIC UD COMPOSITE MATERIALS** *Fei Xu, Arthur Jones, Shuguang Li (University Of Nottingham)* In this paper, a damage representation for linear viscoelastic UD (unidirectional) composites undergoing transverse matrix cracking is derived using correspondence principle and continuum damage mechanics (CDM) . A damage evolution law was constructed by using the Weibull distribution of defects which can be developed into cracks by strain. The time-temperature superposition principle (TTSP) approach is interpreted by this model. The application of this damage model is described and the predictions are compared with experimental data.	4405-3 **DYNAMIC BRIDGING RESPONSE OF THROUGH-THICKNESS REINFORCEMENT IN COMPOSITE LAMINATES** *Hao Cui(University of Oxford), Antonio S. Melro, Yusuf Mahadik(University of Bristol), Mehdi Yasaee(Cranfield University), Giuliano Allegri(Imperial College of London), Ivana K. Partridge, Stephen R. Hallett(University of Bristol), Nik Petrinic(University of Oxford)*	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**	4407-3 **EFFECTS OF CELLULOSE NANOCRYSTALS ON THE INTERFACIAL PROPERITES OF SISAL FIBERS/EPOXY COMPOSITES** *Zhongwei Zhang, Yan Li, (Tongji University)* In this research, cellulose nanocrystals (CNCs) was employed to modify the interface between sisal fibers and epoxy. The results showed CNCs modification changed the deboned mode and improved the thermo-mechanical stability of the interface.	4408-3 **INVESTIGATION OF THE COMPRESSION PERFORMANCE AND FAILURE MECHANISM OF PSEUDO-DUCTILE THIN-PLY HYBRID composites** *G. Czél (Budapest University of Technology and Economics, University of Bristol), P. Suwarta (University of Bristol), M. Jalalvand (University of Bristol), M. R. Wisnom (University of Bristol)* The compressive damage mechanisms of thin carbon/epoxy layers were investigated in-situ in a SEM under deformation. Fragmentation, sliding along the inclined fracture planes and local delamination at the crack tips were identified as key damage modes at the microscopic level.	4409-3 **PREDICTING THE ELASTIC MODULUS OF 3D BRAIDED COMPOSITE TUBES USING GEOMETRICAL MAPPING APPROACH** *Yi-bo Wang, Zhen-guo Liu, Long Hu, Zhe Wu (Beihang University(BUAA)* The micro-geometry of three-dimensional (3D) braided tubular preform is more complex than that of rectangular one, for the macro-structure of yarns vary in different radial positions. This paper presented a FEM analysis method of 3D braided composite tube in the macro level. Stress distribution and deformations of the tubular unit-cell are obtained. The predicted longitudinal moduli are compared with the experimental results, and the predicted errors are within 10%. Then, variation of geometrical parameters is used to study the effect of the braiding parameters on the mechanical properties. The longitudinal Young's modulus increase with the increase of pitch length; and the longitudinal Young's modulus reduces with the increase of the mandrel radius and the slope reduces when the pitch length approaches its low limit; the size of the machine bed affect the longitudinal Young's modulus a lot; the longitudinal Young's modulus increased with the increase of the circumferential number on the machine bed and the rising slope reduces when the pitch length approaches its height limit; the effect of the radial number is not significantly, but there exists a maximum. Reasonable calculation results are obtained and it is shown that geometrical mapping was an effective modelling approach for tubular unit-cell.	4410-3 **KINEMATIC MODELING OF 3D WOVEN CFRP REINFORCEMENT UNIT CELL FOR REALISTIC INTERNAL ARCHITECTURAL** *Zhiqing Ying, Zhenyu Wu, Xudong Hu(Zhejiang Sci-tech University)* A realistic geometric model of 3D woven fabric is developed. The model results of fabric surface and three mentioned cross-sections were validated with manufacturing composite samples. It also could be found in the attachment.	4411-3 **MECHANICAL BEHAVIOUR OF BULK METALLIC GLASS COMPOSITES AT HIGH STRAIN RATES** *Lan-Hong Dai (Chinese Academy of Sciences)*

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
4412-2 **MECHANICAL AND IMPACT BEHAVIORS OF SANDWICH STRUCTURES USING PUR OR PERFORATED PMI FOAM CORES WITH SIMILAR BULK DENSITIES** *Marco Duarte Ibarrola, José M. C. Faria Silva, Paulo Jorge R. O. Nóvoa, António Torres Marques* The sandwich structures of the present work use resin infusion processed skins based on an epoxy resin system reinforced with +/-45° glass fiber fabric (300 g.m-2), and a polyurethane structural adhesive join the structure elements. However, the main drive for the study was to determine flow detrimental, flow effects. The model is validated by comparison with an experiment where a rectangular prism shaped adhesive sample is squeezed between two parallel plates.	4413-2 **AUTOMATIC DETECTION AND CLASSIFICATION OF DEFECTS IN WOVEN COMPOSITES MANUFACTURED BY RTM BASED ON X-RAY MICROTOMOGRAPHY** *Anna Madra (Polytechnique Montréal, Sorbonne University), Piotr Breitkopf (Sorbonne University), François Trochu (Polytechnique Montréal)* The presented methodology employs a machine learning approach to retrieve geometric and spatial features of defects from 3D imagery. Defect classes are then identified in the multi-dimensional feature space with hierarchical clustering algorithms.	4414-2 **A UNIVERSAL MODEL FOR PREDICTING THE EFFECTIVE SHEAR MODULUS OF TWO-DIMENSIONAL POROUS MATERIALS** *Zaoyang Guo (Beihang University, Chongqing University), Lei Wang (Beihang University), Yang Chen (Chongqing University), Lingli Zheng (Beihang University), Zhenjun Yang (Coventry University), Leiting Dong, (Beihang University)*	4415-2 **PREDICTION OF PERMEABILITY IN RTM PROCESS FOR COMPOSITES BASED ON MULTI-SCALE APPROACH (INVITED TALK)** *Yong-joo Cho, Chao Zhao, S.Z.H Shah, Sung-kyu Ha (Hanyang Graduate School)* It is proposed to do virtual test using Multi-scale approach to derive permeability which was measured by experiment per each design change. By applying proposed virtual test method, number of measurement will be minimized and design process for composite will be shortened.	4416-2 **EVALUATION OF THERMOS ELASTIC STRESS ANALYSIS (TSA) AND DIGITAL IMAGE CORRELATION (DIC) TECHNIQUES FOR DETECTION OF DELAMINATION CRACK PROPAGATION OF GLASS EPOXY COMPOSITE PLATE UNDER UNI-AXIAL CYCLIC LOADING** *Ayaf Kaleel (University of Southern Queensland, University of Kirkuk), J.A. Epaarachchi (University of Southern Queensland), Mainul Islam (University of Southern Queensland), J. Leng (University of Southern Queensland, Harbin Institute of Technology), Anura P. Rathnayake (University of Ruhuna) ,N.K. Hettiarachchi (University of Ruhuna)*	4417-2 **SOME NOVEL PHYSICAL PROPERTIES BASED ON PHONONIC CRYSTALS OF SURFACE ACOUSTIC WAVES** *Si-Yuan Yu, Xiao-Chen Sun, Xu Ni, Qing Wang, Xue-Jun Yan, Cheng He, Xiao-ping Liu, Liang Feng, Ming-Hui Lu , Yan-Feng Chen (Nanjing University)*	4418-2 **CURE PROCESS MONITORING OF CURVED COMPOSITE WITH INTERLAMINAR TOUGHENED LAYERS** *Keiichiro Sawaguchi (The University of Tokyo)* This study evaluates the effect of the interlaminar resin layeras on the shear and bending deformation generated during curing and on the final spring-in angle.	4419-2 **MECHANICAL PROPERTIES OF MULTI-WALL CARBON NANOTUBE/ PEEK POLYMER COMPOSITES AT NANO SCALE** *Chun-yen Hsu (Super C Inc., Shenzhen CONE Technology Co., Ltd., University of Delaware), Qing Zhang (Super C Inc., Shenzhen CONE Technology Co., Ltd.), Kazumi Saito (Super C Inc., Shenzhen CONE Technology Co., Ltd.), Chaoying Ni (University of Delaware), Fei Deng (Super C Inc., Shenzhen CONE Technology Co., Ltd.)* This work is mainly focused on nano-scaled mechanical properties of multi-walled carbon nanotubes (MWCNTs)/poly ether ether ketone (PEEK) nanocomposites.	4420-2 **TENSILE BEHAVIOUR OF BASALT FIBRES AFTER THERMAL TREATMENT** *Jacopo Tirillò, Maria Carolina Seghini, Fabrizio Sarasini, Teodoro Valente (The Sapienza University of Rome)* The work experimentally investigates the effects of temperature (up to 600°C) and atmosphere (air and argon) on the tensile behaviour of single basalt fibres with a view to mimicking a pyrolysis process.	4421-2 **FRACTURE FIXATOR CONCEPT BASED ON SHAPE MEMORY POLYMER** *Wei Zhao, Liwu Liu, Xin Lan, Jinsong Leng, Yanju Liu (Harbin Institute of Technology)* The adaptive repair device concept proposed in this paper can accomplish real-time adaption of the tightness according to the configuration of the injured limb. Besides, the tightness problem during different treatment stages can be effectively solved when using SMP, due to its variable stiffness and shape memory effects of SMP. Therefore, the featior has property of self-adaptability.	
4412-3 **SANDWICH STRUCTURES WITH 3D PRINTED FUNCTIONALLY GRADED LATTICE CORES** *Stephen Daynes , Stefanie Feih (Singapore Institute of Manufacturing Technology) , Wen Feng Lu (National University of Singapore) ,Jun Wei (Singapore Institute of Manufacturing Technology)* New methods are presented to determine the shape, size and orientation of cells within a lattice structure for maximising stiffness.		4414-3 **MODELING AND ANALYSIS OF TI/AL SOLID PHASE REACTIVE DIFFUSION BONDING** *Zhang Jiangu, Li Hezong, Chen Yiren (Hebei University of Engineering)* A theoretical model is developed for isothermal reactive diffusion between Ti and Al. The analytical results show that the Ti atoms and Al atoms are mainly used to synthesize TiAl3(β) phase. β phase grows mainly towards Al side and its growth kinetics is controlled by the inter-diffusion coefficient of β phase.	4415-3 **VIBRATION AIDED VACUUM INFUSION OF BNNS MODIFIED CARBON FABRIC/ EPOXY COMPOSITES** *A. Tuğrul Seyhan (Anadolu University (AU)) , Reinhold Meier (EDAG Engineering GmbH, Technische Universität München (TUM)), Sven Zaremba(TUM), Klaus Drechesler (TUM)*	4416-3 **SIMULATION OF THE ELECTROMECHANICAL RESPONSE OF SELF-SENSING CARBON NANOTUBE POLYMER NANOCOMPOSITES** *Miguel A.S. Matos, Vitu L. Tagarielli, Silvestre T. Pinho (Imperial College London)*	4417-3 **HYPERELASTIC SOLIDS AS SMART ELASTODYNAMIC METAMATERIALS** *Zheng Chang, Linli Chen(China Agricultural University)* Based on the hyperelastic transformation theory, we found that a deformed neo-Hookean material can behave like an elastodynamic smart metamaterial for shear elastic waves. Several embedded soft devices are proposed for different wave manipulation functions.	4418-3 **INFLUENCE OF BENDING ON WRINKLE FORMATION AND POTENTIAL METHODS OF MITIGATION** *Sree Shankhachur Roy, Danjie Yang, Prasad Potluri (The University of Manchester)* Manufacturing tubular braided composites with complex bends can lead to out-of-plane deformations such as wrinkles. An optimised structure was investigated to minimise the influence of braid structural parameters on circumferential wrinkle formation.	4419-3 **AlN/ NANOSTRUCTURED ENERGETIC COMPOSITE AND ITS STRUCTURE CHARACTERIZATION** *Lyu Junjun, Guo Fei, He Xiaodong (CAEP)* In this paper, we mainly characterized AlN/ thin film structure using SEM, TEM and Neutron scattering method. And these methods are effective means for characterization of nanometer thin films.	4420-3 **CARBON COMPOSITE FIBERS FROM BY-PRODUCTS OF LIGNIN/PETROLEUM RESIDUE OIL** *Moo Sung Kim (KITECH) Yoong Ahm Kim (Chonnam National University), Kap Seung Yang (Chonnam National University)*	4421-3 **IMPACT FORCE IDENTIFICATION FOR COMPOSITES USING A NON-NEGATIVE BAYESIAN REGULARIZATION ALGORITHM** *Gang Yan (Nanjing University of Aeronautics and Astronautics), Hao Sun (Massachusetts Institute of Technology), Yi He (Nanjing University of Aeronautics and Astronautics)*	

Thursday 24 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
18:00		4402-4 **PREPARED TICx/ CU COMPOSITE BY IN-SITU METHOD AND ANALYSED ITS PROPERTIES** *Cong Lei, Hongxiang Zhai, Zhenying Huang, Wenqiang Hu, Lulu Chen, Yang Zhou (Beijing Jiaotong University)* High volume fraction ceramic phase TiCx-Cu cermet with double continuous structure was prepared by the method of infiltrating porous TiCx preform in consideration of the great wettability of TiCx and Cu when x is less than 0.67.	4403-4 **MODE I RATE DEPENDENT MESO-MECHANICS OF Z-PINS** *Hussein Hijazi (Imperial College London), Hao Cui (University of Oxford), Giuliano Allegri (Imperial College London), Stephen R. Hallett (University of Bristol), Ivana K. Partridge (University of Bristol), Nik Petrinic (University of Oxford)* This paper describes a reduced order model that describes the Z-pin crack bridging performance subject to dynamic Mode I loading. The model provide results with high degree of accuracy and is significantly more computationally efficient when compared to detailed finite element analysis.	4404-4 **FRACTURE CHARACTERIZATION OF PVC FOAM CORE SANDWICH SPECIMEN USING THE DCB-UBM TEST METHOD** *Vishnu Saseendran Christian Berggreen (Technical University of Denmark)* The paper titled "FRACTURE CHARACTERIZATION OF PVC FOAM CORE SANDWICH SPECIMEN USING THE DCB-UBM TEST METHOD" introduces a novel fracture test methodology – Doubler Cantilever Beam loaded with Un-even Bending Moments (DCB-UBM). This method is employed to perform mixed-mode fracture characterization of foam core sandwich composites which are widely used in marine and wind industries.	4405-4 **SPRING ELEMENT MODEL FOR HYBRID COMPOSITES WITH A RANDOM FIBRE PACKING** *Rodrigo Tavaresa (Faculdade de Engenharia da Universidade do Porto& University of Girona&Instituto de Ci^encia e Inova c~ao em Engenharia Mec^anica e Engenharia Industrial), Fermin Otero (Instituto de Ci^encia e Inova c~ao em Engenharia Mec^anica e Engenharia Industrial),Albert Turon ((University of Girona), Pedro P. Camanho (Faculdade de Engenharia da Universidade do Porto&Instituto de Ci^encia e Inova c~ao em Engenharia Mec^anica e Engenharia Industrial)* A computationally efficient spring element model to simulate tensile failure of both non-hybrid and hybrid composites is proposed.	**INTERNATIONAL TOP-LEVEL FORUM ON ENGINEERING SCIENCE AND TECHNOLOGY DEVELOPMENT STRATEGY - LIGHTWEIGHT STRUCTURES AND COMPOSITES (Registered participants only, please see separate pages for details)**			4409-4 **A COMPARATIVE RESEARCH ON THE PROCESSABILITY OF GLASS WOVEN FABRIC PREPREG** *Hansong Liu, Xiaoran Zhao, Ming Gong, Yan Zhao (Beihang University)*	4410-4 **A MODEL FOR PREDICTING THE FLOW FREE SURFACE OF RTM PROCESSING** *Da Wu, Ragnar Larsson (Chalmers University of Technology)* A model based on the theory of porous media and continuum mechanics is developed for simulating the Resin Transfer Moulding process, and the Streamline-Upwind/Petrov-Galerkin method is chosen to enhance the stability.	4411-4 **BULK STRAIN SOLITONS IN POLYMERIC COMPOSITES WITH ANISODIAMETRIC INCLUSIONS** I.V. Semenova (Ioffe Institute of the RAS), A.V. Belashov (Ioffe Institute of the RAS), O.A. Moskalyuk (Institute of Macromolecular Compounds), A.M. Samsonov (Ioffe Institute of the RAS), V.E. Yudin (Institute of Macromolecular Compounds) The paper presents results on nonlinear strain wave (soliton) generation and evolution in polystyrene based nanocomposites with anisodiametric inclusions. Variations of mechanical characteristics of composites as function of inclusions concentration are demonstrated.
19:00	Banquet										

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
4412-4 **FLEXURAL BEHAVIOURS OF NANOPHASED RIGID POLYURETHANE FOAM CORE SANDWICH COMPOSITES** *Cigdem Caglayan Elif Demir Ilkiz Soltani Kaya Hava Vrieniot Istanbul Technical University)* Reinforcing cores of sandwich composites with nanoparticles occupies an important place in expending the utility of sandwich structures in various industries. This paper focuses on improving flexural properties of sandwich structures by enhancing mechanical performance of polyurethane foams. Polyurethane foams are preferred over honeycomb cores due to decreased debonding problem between core and skin. MWCNT and nSi particles are dispersed in polyurethane foam by homogenization and ultrasound sonication to achieve proper distribution and higher mechanical performance. Compression and three-point bending tests are applied to nanophased foams and sandwiches, respectively. The enhancement in compressive strength of nanophased foam is directly related to density and changes in cell structure. Sandwich composites have shown an enhancement more than 5% in core shear yield strengths of both nSi/PU and MWCNT/PU cores under three-point bending tests.			4415-4 **ELECTRICAL-HEATING MOLDING PROCESS BASED ON CARBON FIBER FELT FOR FABRICATING GLASS FIBER REINFORCED THERMOPLASTIC COMPOSITE** *Jiyong Liang, Cong Liu, Yizhuo Gu, Min Li, Shaokai Wang, Tanxia Li, Zuoguang Zhang (Beihang University)*	4416-4 **RAPID WITH DOUBLE-TURN COIL OSH-MPT ARRAY FOR DAMAGE DETECTION IN COMPOSITE PLATE** *Zenghua Liu, Xuwen Zhong, Cunfu He, Bin Wu(Beijing University of Technology)* Imaging detection of composite plates is presented based on reconstruction algorithm for the probabilistic inspection of damage (RAPID) and double-turn coil omnidirectional shear-horizontal wave magnetostrictive patch transducer (OSH-MPT) array.				4420-4 **PREPARATION AND PROPERTIES OF POLYMER-DERIVED SiBNC CERAMIC FIBERS** *Liu Yong, Peng Shuai, CuiYongjie, Mou Shiwei, Han Kegang, Yu Muhuo (Donghua University)* A novel polymericprecursor for SiBNC ceramic fibers was synthesized by copolymerization of SiHCl3, BCl3 and methylamine via a one-pot method.		
Banquet										

Friday 25 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
08:00	PLENARY LECTURE at Qujiang Auditorium: **The Role of Composites in Avian Inspired Morphing Aircraft** Daniel J. Inman, University of Michigan, USA										
09:05	5101 Polymer Matrix Materials 13	5102 Metal Matrix Composites 13	5103 Fiber-reinforced Composites 13	5104 Dynamic Fracture 1	5105 Damage Tolerance of Composites Structures 2	5106 Fiber-reinforced Composites 20	5107 Green Composites 3	5108 Other New Testing Methods 1	5109 Textile-Based Composites 6	5110 Process Modelling 4	5111 Composite Repair 1
09:05	5101-1 **MOLECULAR DYNAMICS SIMULATION OF NOVEL ELASTOMER NANOCOMPOSITES: STRUCTURE DESIGN AND PROPERTY PREDICTION** *Jun Liu, Liqun Zhang, Jianyang Shen, Yangyang Gao, Zijian Zheng (Beijing University of Chemical Technology)* In this talk, by employing molecular dynamics simulation, we aim to provide the structure design and property prediction of novel elastomer nanocomposites (ENCs) by considering three typical systems such as physical compounding, self-assembly and end-linked systems. We examine the dispersion, interfacial interaction and the resulting static and dynamic mechanical properties of each system. Emphasis is placed on how to tune the visco-elasticity and decrease the dynamic hysteresis loss of ENCs by considering to introduce the flexible nanoparticles(nps) with low surface energy and deformation such as carbon nanosprings and graphene nanoribbon, achieve a homogeneous distribution of nps in the elastomeric polymer matrix together with decrease the mean free of the entangled polymer chains. In particular, the end-linked system exhibits both excellent static and dynamic mechanical properties, independent of the temperature, this novel encs could provide some useful guidances for the fabrication of encs tailored for tire cross at given tires with the fuel consumption.	5102-1 **MICROSTRUCTURE OF FE(AL,TA)/ FE2TA(AL) EUTECTIC COMPOSITES PREPARED BY DIRECTIONAL SOLIDIFICATION TECHNIQUE** *Chunjuan Cui, Yagang Wen, Meng Yang, Pei Wang, Chuiang Ren (Xi'an University of Architecture and Technology)* Fe-Al alloys have been paid more attentions due to light density, low price, excellent anti-shake performance, superior oxidation resistance and good corrosion resistance. In this paper, the engineering application of the Fe-Al alloys has been limited, because the ductility of Fe-Al alloys tends to be worse at ambient temperatures. Moreover, the strength and creep resistance of Fe-Al alloys at 600 °C are poor. In order to overcome these shortcomings, a modified directional solidification technique is adopted and Ta is added to Fe-Al alloys during directional solidification. Microstructures of the Fe-Al-Ta alloys prepared by the Al-rich solidification rate of R=90~600 μm/s are composed of two phases, disordered Fe(Al,Ta) matrix phase, and ordered Fe2(Ta,Al) Laves phase. The eutectic structure transforms from lamellar-like eutectic to rod eutectic, and then to dendritic structure with the increase of the solidification rate, and the lamellar spacing (or the inter-rod spacing) is decreased at the same time. The solid/ liquid interface also evolves from cellular interface to cellular-dendritic interface with the increase of the solidification rate.	5103-1 **OPTIMIZATION OF STRUCTURAL REACTION INJECTION MOLDING PROCESS (S-RIM) WITH DICYCLOPENTADIENE RESIN AS A MATRIX** *Hyeong Min Yoo, Ji Ho Jeon, Jai Woong Choi, Woo Il Lee (Seoul National University)* Use of flow simulation and optimized condition of S-RIM process enabled the fabrication long fiber reinforced composite specimens. The corresponding test results showed increases in tensile, flexural, and impact strengths depending on the increase in the fiber content.	5104-1 **EFFECTS OF WATER IMMERSION ON THE PENETRATION RESISTANCE OF GRAPHITE/ EPOXY LAMINATES IMPACTED BY A PROJECTILE WITH A CONICAL TUP** *Zhang Jiangtao, Gu Weimin, Duan Qingfeng, Liu Lisheng, Zhai Pengcheng (Wuhan University of Technology)* The effect of water absorption on the penetration resistance and energy absorption ability of the cross-ply composite laminates were analyzed by comparing the saturated and dry specimens impacted by a projectile with a conical tup.	5105-1 **THE EFFECT OF THE THROUGH-THE-THICKNESS COMPRESSIVE STRESS ON MODE II INTERLAMINAR FRACTURE TOUGHNESS** *G. Catalanotti(Queen's University Belfast), T. Scalici,G. Pitarresi(Universita degli Studi di Palermo),F.P.van der Meer(Delft University of Technology)* The effect of through-the-thickness compressive stress on the mode II interlaminar fracture toughness is investigated experimentally and replicated numerically. It is shown that the mode II interlaminar fracture toughness increases with the applied compressive through-the-thickness stress. A good agreement between numerical predictions and experiments is found.	5106-1 **THE DAMAGE OF LOW-VELOCITY IMPACTED CFRP LAMINATES WITH DIFFERENT STACKING SEQUENCE BASED ON MICRO-MECHANICS OF FAILURE** *Xiaofei Lou, Hongneng Cai, Xuecheng Han, Fei Jiao (Xi an Jiaotong University)* In this paper, a multiscale analysis method based on micro-mechanics of failure (MMF) theory is used to study the intralaminar damage of CFRP laminates with different stacking sequences, and the progressive failure process analysis combining MMF and continuum damage mechanics (CDM) is introduced.	5107-1 **EFFECT OF NANO-FILLER ON THE MECHANICAL PROPERTIES OF JUTE FABRIC/ VINYL ESTER NANOCOMPOSITE** *Muhammad Latif, SibeogNam, Chang-uk kim, Jungil Song (Changwon National University)* Fabrication of nano-composites by utilizing vinyl ester and Jute fabric through VARTM method. OMMT was incorporated in composites to improve the mechanical as well as flame retardant properties.	5108-1 **INVERSION ANALYSIS FOR INTERFACIAL STRESS OF COMPOSITE SINGLE-LAP JOINT BASED ON FULL-FIELD DEFORMATION AND FEM (INVITED TALK)** *Ruixiang Bai, Shuanghua Bao, Zhenkun Lei (Dalian University of Technology)* A hybrid inversion method combining the finite element method (FEM) and full-field displacement data was proposed to analyze the adhesive interface stress at a composite single-lap bonded joint.	5109-1 **NOVEL PREFORM WITH SELF-BONDING LAYERS** *Qiangian Fang, Li Chen, Dong Chen (Tianjin Polytechnic University)* The paper study the preparation of novel preform with self-bonding layers and the interlaminar performance of composites with the perform in different temperature.	5110-1 **CONSOLIDATION MODEL FOR OPTIMIZATION OF THERMOPLASTIC COMPOSITE LAMINATION PROCESSES** *Huaije Shi, Jeffrey Lugo, Bert Reitman, Nikhil Verghese (SABIC)* A consolidation model has been implemented and applied for the lamination process of thermoplastic tape based composites. The influence of key processing parameters on the consolidation quality have been investigated, and the model has been validated for hot press lamination of GF/PP composites.	5111-1 **DEVELOPMENT OF ROBUST REPAIR PROTOCOLS FOR COMPOSITE AIRCRAFT STRUCTURES (INVITED TALK)** *Pascal Hubert, Andrew MacLean, Mathieu Préau (McGill University)* In this paper, robust processing protocols were developed for prepreg and wet patch bonded repairs and were applied to a repair demonstrator.
09:25	5101-2 **THERMAL DECOMPOSITION BEHAVIOR AND ABLATION RESISTANCE OF SI-O-C MODIFIED CARBON FIBERS REINFORCING PHENOLIC RESIN COMPOSITES** *Huafei Xue, Changqing Hong, Xinghong Zhang, Haiming Cheng, Jiecai Han (Harbin Institute of Technology)* In this paper, the elastic moduli of porous PDMS with different porosities at different temperatures are studied by experimental and theoretical methods.	5102-2 **A PROMISING PREPARATION METHOD FOR AL7075-B4C LAYERED COMPOSITE BY CONTINUOUS CASTING AND HOT ROLLING** *Yuky Zhang, Yinghui Yu, Ting Li (Dalian University of Technology)* A three-layered composite material, consisted of pure Al and 7075-B4C, was obtained by semi-continuous casting and hot rolling process.	5103-2 **EFFECT OF TEMPERATURE AND MOISTURE ON MECHANICAL PROPERTIES OF A WOVEN AND SHORT FIBRE THERMOPLASTIC COMPOSITES FOR LOAD-BEARING AUTOMOTIVE PARTS** *Réda Ouahmoune, Michèle Salvia, Jérôme Lulzede (Ecole Centrale de Lyon)* This study focuses on effect of temperature and moisture on mechanical properties of a woven and short fibre thermoplastic composites for load-bearing automotive parts. Moreover, it will be difficult for me to send my papers for tomorrow.	5104-2 **DYNAMICS OF SHEAR BANDS IN A PRESTRESSED MATERIAL** *Davide Bigoni (University of Trento) , Domenico Capuani (University of Ferrara), Diana Giarola (University of Trento)* The incremental behaviour of a prestressed, elastic, viscotropic and incompressible material is analyzed in the dynamic regime, under the plain strain condition. Dynamic perturbations of stress/ deformation incident wave fields, caused by a shear band of finite length, formed inside the material at a certain stage of continued deformation, are investigated.	5105-2 **SUPPRESSING DELAMINATIONS IN COMPOSITES ACROSS A RANGE OF LOADING MODES** *Beene M'member (University of Bristol), Mehdi Yasaee(Transport and Manufacturing Cranfield University), Stephen R. Hallett, Ivana K Partridge(University of Bristol)* Commercially available composite Z-pins are known to be significantly less effective at suppressing Mode II delaminations compared to Mode I delaminations. This paper presents two means of achieving high energy absorption throughout the entire mixed Mode I/ II test range using hybrid arrays and a novel hybrid metal/composite Z-pin.	5106-2 **PREPARATION AND CHARACTERIZATION OF FLEXIBILITY AND LIGHTWEIGHT CF-RGO COMPOSITES** *Jun Li, Song Bi, Xunxia Su, Genliang Hou, Bing Mei, YangYang Lin, Weigiang Ma (Xi'an Research Institute of High-Tech)*	5107-2 **A STUDY ON THE INFLUENCE OF PROCESSING PARAMETERS ON DAMPING, ELASTIC AND ULTIMATE PROPERTIES OF COMMINGLED FLAX-POLYPROPYLENE COMPOSITES** *Karthik Ram Ramakrishnan (Ecole des mines d'Alès), Stéphane Corn (Ecole des mines d'Alès), Nicolas Le Moigne (Ecole des mines d'Alès), Olivier De Almeida (Institut Clement Ader)* The damping factors of flax-PP commingled composites manufactured with different sets of processing parameters were assessed and correlated to the composite microstructure, flax fibre degradation as well as the tensile modulus and strength of the composite.	5108-2 **AN INNOVATIVE MECHANICAL TESTING METHOD FOR MEASURING YOUNG'S MODULUS OF THIN FLEXIBLE MULTI-LAYERED MATERIALS (OWN-WEIGHT METHOD) (INVITED TALK)** *Atsumi Ohtsuki (Meijo university)* Considering large deformation behaviors due to own-weight, an innovative method is developed to measure Young's modulus of each layer in a flexible multi-layered materials (wire, rod, thin plate).	5109-2 **IN-PLANE SHEAR PROPERTIES OF MULTIAXIAL 3D WOVEN COMPOSITE** *Xinmiao Wang, Ling Cheng, Li Chen, Hui Guo (Tianjin Polytechnic University)* This paper evaluates the in-plane shear properties and damage mechanism of multiaxial 3D woven carbon/epoxy composites. These results presented in this paper serve as a baseline to further study the in-plane shear properties of multiaxial 3D woven carbon/epoxy composites.	5110-2 **OPTIMAL PROCESS DESIGN FOR LARGE-SCALE PULTRUSION STRUCTURES** *Alexander Safonov (Skolkovo Institute of Science and Technology), Daria Bondarchuk (Skolkovo Institute of Science and Technology), Anton Sarafov (SMTADVANCE), Andrey Ushakov (Skolkovo Institute of Science and Technology), Iskander Akhatov (Skolkovo Institute of Science and Technology)* Computational methods for optimal design of the pultrusion process of structural profiles are developed. The methods are based on simulation of composite material behaviour during manufacturing process and multi-objective surrogate-based optimization algorithms.	5111-2 **INJECTION REPAIR OF COMPOSITES FOR AUTOMOTIVE AND AEROSPACE APPLICATIONS** *R. S. Pierce (Northern Ireland Advanced Composites and Engineering (NIACE) centre & Queen's University Belfast), C. Campbell (Bombardier Aerospace), B. Telford, A. O'Carroll, T. Young (University of Limerick), R. S. Falzon (Queen's University Belfast)* Resin injection repair methods have been extended to industrial applications, specifically for the repair of dry spot defects in thick Carbon Fibre Reinforced Polymer (CFRP) laminates, and skin disbonds in Glass Fibre Reinforced Polymer (GFRP) / foam sandwich structures.

Time	ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
08:00	PLENARY LECTURE at Qujiang Auditorium: **The Role of Composites in Avian Inspired Morphing Aircraft** Daniel J. Inman, University of Michigan, USA										
09:05	5112 Sandwich Structures and Materials 9	5113 Ultrasound, Acoustic Emission, and Electromagnetic waves 1	5114 Constitutive Models 4	5115 Processing-Manufacturing Technologies 5	5116 Sensing and Self-Diagnosis 3	5117 Manufacturing Up-Scaling and Automation 1	5118 Process Induced Effects 5	5119 Experimental Methods for Process Characterization 1	5120 Fibers 4	5121 Machining of Composites 1	
09:05	5112-1 **FATIGUE CHARACTERIZATION OF HONEYCOMB COMPOSITE SANDWICH AND TOMOGRAPHY ANALYSIS** *Fahmi Alilla,Pascal Casari,Jamal Fajoui(Institut de recherche en genie civil et ecanique), Mohammed Ichchou(Univ.Sfax), Frederic Jacquemin(Institut de recherche en genie civil et mecanique), Francois Bertrand(Ecole central de Nantes)*	5113-1 **LAMB WAVE WAVENUMBER-FREQUENCY DOMAIN ANALYSIS OF COMPOSITE STRUCTURES BASED ON SPARSE RECONSTRUCTION ALGORITHM** *Hao Zuo, Caibin Xu, Panhui Xu, Zhibo Yang, Xuefeng Chen (Xi'an Jiaotong University)* The crack occurrence locations of TI-6Al-4V alloys were successfully predicted from the microscale strain concentrations using DIC and Moiré methods complementarily.	5114-1 **EFFECT OF FIBER VOLUME FRACTION ON THE VARIATION OF STOCHASTIC ELASTIC CONSTANTS OF PLAIN-WEAVE COMPOSITE** *Hao Wang, Xiu-wei Yu, Zhong-wei Wang (National University of Defense Technology)* This paper presents a new method based on local stochastic variable metric basis to estimate the influence of fiber volume fraction of yarn on ealstic constatns of plain-weave composites.	5115-1 **NUMERICAL SIMULATION AND DESIGN OPTIMIZATION OF MOLD DURING AUTOCLAVE PROCESS** *Lingyun Wang, Weidong Zhu, Qiang Xu, Le Zu, Qing Wang, Yingjin Ke (Zhejiang University)* In our work, the complex geometry of molds, effect of auxiliary materials and reaction heat of composites are considered in the numerical model. A method combining numerical simulations and the genetic algorithm is then presented for the optimization of design parameters of the mold substructure.	5116-1 **EFFECT OF PRE-TIGHTENING FORCE ON LAMB WAVE PROPAGATING BEHAVIOUR IN COMPOSITE BOLTED JOINTS** *Bin Yang, Fu-Zhen Xuan (School of Mechanical and Power Engineering, East China University of Science and Technology)* In our paper, we used simulation and experimental methods to obtain the guided wave propagating features in composite bolted joints.	5117-1 **AUTOMATING THE MANUFACTURE OF VERY COMPLEX COMPOSITE STRUCTURES (INVITED TALK)** *Kevin Potter, Mike Elkington, Dennis Crowley, Carwyn Ward (University of Bristol)* This paper explores why it has proven so difficult to automate the manufacture of very complex composite structures and offers possible routes forward in different application areas for composite structures.	5118-1 **UNCERTAINTY QUANTIFICATION OF COMPOSITE STRUCTURES WITH WRINKLE DEFECTS USING STOCHASTIC SIMULATION** *T. J. Dodwell (University of Exeter), A. Poinarz (University of Bath), A. Sandhu (University of Exeter)* This paper presents a methodology for parametrising out-of-plane wrinkles from B-scans in order to quantify the knockdown in strength whilst reducing the uncertainty in the prediction of failure using state-of-the-art statistical methods.	5119-1 **EVALUATION OF FIBER PREFORM PERMEABILITY TENSOR CONSIDERING FLOW INLET FINITE SIZE** *Viktor Grishaev, Senzey G. Abaimov, Oleg V. Lebedev, Iskander S. Akhatov (Skolkovo Institute of Science and Technology)* A set-up to measure both in-plane and out-of-plane permeability of fibrous preforms was developed. Based on experimental data, all components of permeability tensor were calculated, taking into account a finite size of the flow inlet and analyzing the flow fronts on both sides of the preform.	5120-1 **FUNCTIONAL CARBON NANOTUBE/ CELLULOSE COMPOSITE FIBERS PREPARED FROM SOLUTION-SPINNING** *H. Qi (Leibniz-Institut für Polymerforschung Dresde), E. Mäder (The Leibniz Institute of Polymer Research in Dresden, Dresden University of Technology)* Electrically conducting fibers composed of cellulose and carbon nanotubes (CNTs) were spun using aqueous alkaline solution. These composite fibers have impressive multifunctional sensing abilities and are promising to be used as smart materials.	5121-1 **MICROSCOPIC ANALYTICAL AND NUMERICAL INVESTIGATION OF ORTHOGONAL CUTTING CFRP** *Bin Niu, Wen Wen, Youlang Su, Shiyong Sun, Rui Yang (Dalian University of Technology)* This paper deals with the theoretical analysis and finite element simulation of orthogonal machining carbon fiber reinforced polymers, where the normal and transverse supporting effects on the material removal are investigated.	
09:25	5112-2 **HOLLOW LATTICE TRUSS REINFORCED HONEYCOMBS (HONEYTUBES): EXPERIMENT AND SIMULATION** *Yaobo Wu, Jianxing Hu (Beihang University), Jun Xu (Beihang University & Xi'an Jiaotong University & Tsinghua University), Sha Yin (Beihang University & Xi'an Jiaotong University)*	5113-2 **ULTRASOUND IN CFRP DETECTED BY ADVANCED OPTICAL FIBER SENSOR FOR COMPOSITE STRUCTURAL HEALTH MONITORING** *Qi Wu (The University of Tokyo, Nanjing University of Aeronautics and Astronautics), Yoji Okabe (The University of Tokyo), Fengming Yu (The University of Tokyo)* A highly advanced optical fiber sensor based on phase-shifted fiber Bragg grating was used in three different ultrasonic SHM techniques, including acousto-ultrasound, acoustic emission and nonlinear ultrasound, demonstrating its advantages in evaluation of diversified damages inside the composites.	5114-2 **A NON-LINEAR ORTHOTROPIC BINARY MODEL TO PREDICT THERMO-MECHANICAL BEHAVIOUR OF PLAIN WEAVE CERAMIC MATRIX COMPOSITES** *Mingming Chen, Heyin Qi, Shutong Cheng, Daxu Zhang, Jinghai Gong (Shanghai Jiao Tong University)* The paper addresses the development of a coupled thermal-stress finite element model to predict the thermo-mechanical behaviour of plain weave ceramic matrix composites using the non-linear orthotropic constitutive properties.	5115-2 **THERMOPLASTIC SANDWICH STRUCTURES – PROCESSING APPROACHES TOWARDS AUTOMOTIVE SERIAL PRODUCTION** *T. Neumeyer (Neue Materialien Bayreuth GmbH), J. F. Knaechel (Neue Materialien Bayreuth GmbH), M. Muehlbacher (Neue Materialien Bayreuth GmbH), T. Kroeger (Neue Materialien Bayreuth GmbH), E. Schleier (Neue Materialien Bayreuth GmbH), V. Altstaedt (Neue Materialien Bayreuth GmbH, University of Bayreuth)* The work focuses on novel processing techniques for efficient manufacturing of integrated thermoplastic sandwich structures at cycle times suitable for high volume production in automotive industry. Special attention is drawn to functionalization via injection molding while using low modulus foam cores.	5116-2 **EVALUATION OF INTERFACIAL PROPERTIES AND DAMAGE SENSING ON CFRP BY VARTM USING 3-DIMENSIONAL ELECTRICAL RESISTANCE MAPPING** *J. H. Kim (Gyeongsang National University), D. J. Kwon (Gyeongsang National University), P. S. Shin (Gyeongsang National University), K. L. DeVries (The University of Utah), J. M. Park (Gyeongsang National University, The University of Utah)*	5117-2 **4D PRINTING OF COMPOSITES** *Hoa Suong V., Minh Duc Hoang, Jeffrey Fortin Simpson, Tsz Ho Kwok (Concordia University)* The new technique of 4D printing of long fiber composites is proposed. Curved composite pieces can be made from flat composite prepregs, without having to use curved molds.	5118-2 **INFLUENCE OF STRAND DISPERSION METHOD ON MECHANICAL PROPERTIES OF RANDOMLY ORIENTED CARBON FIBER STRAND THERMOPLASTIC COMPOSITES** *Yuito Nakashima, Hirofumi Sagarumia, Shinichiro Yamashita, Jun Takahashi (The University of Tokyo)* Discontinuous composites with chopped carbon fiber thermoplastic strand were manufactured using two types of strand dispersion methods. Sheet stacking method reduced scatter of mechanical properties and improved strength of the materials.	5119-2 **DEVELOPMENT OF AN EXPERIMENTAL BENCH FOR ANALYZING HEAT TRANSFER DURING THE TAPE PLACEMENT OF CARBON/ PEEK COMPOSITES** *Violaine Le Louët (RT Jules Verne, CNRS Laboratoire de Thermocinétiques de Nantes), Steven Le Corre, Nicolas Boyard (CNRS Laboratoire de Thermocinétiques de Nantes), Didier Delaunay (CNRS Laboratoire de Thermocinétiques de Nantes), Xavier Tardif (RT Jules Verne)* Accurate measurement of the heat transfers occurring during the manufacturing of composite parts by Automated Tape Placement, according to various heat laser source inclination and power. The evolution of the Thermal Contact Resistances between the mold and one ply will be assessed thanks to a specific thermal metrology, and suitable inverse methods.	5120-2 **SMART MULTI-FUNCTIONAL CARBON NANOTUBE/ POLY(VINYL ALCOHOL) COMPOSITE FIBERS** *G. Zhao (Korea Institute of Materials Science, Changwon National University), J. H. Byun (Korea Institute of Materials Science), Y. Oh (Korea Institute of Materials Science), M. K. Lee (Korea Institute of Materials Science), B. S. Kim (Korea Institute of Materials Science), J. I. Song (Changwon National University)* Wearable smart textiles that have functionalities like sensor, actuator, and electromagnetic shielding are becoming increasing interesting research field due to the proliferation of modern society's demand for wearable electronics and protection of environmental electromagnetic pollution. Here, we report two types of smart nano-composite fiber which can be used as high sensitive textile humidity sensor and electromagnetic interference shielding textiles.	5121-2 **OPTIMIZATION OF CUTTING TOOL GEOMETRIC PARAMETERS IN MILLING OF CFRP LAMINATES** *Saad Waqar (Northwestern Polytechnical University), He Yanli (Northwestern Polytechnical University),Ch. Asad Abbas (Shandong University), Arfan Majeed (King Abdul-Aziz University)* The paper presents the numerical optimization of cutting tool geometric parameters of end mill during the milling of Multi directional CFRP laminates. Tool geometric parameters namely, rake angle, helix angle and clearance angle were optimized for cutting force generated during the milling operation and surface roughness of the machined surface separately using Taguchi's Design of experiment, Signal to Noise ratio analysis and ANOVA.	

Friday 25 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
09:45	5101-3 **EFFECTS OF ORGANIC GROUPS GRAFTED CARBON NANOTUBE ON TENSILE CREEP BEHAVIOR OF CNTS/ EPOXY NANO-COMPOSITES** *Xinlong Shang, Jianwei Zhang, Cai Jiang, Su Ju, Dazhi Jiang (National University of Defense Technology)* The research focused on investigating effects of type and contents of carbon nanotubes (CNTs) on creep behavior of CNTs/epoxy composites.	5102-3 **TAIL ORING INTERFACIAL STATES OF HIGHLY THERMAL PERFORMANCE DIAMOND/AL COMPOSITES** *Gang Ji (Unité Matériaux et Transformations (UMET)), Zhanglu Tan (Shanghai Jiao Tong University), Zhigiang Li (Shanghai Jiao Tong University), Ahmed Addad (UMET), Jean-Francos Silvain (Institut de Chimie de la Matière Condensée de Bordeaux (ICMCB-CNRS)), Xiaopeng Li (KU Leuven, University of Leuven), Di Zhang (Shanghai Jiao Tong University)* Interfacial haracterization has been carried out to reveal microstructural features determining interfacial bonding states in a diamond/Al composite for thermal management applications.	5103-3 **CRYOGENIC MECHANICAL PROPERTIES OF GRAPHENE/ CARBON FIBERS/ BROMINATED EPOXY/ CYANATE ESTER COMPOSITES** *Yang Zhao (Chinese Academy of Sciences), Chao Wu (Chinese Academy of Sciences), Yu Liu (Chinese Academy of Sciences), Hong-Mei Xiao (Chinese Academy of Sciences), Shao-Yun Fu (Chongqing University)*	5104-3 **THE HIGH VELOCITY IMPACT RESISTANCE OF FIBRE METAL LAMINATES** *J. Zhou (University of Liverpool), C. Kaboglu (Imperial College London), I. Mohaghegh ian (Imperial College London), Z. Guan (University of Liverpool), J. P. Dear (Imperial College London), W.J. Cantwell (Khalifa University of Science Technology and Research)* The high velocity impact resistance of fibre metal laminates (FMLs) based on combinations of aluminium alloys (6161 and 7075 series) and a glass fibre reinforced epoxy resin have been investigated using Digital Image Correlation (DIC) method and Finite Element (FE) method. A full-field deformations and strain for FMLs was measured to validate the developed FE model.	5105-3 **ANGLE-PLY LAMINATES WITH PARTIAL-DEPTH NOTCHES FOR DAMAGE TOLERANT DESIGN OF COMPOSITE PRESSURE VESSELS** *Calum P. Fowler(RMIT University), Matthew W. Joosten(Deakin University), Adrian C. Orifici(RMIT University) , Chun H. Wang (University of New South Wales)* The research presented in this paper focuses on the understanding and prediction of the failure mechanisms of angle-ply carbon fibre composite laminates with part-depth longitudinal notches, which is a key test configuration for demonstrating compliance with composite flaw tolerance requirements according to ISO 11439. The influence of notch depth and fibre angle on the tensile strength and failure mechanisms is experimentally analysed with the aid of both digital image correlation and X-ray computed tomography.		5107-3 **MARBLE BASED GREEN CEMENT BY USING GEOPOLYMER TECHNOLOGY** *W.H. Lee, T.W. Cheng, Y.C. Ding, T.T. Wang (National Taipei University of Technology)* A new type and low CO2 emission green cement was development in this study. It has the great potential to be used as a new civil engineering construction material.	5108-3 **MICRO-CRACK DETECTION TECHNIQUE IN POLYMERIC COMPOSITES DURING THERMAL CYCLING** *Shambhu Kumar Gupta, Mehdi Hojati (Concordia University)*	5109-3 **EFFECT OF WARP KNITTING CONDITION ON MECHANICAL PROPERTIES OF NON-CRIMP FABRIC REINFORCED COMPOSITES** *Yuya Yamasaki, Masayuki Kitamura, Akio Ohtani, Asami Nakai*	5110-3 **A TWO-PHASE ORTHOTROPIC MODEL FOR INTEGRATING RESIN FLOW AND STRESS DEVELOPMENT IN PROCESSING OF COMPOSITE MATERIALS (INVITED TALK)** *Sina Amini Niaki (The University of British Columbia), Alireza Forghani (Convergent Manufacturing Technologies Inc.), Reza Vaziri (The University of British Columbia), Anoush Poursartip (The University of British Columbia)* A model is developed and implemented in a finite element framework to integrate fluid flow and stress development in processing of polymeric composite materials. In a seamless and continuous fashion, the model connects two extremes of processing, i.e. when initially resin behaves as liquid and when finally it is fully cured and solidified to form a solid composite material.	5111-3 **INFLUENCE OF THE SURFACE PRETREATMENT ON THE DURABILITY OF ADHESIVELY BONDED COMPOSITE REPAIRS** *F. Roeper , M. Wolfahrt (Polymer Competence Center Leoben GmbH), G. Kocher , A. Bubestinger (FACC Operations GmbH), G. Pinter (hair of Material Science and Testing of Polymers tanuniversitaet Leoben)* The effect of ambient conditions related to the aircraft industry will be analyzed. Therefore, quasistatic tensile tests were performed on repair-specimens manufactured from epoxy-based carbon fiber reinforced prepreg material utilizing two different kinds of surface treatment and, in comparison, on unrepaired (reference-) specimens.
10:05			5103-4 **THERMAL DAMAGE CHARACTERISTICS OF CFRP LAMINATES SUBJECTED TO LIGHTNING STRIKE** *Yunli Guo, Yixi Jia (Shandong University)*	5104-4 **IMPACT BEHAVIOUR OF CARBON FIBRE REINFORCED POLY (METHYL METHACRYLATE) THERMOPLASTIC COMPOSITE** *Daiva Zelenjakiene , Kristina Zukiene, Paulius Griskevicius (Kaunas University of Technology)* The investigation of low velocity impact behaviour and damage patterns of carbon fibre reinforced methyl methacrylate composites; modelling of the process of impact damage in composite using finite element method.				5108-4 **A NOVEL TECHNIQUE TO ACCURATELY MEASURE THE FIBRE FAILURE STRAIN IN COMPOSITE LAMINATES UNDER A COMBINED IN-PLANE TENSION AND SHEAR STRESS STATE** *Meisam Jalalvand, Mohammad Fotouhi, Mun Choong Leong, Michael R. Wisnom (University of Bristol)* A simple and accurate test method is presented to investigate the influence of shear stresses on tensile failure of unidirectional carbon fibre/epoxy. It is shown that in-plane shear does not significantly affect the fibre failure strains.	5109-4 **FATIGUE LIMIT: IS THERE A LINK TO THE QUASI-STATIC DAMAGE?** *Stevan V. Lomov (KU Leuven), Valter Carvelli (Polytechnic University of Milan), Atul Jain (Indian Institute of Technology)* The paper presents the experimentally observed relations of the fatigue life limit and the quasi-static damage thresholds for textile composites.	5110-4 **MANUFACTURING PROCESS SIMULATION FOR ADVANCED COMPOSITE STRUCTURE** *Ye Xiao, Zhang Cheney, Simon Julien (Siemens Industry Software, Beijing)* A sequential thermos-chemical & structural analysis based complete curing solution for manufacturing process simulation of advanced composite structure is introduced. This method is successfully implemented with an Chinese aerospace OEM factory.	5111-4 **IMPLEMENTATION OF NOVEL DESIGN AND VALIDATION APPROACHES FOR BOND REPAIRS OF A COMPOSITE AIRCRAFT COMPONENT** *J. Wang, P. Chang (Defence Science and Technology Group), A. Baker (Defence Science and Technology Group & Advanced Composite Structures Australia), M. Vuong, A. Litchfield (Advanced Composite Structures Australia)*

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
5112-3 **COMPRESSIVE PROPERTIES OF METAL BEETLE ELYTRON PLATES AND EXPLORATION OF AN EQUIVALENT MODEL OF THE CORE STRUCTURE** *Xiaoming Zhang, Jinxiang Chen(Southeast University), Yoji Okabe(The University of Tokyo), Juan Xie, Zhijie Zhang(Southeast University)* This paper investigates the mechanical properties of metal beetle elytron plates (BEPs, a type of bionic sandwich structure) and the elementary unit of the trabecular-honeycomb core structure by compression experiments.	5113-3 **NUMERICAL ESTIMATION OF PERFORMANCES OF FREQUENCY SELECTIVE SURFACE-IMPACTED SANDWICH RADOME (INVITED TALK)** *Dae-Sung Son, Jong-Min Hyun, Jung-Ryul Lee (Korea Advanced Institute of Science and Technology)* In this paper, electromagnetic performance of radome applied sandwich structure inserted frequency selective surface was estimated. Through this study, it was confirmed that it is an important design technique to calculate the equivalent impedance using the equivalent circuit model of the FSS-impacted sandwich structure to perform the electromagnetic performance evaluation of the radome.	5114-3 **DEFORMATION AND FAILURE BEHAVIOR OF CARBON NANOTUBE COMPOSITE FIBERS** *Xia Liu, Qingsheng Yang (Beijing University of Technology)*	5115-3 **QUASI-ISOTROPIC ALIGNED SHORT FIBRE COMPOSITES WITH THE HIPERDIF (HIGH PERFORMANCE DISCONTINUOUS FIBRES) METHOD** *H. Yu, M.L. Longana, K.D. Potter (University of Bristol)* Tensile mechanical properties of a QI aligned discontinuous fibre composite were directly compared with a randomly oriented short fibre composite with the same fibre length and volume fraction. The results showed significant increase of tensile modulus and strength, 34% and 76% respectively and a more consistent behaviour.	5116-3 **EFFECT OF CURRENT ANNEALING ON MAGNETIC AND MECHANICAL PROPERTIES OF CO-BASED AMORPHOUS (INVITED TALK)** *Y.F. Wang, F.X. Qin, H. Wang, Y. H. Li, H. X. Peng (Zhejiang University)* In this work, Co-based amorphous microwires were treated under different current annealing for a constant time. The results show that the mechanical properties and soft magnetic properties can be improved by proper current annealing.	5117-3 **TAIL-OR-MADE THERMOPLASTICS: PRODUCTION TECHNOLOGY AND QUALITY ASSURANCE OF A THERMOPLASTIC AIRCRAFT FUSELAGE SKIN SEGMENT** *Frederic J.C. Fischer, Christoph Frommel, Arthur-Hans Thelmann, Thomas Stefani, Michael Kühnel, Matthias Beyrle, Alfons Schuster, Tobias Gerngross, Michael Kupke (German Aerospace Center (DLR))*	5118-3 **CHARACTERISING THE INFLUENCE OF FIBRE ANGLE ON THE BENDING OF UNCURED UNIDIRECTIONAL CARBON FIBRE PREPREG** *S. Erland, T. J. Dodwell (University of Exeter)* In this paper a method is presented whereby results from Dynamic Mechanical Analysis might be reanalysed to consider shear in bending using Timoshenko beam theory rederived to consider a viscoelastic shear force. Results are presented for small laminates made from 8552/AS4 unidirectional carbon fibre prepreg with plies arranged at various industry standard angles.	5119-3 **TACK TESTING TO AID OPTIMISATION OF PROCESS PARAMETERS FOR AUTOMATED MATERIAL PLACEMENT IN AN INDUSTRIAL ENVIRONMENT** *A. Endruweit, S. Ghose, B.A. Johnson, S. Kelly, D.S.A. De Focatiis, N.A. Warrior (University of Nottingham)*	5120-3 **PROGRESS IN FABRICATION OF SILICON CARBIDE NANOFIBERS** *Chen Jiangun, Jiang Min (Zhejiang Sci-Tech University)*	5121-3 **PERFORMANCE OF BRAZED DIAMOND TOOL IN GRINDING OF CARBON FIBER REINFORCED POLYMER LAMINATES** *Yuhong Liang , Yan Chen, Yucan Fu, Chaoren Yan, Kai Zheng (Nanjing University of Aeronautics and Astronautics)* The monolayer brazed diamond tool was developed and a study on tool performance during grinding multidirectional CFRP laminates was presented.The results indicated that the defined distributed brazed diamond tool was more suitable for machining multidirectional CFRP laminates. Moreover, the significant damage did not appear and the main wear modes of tool were attritious wear or micro-fragmentation when the edge grinding distance reached 15m.	
	5113-4 **A SINGLE PORT SCANNING FREE SPACE MEASUREMENT TECHNIQUE TO INVESTIGATE REFLECTION LOSS CHARACTERISTICS OF THE CURVED STRUCTURE AT X-BAND** *Jong-Min Hyun, Nasan Ahmed, Jung-Ryul Lee (Korea Advanced Institute of Science and Technology)* The aim of this study was to develop a single port scanning free space measurement (SFSM) to measure reflection loss of the curved structure at X-band.		5115-4 **EXPERIMENTAL INVESTIGATION OF COMPOSITE MATERIALS DRILLING USING STEP GUNDRILLS** *P. Rahme (Lebanese University), Y. Landon (University of Toulouse), F. Lachaud (University of Toulouse), R. Piquet (University of Toulouse), P. Lagarrigue (University of Toulouse)* In this paper, an experimental study on the drilling of thick composite plates using a step gundrill is conducted. The aim of this study is to determine experimentally the critical thrust force at delamination.	5116-4 **IN-SITU SENSING OF CARBON FIBERS IN FIBER REINFORCED POLYMER COMPOSITE TUBES FOR BENDING DECTECTION** *Xiaoying Chen, Zhenyu Wu, Xudong Hu (Zhejiang Sci-Tech University)* This paper presents a method to detect the direction and the amplitude of indentation force applied on the FRPC tubes under bending tests based on the piezoresistive property of carbon fibers.	5117-4 **FIBRE OPTICAL TEMPERATURE SENSOR FOR DISTRIBUTED SENSING IN COMPOSITE MOULDS** *J. Oelhafen (Technical University of Munich), F.Muschawekh (fos4X GmbH), S. Zaremba (Technical University of Munich), K. Drechsler (Technical University of Munich)* A distributed fibre optic temperature sensor made of CFRP tube is introduced. We investigated mechanical properties of the tube and the temperature sensitivity of the sensor.		5119-4 **AN ALTERNATIVE METHOD FOR ADVANCING GLASS TRANSITION TEMPERATURE IN EPOXY BASED COMPOSITES FOR SOFTENING SENSITIVE MEASUREMENTS** *Stewart, A. L., Poursartip, A. (The University of British Columbia)* Characterization of uncured prepreg properties remains a challenge, yet is needed to measure and track incoming quality as this will affect final quality and variability in finished components. A novel technique to sufficiently advance the cure of epoxy matrix prepregs without thermal excursion and minimized cure shrinkage is presented. The benefits of the method are that it minimizes changes in the prepreg morphology whilst allowing classical characterization methods to be used.	5120-4 **CARBON FIBRE SURFACES WITH GRAFTED FUNCTIONAL GROUPS AND SIZINGS AND ITS INTERACTION WITH DIFFERENT MATRICES** *E. Wölfel (Institute of Polymer Research in Dresden), L. C. Henderson (Deakin University), C. Scheffler (Institute of Polymer Research in Dresden)* The influence of different functional groups and sizings on the adhesion strength between carbon fibre and matrix were investigated using the single fibre pull-out test and SEM.		

Friday 25 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
10:25	Coffee Break										
10:50	KEYNOTE at Quijang Auditorium: **Advancement of FRP Composites and Structural Innovation** Zhishen Wu, Southeast University, China KEYNOTE at Lilly Hall: **Vibration and Buckling Analysis of Composite Panels with Consideration of Optimization** Yoshihiro Narita, Hokkaido University, Japan KEYNOTE at Rose Hall: **Failures of Composites by Micromechanics Approach** Zhengming Huang, Tongji University, China										
11:35	5201 Liquid Composites Moulding 1	5202 Metal Matrix Composites 14	5203 Fiber-reinforced Composites 14	5204 Dynamic Fracture 2	5205 Damage Tolerance of Composites Structures 3	5206 Fiber-reinforced Composites 21	5207 Green Composites 4	5208 Other New Testing Methods 2	5209 Textile-Based Composites 7	5210 Process Modelling 5	5211 Composite Repair 2
11:35	5201-1 **PERMEABILITY MEASUREMENT OF 3D WOVEN PREFORM AND ITS APPLICATION IN LIQUID COMPOSITE MOLDING SIMULATION** *Xuan Zhang, Guojuan Bai, Xingyang Wang, Tianjin Huang (AECC Commercial Aircraft Engine Co., Ltd.)* This paper presents the experimental measurement of three-dimensional permeability of 3D woven performs and its application in simulating the liquid composites molding. The influence of preform architecture on the permeability has been discussed.	5202-1 **FABRICATION OF GRAPHENE REINFORCED AL MATRIX COMPOSITES USING FLAKY POWDER METALLURGY METHOD** *L. H. Wang, Z.Y. Liu, B.L. Xiao, Z. Y. Ma (Chinese Academy of Sciences)*	5203-1 **A NOVEL COHESIVE MODEL FOR SIMULATING DELAMINATION PROPAGATIONS IN COMPOSITE LAMINATED STRUCTURES** *Ning Hu, Huiming Ning (Chongqing University)* We propose a new cohesive model to stably simulate delamination propagations in composite laminates under transverse quasi-static or impact loads when using comparatively coarse cohesive elements for reducing the computational cost. Its effectiveness was verified.	5204-1 **DYNAMIC DAMAGE IN CARBON FIBRE/ EPOXY LAMINATES: AIR BLAST AND IMPACT** *Laurence A. Coles (Loughborough University), Anish Roy (Loughborough University), Leonid Voronov (Perm National Research Polytechnical University), Boris Bolotov (Perm National Research Polytechnical University), Craig Tilton (University of Rhode Island), Mikhail Nikhamkin (Perm National Research Polytechnical University), Arun Shukla (University of Rhode Island), Vadim V. Silberschmidt (Loughborough University)* This study presents complementing experimental case studies, in which a 2x2 twill weave T300 carbon fibre/epoxy composite was subjected to ballistic impact with both steel and ice projectiles (95 – 865) at 70-90 m/s and 300-500 m/s, respectively) and air-blast loading (with incident pressures 0 0.4 MPa, 0.6 MPa and 0.8 MPa, and wave speeds between 650 m/s and 950 m/s).	5205-1 **IMPACT RESISTANCE OF CARBON/EPOXY L-SECTIONS REINFORCED THROUGH-THE-THICKNESS BY TUFTING** *Steve D. Green , Giuseppe Dell'Anno(The National Composites Centre)* This paper provides an account of the mechanical behaviour of thick, single curvature parts, reinforced through-thickness by tufting, confirming the remarkable capability of tufted components to retain structural integrity following an impact. Assessment of the feature-scale components' meso-structure highlighted potential manufacturing challenges resulting from the interaction of the high-temperature curing resin and the complex fibre architecture.	5206-1 **DYNAMIC ANALYSISOF THE EVOLUTION LAW OF LOW-VELOCITY IMPACT DAMAGE IN COMPOSITE LAMINATES WITH A CONTINUUM DAMAGE MODEL** *Peng Ou (Liaocheng University), Yuxi Jia (Shandong University)* A numerical method for the evaluation of composite laminates damage under the low-velocity impact was proposed based on the continuum damage mechanics (CDM) and the cohesive zone model (CZM).	5207-1 **THE EFFECT OF BAMBOO MICROSTRUCTURE ON THE MECHANICAL PROPERTIES OF BAMBOO FIBRE REINFORCED COMPOSITES.** *D. E.C. Depuydt, Nick Swiggers, Lise Appels, Jan Ivens, Aart W. van Vuure (KU Leuven)* The mechanical properties of three different bamboo species of two ages were analyzed as well as their chemical constituents. Differences in properties are discussed and linked with the composition.	5208-1 **THICKNESS EVALUATION OF KISSING DEFECTS IN DIELECTRIC LAMINATED COMPOSITES: A HIGH-RESOLUTION MICROWAVE METHOD** *Peiyu Wang (Peking University), Zhencheng Li (Peking University), Yongmao Pei (Peking University), Licheng Zhou (South China University of Technology)* This paper proposed a high resolution microwave method in nondestructive detection of kissing defects in dielectric composite laminates.	5209-1 **MACRO-MECHANICAL CHARACTERIZATION OF 3D ORTHOGONAL WOVEN COMPOSITES USING A VOXEL-BASED FINITE ELEMENT MODEL** *Dantang Zhang (Jiangnan University), Li Chen (Tianjin Polytechnic University), Yanjie Wang (Jiangnan University), Ying Sun (Tianjin Polytechnic University), Kun Qian (Jiangnan University)*	5210-1 **MODELING AND MATERIAL DATA ISSUES OF INJECTION MOLDING SIMULATION** *Zhiliang Fan, Russell Speight (Autodesk Australia Pty Ltd)* Injection molding process involves highly complex physics: fast-cooling rate, high pressure, phase change, crystallization and morphology development, fiber orientation, stress relaxation and time-varying boundary conditions during filling, packing, cooling and ejection stages. This paper discusses the modelling and material data issues in simulation of injection molding, particularly the prediction of shrinkage and warpage.	5211-1 **OPTIMIZING COMPOSITE REPAIRS WITH GREEN LASER** *S.Psarras, G.Sotriadis, T.Loutas, V.Kostopoulos (University of Patras)* In this paper, the results of a laser repair process are analyzed and presented. Such a process is systematically investigated to the direction of identifying the influential parameters as well as to optimize their values in a multi-objective optimization task that entails the maximization of the mechanical properties of the repair.
11:55	5201-2 **PERMEABILITY PREDICTION USING POROUS YARNS IN A DUAL-SCALE SIMULATION WITH OPENFOAM** *J. Ditmann, S. Hügle, M. Klenk, A. Burkhardt, P. Middendorf (University of Stuttgart)* The paper will show a method predicting mesoscopic dual phase flow permeabilities with porous yarns and mapping it directly to an FEM filling simulation.	5202-2 **EFFECT OF HIGH AMOUNT INTERFACE ON THE MICROSTRUCTURE AND MECHANICAL BEHAVIOUR OF SiC NANOWIRES REINFORCED AL MATRIX NANO-COMPOSITES** *Wenshu Yang, Gaohui Wu (Harbin Institute of Technology)*	5203-2 **DEVELOPMENT OF NEW SIMULATION TECHNOLOGY FOR COMPRESSION MOLDING OF LONG FIBER REINFORCED PLASTICS** *Shinya Hayashi (JSOL Corporation), Hao Chen (Livermore Software Technology Corporation), Wei Hu (Livermore Software Technology Corporation)* A new simulation technology has been developed where fibers modelled by beam elements are coupled to a matrix modelled by tetrahedron solid elements that undergo r-adaptive remeshing. This technique has great potential to simulate compression molding of long fiber reinforced plastics with high accuracy.	5204-2 **THICK-LEVEL-SET MODELING OF THE DYNAMIC DOUBLE CANTILEVER BEAM TEST** *Y. Liu, F.P. van der Meer, L.J. Sluys (Delft University of Technology)* In this paper, the thick-level-set method is used to model stable and unstable (stick/slip) crack propagation in the dynamic double cantilever beam (DCB) test for unidirectional composite laminate. A phenomenological model is introduced to calculate the crack speed as a function of the energy release rate.	5205-2 **AN EXPERIMENTAL STUDY OF STIFFENED OPEN-HOLE COMPOSITE PANEL WITH BVID UNDER UNIAXIAL COMPRESSION** *Jianzhuo Sun(Beijing Key Laboratory of Civil Aircraft Structures and Composite Materials), Qun Chao(Beijing Aeronautical Science & Technology Research Institute of COMAC), Peng Shi , Chuantian Liu(Future Science and Technology Park)* An experimental study is conducted to validate a finite element method for a stiffened open-hole composite panel under uniaxial compression. Acoustic emission and strain gauges were used to monitor the test process during the test.	5206-2 **THREE DIMENSIONAL MODELING AND PROGRESSIVE DAMAGE ANALYSIS OF FIBER REINFORCED COMPOSITES** *S.Z.H Shah, Chao Zhao, Yong-ixo Cho, Sung Kyu Ha (Hanyang Graduate School)* Discontinuous fiber composites material called HexMC is modeled using randomization. A micro mechanics based criteria is used to predict failure in specimens by considering constituents properties, moreover finite element results are compared with the experimental results available in the literature.	5207-2 **HOMOGENEOUS AND TOUGHENED CELLULOSE EPOXY COMPOSITES** *Xinying Deng (Imperial College London, Singapore Institute of Manufacturing Technology), Anthony J. Kinloch (Imperial College London), Sophia Pimenta (Imperial College London), Gregory T. Scharnman (USDA Forest Service), Stephan Sprenger (Evonik Hanse GmbH), Ambrose C. Taylor (Imperial College London), Wenn Sze Teo (Singapore Institute of Manufacturing Technology)* Homogeneous and toughened cellulose-epoxy materials were made by modifying an anhydride-cured epoxy with two green modifiers, namely microcrystalline cellulose (MCC) and cellulose nanocrystal (CNC); and adding (3-glycidyloxypropyl) trimethoxysilane (GPTMS) during the three-roll mill preparation process in order to obtain good dispersions of the added cellulose.	5208-2 **EXPERIMENTAL AND NUMERICAL INVESTIGATION ON FRACTURE TOUGHNESS OF PLASMA-SPRAYED TBCS USING A MODIFIED THREE-POINT BENDING METHOD** *Qi Zhu, Gaosheng Yan, Jianguo Zhu, Wenfeng Hao, Daheng Chen (Jiangsu University)* The interfacial fracture toughness of plasma-sprayed TBCs is investigated according to a modified three-point bending test combined with cross-sectional deformation measurement using micro-scale digital image correlation method.	5209-2 **A SHELL APPROACH FOR TEXTILE COMPOSITE FORMING SIMULATIONS** *B. Liang, J. Colmars, P. Boisse (University of Lyon)* The basic assumptions of classical shell theories are not verified by textile materials because of the slippage between fibers. A shell approach is proposed for the forming of continuous fiber reinforcements.	5210-2 **TTT DIAGRAM OF THE ANIONIC POLYMERIZATION PA6 FROM E-CAPROLACTAM** *Céline Vicant (Institut Clément Ader, Ecole des Mines d'Albi-Carmaux), Olivier De Almeida (Institut Clément Ader, Ecole des Mines d'Albi-Carmaux), Arthur Cantarel (Institut Clément Ader, IUT Tarbes), Gérard Bernhart (Institut Clément Ader, Ecole des Mines d'Albi-Carmaux, IRT Saint-Exupéry)* Polymerization-crystallization kinetics of the PA6 synthesis for liquid reactive process of thermoplastic composite are characterized and modeled thank to an original coupling.	5211-2 **DEVELOPMENT OF HIGH TEMPERATURE OVERWRAP COMPOSITE REPAIRS FOR PIPELINES** *M.S.F. Samsudin (PETRONAS Research), R.J. Varley, B.N. Dao, T.Nguyen (CSIRO Manufacturing Flagship), Y.C. Tan (PETRONAS Research) P. Cass (CSIRO Manufacturing Flagship), K.H. Leong (PETRONAS Research)*

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11:35	5212 Sandwich Structures and Materials 10	5213 Ultrasound, Acoustic Emission, and Electromagnetic waves 2	5214 Constitutive Models 5	5215 Processing-Manufacturing Technologies 6	5216 Sensing and Self-Diagnosis 4	5217 Manufacturing Up-Scaling and Automation2	5218 Offshore and Subsea 1	5219 Experimental Methods for Process Characterization 2	5220 Fibers 5	5221 Machining of Composites 2	
11:35	5212-1 **INDENTATION BEHAVIOUR CHARACTERISTICS CAUSED BY DOMINANT PARAMETERS IN POLYMERIC SANDWICH PANELS** *Gang Zhou, Qingchun Jiang(Loughborough University),YipuShen(Tongji University)* This work characterises the indentation behaviour of sandwich panels, especially the effects of varying core density and identifies dominant mechanisms dictating the indentation behaviour. It paves the way for significantly improving the indentation laws used for composite skinned honeycomb sandwich panels.	5213-1 **NUMERICAL SIMULATION OF LAMB WAVE PROPAGATION FOR DETECTION OF IMPACT DAMAGE IN A SKIN-STRINGER COMPOSITE STRUCTURE** *Peiwen Deng (The University of Tokyo), Yoji Okabe (The University of Tokyo), Osamu Saito (The University of Tokyo), Hideki Sogiimk (Fuji Heavy Industries)* In this research, the authors attempted to model the lamb wave propagation for detection of impact damage by a homogeneous frustum of a cone shape with the degradation of quasi-isotropic stiffness matrix. And the decreasing rate of the stiffness matrix was determined based on the velocity change of ultrasonic waves and the cross-section observation of the impact damage.	5214-1 **A SYSTEMATIC APPROACH TO INVARIANT-BASED ANISOTROPIC NON-ASSOCIATIVE PLASTICITY FOR FIBER REINFORCED POLYMERS** *B.Daum, A. Dean, R. Rolfes (University of Hannover)* The formulation of non-associated plasticity in the context of isotropic tensor functions is reviewed. Particular consideration is given to the modeling of constitutive constraints.	5215-1 **STUDY OF PAINTING PRETREATMENT OF CARBON FIBER COMPOSITES FOR AUTOMOTIVE APPLICATIONS** *Huang Zou, Yang zhensan , He geng* This paper will focus on study of pretreatment of carbon fiber composites prior to painting, using different surface filling materials, via varies applying techniques for different surface contitions which is produced by different processing methods. The objective of this work is to evaluate and compare the available and prespective painting pretreatment solutions to ensure that the painting quality meets the requirements of automotive exterior applications.	5216-1 **AN INVESTIGATION ON THE ELECTRICAL RESPONSE OF DELAMINATED LAMINATES** *Michele Zappalorto, Francesco Panozzo, Paolo A. Carraro, Marino Quaresimin (University of Padova)* An experimental and theoretical study is carried out to investigate the possibility of monitoring the presence of a delamination through electrical measurements in a conductive composite part. As a representative example of application, DCB tests are considered and it is proved that the growth of the delamination results in an irreversible increase of the electrical resistance.	5217-1 **EFFECT OF MANUFACTURING PARAMETERS ON THE QUALITY OF THERMOPLASTIC COMPOSITES MADE BY AUTOMATED FIBER PLACEMENT (AFP)** *S. V. Hoa, F. Shadmehri, J. F. Simpson, M. I. El-Gouchy, Jinbo Bai (ECP), Delong He (ECP)* In this paper, the effect of a novel in-situ treatment called "repass" on surface finish quality of thermoplastic composites made by Automated Fiber Placement (AFP) is studied. Achieving a smooth surface finish is required for thermoplastic composites used as aero-surface structures.	5218-1 **STUDY OF ARMOUR ANCHORING MECHANISM WITH MWCNTS FILLED TOUGHENED EPOXY INSIDE THE END FITTING OF FLEXIBLE RISER** *Rafael Pereira Matteoli (Technip / UFRJ / ECP), Anh-Tuan Do (Technip), Fernando Luiz Bastian (UFRJ), Jinbo Bai (ECP), Delong He (ECP)* This work deals with the understanding of carbon fibre composite armours adhesion behaviour with an epoxy based matrix filled with multi-walled carbon nanotubes (MWCNTs) with a focus on improving the epoxy mechanical properties and its performance in adhesion. Test results confirmed improvement in some epoxy mechanical properties and delamination toughness.	5219-1 **INVESTIGATION OF SHEAR-BENDING COUPLED PROPERTIES IN COMPOSITE PREPREG FORMING** *Hassan Alshahrani, Mehdi Hojjati (Concordia University)* The current study explored the coupling effect of shear on bending properties during prepreg forming process, including the relationship between the shear angle and bending stiffness.	5220-1 **CURRENT-ASSISTED WET-SPINNING FOR MANUFACTURING ADVANCED POLY(ACRYLONITRILE) AND CARBON FIBERS** *Ho-Sung Yang, Woong-Ryeol Yu (Seoul National University)* Functional development of wet-spun organic conducting composite fiber.	5221-1 **ANALYSIS AND QUANTIFICATION OF DAMAGE IN POLYMER COMPOSITE MATERIALS** *Pedro Silva, Stella M. Abreu, João E. Matos, Luís Miguel P. Durão (Polytechnic of Porto (ISEP)* In this study the authors deal with the evaluation of the magnitude of the area damaged by drilling in carbon/epoxy laminates. Furthermore, it is presented an experimental procedure to show how the resulting damage of the drilling process affects the mechanical properties of the plates.	
11:55	5212-2 **DYNAMIC MECHANICAL BEHAVIOR OF HIERARCHICAL MECHANICAL METAMATERIALS** *Jiani Li, Jianying Hu, Haoyu Chen(Beihang University), Jun Xu(Beihang University&Xi'an Jiaotong University&Tsinghua University), Sha Yin(Beihang University&Xi'an Jiaotong University)*	5213-2 **DAMAGE SIZE AND DEPTH ESTIMATION ON COMPOSITE STRUCTURES WITH WAVENUMBER ANALYSIS** *Jun Young Jeon (Chonnam National University), Duhawn Kim (Chonnam National University), To Kang (Korea Atomic Energy Research Institute), Soon Woo Han (Korea Atomic Energy Research Institute)*	5214-2 **NUMERICAL ANALYSIS OF THE MECHANICAL BEHAVIOR OF CARBON FIBER REINFORCED COMPOSITES BASED ON ELASTOPLASTIC MACROSCOPIC MODEL** *Jinhyeok Jang, Jae Hyuk Choi, Woong-Ryeol Yu (Seoul National University)* Continuum-based elastoplastic model (based on Chen and Sun's plastic model) was developed to analyse the mechanical behaviour of CFRP. Using combining Puck's failure model, the nonlinear mechanical behaviour of CFRP was then predicted and compared with experiments, demonstrating the validity of the current model.	5215-2 **LASER MACHINING OF CFRP** *Rajesh Patel (Spectra-Physics)* Achieving fast processing and low thermal damage CFRP cutting and drilling using ultraviolet nanosecond laser. Also, achieving stronger CFRP joints with ultraviolet nanosecond laser cleaning and texturing process.	5216-2 **HIGHLY SENSITIVE GRAPHENE COMPOSITE STRAIN SENSOR FROM QUASI-STATIC TO ULTRASONIC WAVE** *Feng Duan (CAS Center for Excellence in Nanoscience, The Hong Kong Polytechnic University), HaoJin (CAS Center for Excellence in Nanoscience), Zhong Zhang (CAS Center for Excellence in Nanoscience)* Flexible, surface compatible, lightweight and low-cost graphene nanocomposite realized sensitive response to strain of different magnitudes from quasi-static strain to medium frequency vibration, and even up to high frequency ultrasonic wave, which exhibiting vast potential in human motion and structure health monitoring.	5217-2 **ADVANCED AUTOMATED TAPE LAYING WITH FIBRE STEERING CAPABILITY USING CONTINUOUS TOW SHEARING MECHANISM** *Evangelos Zympeloudis, Kevin Potter, Paul M. Weaver, Byung Chul Kim (University of Bristol)* A novel placement head is presented which can steer wide prepreg tapes. The process can achieve excellent quality whilst producing steering radii as low as 50 mm, making this technology the first that allows for wide tape layup with steering capabilities.	5218-2 **FINITE ELEMENT ANALYSES OF ENHANCED CORROSION BARRIER FOR POLYMER NANOCOMPOSITES** *W.S. Sum (PETRONAS Research, Imperial College London), A.YL. Leong (PETRONAS Research, Imperial College London), K.H. Leong (PETRONAS Research), D. Ballint (Imperial College London)*	5219-2 **CASCADE INJECTION PROCEDURE FOR BLADDER-ASSISTED RESIN TRANSFER MOLDING** *C. Schiffarti, E. Fauster, R. Schledjewski (Montanuniversität Leoben)* The application of a cascaded injection procedure for bladder-assisted resin transfer molding (BARTM) is investigated. Flow simulations and saturation experiments showed that this concept enables a signifcant reduction in part filling times.	5220-2 **INFLUENCE OF ORGANIC VAPOR ANNEALING ON STRUCTURE AND PROPERTY OF CONJUGATED COMPOSITE FIBER** *Xinyue Wang, Minggao Ge (Jiangnan University)* Functional development of wet-spun organic conducting composite fiber.	5221-2 **INVESTIGATIONS ON THE THERMAL LOAD AND ACTIVE THERMAL LOAD REDUCTION DURING LASER PROCESSING OF CFRP** *R. Staehr, S. Bluemel, P. Jaeschke, O. Suttmann, L. Overmeyer (Laser Zentrum Hannover e.V.)* In this paper, investigations were carried out on the impact of cost effective and easy-to-apply cooling options on the thermal load during laser processing of CFRP.	

Friday 25 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
12:15	5201-3 **EFFECT OF FIBER ORIENTATION AND BENDING STRUCTURE ON THE PERMEABILITY OF NON-CRIMP FABRIC IN LCM** *Yi Geng, Jinhua Jiang, Nanliang Chen, Wenquan Yang, Chuanli Su (Donghua University)* This work is to investigate flow front movement in complex structure L shape mold and see how much degree the local permeability will be influenced in LCM.		5203-3 **EFFECTS OF SALT-SPRAY AND HEAT-WET ON THE LAMINATES USING HOT-PRESSED TACKIFYING** *Jin Li (Ningxia University), Changchun Wang (Commercial Aircraft Corporation of China Ltd. (COMAC)), Guangquan Yue (Commercial Aircraft Corporation of China Ltd. (COMAC)), Shaofu Kang (Ningxia University), Yihan Yang (Ningxia University)*		5205-3 **DISCRETE PLY MODELLING OF NOTCHED CFRP PLATES UNDER TENSION** *Joel Serra Christophe Bouvet, Bruno Castanie(Institut Clément Ader (ICA),Université de Toulouse – INSA-ISAE-Mines Albi-UPS), Caroline Petiot(AIRBUS GROUP INNOVATIONS)* Numerical and experimental investigations under tensile loading of notched specimens were carried out. A computational study of notched tensile tests using the Discrete Ply Modelling (DPM) method is developed. The specificities of this finite element model are its discrete nature (interface elements to model delamination and matrix cracks), the small number of parameters required and its robustness. Comparisons with experiments demonstrate that tensile strengths, and failure scenarios and patterns are predicted with acceptable accuracy.	5206-3 **THEORETICAL ANALYSIS AND EXPERIMENTAL STUDY OF CARBON FIBER ORTHOGRID-CORE SANDWICH CYLINDER UNDER UNIAXIAL COMPRESSION** *Shu Jiang (Nanjing University of Aeronautics and Astronautics, Hohai University), Fangfang Sun (Nanjing University of Aeronautics and Astronautics), Hualin Fan (Nanjing University of Aeronautics and Astronautics)*	5207-3 **THERMAL DEGRADATION AND FIRE REACTION PROPERTIES OF MYCELIUM COMPOSITES** *M. Jones (RMIT University), T. Bhat (University of New South Wales), C.H. Wang (University of New South Wales), K. Mainuddin (Victoria University), S. John (RMIT University)* Thermal degradation and fire reaction properties of biologically produced mycelium composites are assessed and compared with XPS foam for non-structural and semi-structural applications in the construction industry.	5208-3 **BIAXIAL TESTING OF GLASS/EPOXY COMPOSITE LAMINATES USING A MODIFIED ARCAN'S FIXTURE (MAF)** *Khong Wui Gan (University of Southampton Malaysia Campus (USMC), University of Southampton), Tobias Laux (University of Southampton), Ole Thybo Thomsen (University of Southampton), Janice M. Dulieu-Barton (University of Southampton)* A novel modified Arcan fixture (MAF) has been developed and used to investigate the biaxial mechanical response and failure behaviour of multidirectional E-glass/epoxy composite laminates.		5210-3 **OPTIMISATION OF DOUBLE DIAPHRAGM FORMING PROCESS THROUGH LOCAL ADJUSTMENT OF IN-PLANE CONSTRAINT** *S. Chen, L. T. Harper, O.P.L. McGregor, A. Endruweit, N. A. Warrior (University of Nottingham)* A Double Diaphragm Forming (DDF) process has been optimised using finite element simulations to form flat 2D preforms into complex 3D shapes without defects. The model has been simplified to enable a genetic algorithm to be used to find the optimum arrangement of riser blocks to locally change the strain distribution in the diaphragms to alleviate wrinkles.	5211-3 **EFFECT OF LAMINATE B-STAGING ON OUT-OF-AUTOCLAVE COMPOSITE REPAIR** *H. M. Chong, A. S. Subramanian, S. P. Ng, E. Kok and S. Feih (Singapore Institute of Manufacturing Technology)* This paper demonstrates the use of a double-vacuum debulking process for out-of-autoclave repair of composite structures.
12:35	Lunch										
13:35	PLENARY LECTURE at Qujiang Auditorium: **Technologies Overview for Composite Materials and Automotive Components in Korean Automotive Industry** Hee June Kim, LG Hausys R&D Center, Korea										
14:25	Coffee Break										
14:50	5301 Liquid Composites Moulding 2	5302 Metal Matrix Composites 15	5303 Fiber-reinforced Composites 15	5304 Dynamic Fracture 3	5305 Damage Tolerance of Composites Structures 4	5306	5307 Green Composites 5	5308 Other New Testing Methods 3	5309 Textile-Based Composites 8	5310 Process Modelling 6	5311 Composite Repair 3
14:50	5301-1 **EFFECT OF MOLDING PRESSURE ON MECHANICAL PROPERTIES OF FRP BY RTM** *Kazumasa Okuyasu, Ryo Hirai, Asami Nakai (GIFU University)* GFRP with different surface treatment and molding pressure were molded by RTM. Static tensile property, crack propagation behavior, and fatigue property were investigated by tensile test, cyclic tensile test and fatigue test.	5302-1 **THE EFFECT OF INTERFACE LAYER THICKNESS ON THERMAL CONDUCTIVITY OF DIAMOND PARTICLES DISPERSED CR-ALLOYED CU MATRIX COMPOSITES** *Jianwei Li, Hailong Zhang, Zifan Che, Yang Zhang, Xitao Wang (University of Science and Technology Beijing)* A high thermal conductivity of 810 W/mK is obtained in a diamond/Cu0.5wt.%Cr composite produced by a gas pressure infiltration route.	5303-1 **MECHANICAL PROPERTIES AT CRYOGENIC TEMPERATURE OF MULTI-SCALE NANO-CARBON/ MICRO-FIBER REINFORCED EPOXY COMPOSITES** *Jian Qiao (Chongqing University), Bao-Gang Sun (Chongqing University), Yuan-Qing Li (Chongqing University), Cheng-Bin Qu (Chinese Academy of Sciences), Hong-Min Xiao (Chinese Academy of Sciences), Shao-Yun Fu (Chongqing University, Chinese Academy of Sciences)* Mechanical properties of epoxy composites are critical parameters for their successful applications in cryogenic engineering fields such as large cryogenic project, aerospace and superconducting industries, etc.	5304-1 **FINITE ELEMENT MODELS WITH NODE-DEPENDENT KINEMATICS ADOPTING LEGENDRE POLYNOMIAL EXPANSIONS FOR THE ANALYSIS OF LAMINATED PLATES** *G. Li, A.G. de Miguel, E. Zappino, A. Pagani, E. Carrera (Politecnico di Torino)* Node-dependent kinematics for 2D modeling is extended to p-version plate elements constructed with Hierarchical Legendre Expansions (HLE).	5305-1 **DAMAGE TOLERANCE ANALYSIS OF BONDED COMPOSITE SCARF JOINTS USING COHESIVE ZONE MODELS: LIMITATIONS &AMP CHALLENGES** *J.M. Hayes-Griss (RMIT University & Advanced Composite Structures Australia), A.J. Gunnion (Advanced Composite Structures Australia), A. Orifici, A. A. Khatibi (RMIT University)*		5307-1 **ALLOCATION IN LCA OF FLAX FIBRES FOR THE REINFORCEMENT OF COMPOSITES** *John Summerscales (Plymouth University)* The study compares Life Cycle Assessment allocation of environmental burdens for two different primary products: (i) flax seed as a nutritional supplement with fibre generated from the waste stream, or (ii) flax fibre as the primary product.	5308-1 **METHOD OF PLANE STRESS MEASUREMENT BASED ON TERAHERTZ SPECTROSCOPY** *Wang Zhigong, Han Yunhui, Kang Kai (Tianjin University)* This paper proposes a new approach to obtain the plane stress state of optically opaque materials and measures the plane stress of polytetrafluoroethylene (PTFE) specimen. In this approach we based on stress-optical law, using the polarization sensitive terahertz time-domain spectroscopy (THz-TDS) through optimization calculation finally solve the plane stress state.	5309-1 **CARBON FIBER TEXTILE COMPOSITES USING HIGHLY-POLYMERIZED THERMOPLASTIC EPOXY: EFFECT OF MOLECULAR WEIGHT OF EPOXY ON THE MECHANICAL PERFORMANCE OF COMPOSITES** *Hironori Nishida, Keisuke Nagai, Souchirou Imagawa, Kazuya Okubo, Toru Fujii (Doshisha University), Valter Carvelli (Polytechnic University of Milan)* This study is to reveal the effect of resin molecular weight (Mw) on the mechanical properties of carbon fabric reinforced thermoplastic epoxy composites (CFRTP). It is shown that an excessive polymerization is not necessary for composite performance greater than 60,000 Mw.	5310-1 **DETERMINING MATERIAL PROPERTY DEVELOPMENT OF CFRP DURING CURE BASED ON IN-SITU MEASUREMENT OF INTERNAL STRAIN AND ITS APPLICATION TO ARBITRARY CURE CYCLE SIMULATION** *Shoma Niwa, Shu Minakuchi, Nobuo Takeda (The University of Tokyo)* A novel technique of manufacturing kiss-bonds within a composite component is presented. The defects are controllable in size, shape and location, and provide a realistic defect for the purposes of NDI equipment assessment and calibration, as well as mechanical characterisation of the defects.	5311-1 **CREATING KISS-BONDS FOR NON-DESTRUCTIVE INSPECTION** *R. Telford, A. O'Carroll, T. M. Young (University of Limerick)* A novel technique of manufacturing kiss-bonds within a composite component is presented. The defects are controllable in size, shape and location, and provide a realistic defect for the purposes of NDI equipment assessment and calibration, as well as mechanical characterisation of the defects.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
5212-3 **ON THE INHOMOGENEOUS STRESS DETERMINATION OF HONEYCOMB CORE BLOCK MANUFACTURED BY STRETCHING TECHNOLOGY** *Zhongqang Wang, Jiefu Liu (Central South University&Ministry of Education)* Inhomogeneous stress of honeycomb core block manufactured by stretching technology was evaluated extensively by means of experiments.	5213-3 **DAMAGE-TYPE IDENTIFICATION IN A CFRP CROSS-PLY LAMINATE FROM ACOUSTIC EMISSION SIGNALS DETECTED BY A FIBER-OPTIC SENSOR IN A NEW REMOTE CONFIGURATION** *Fengning Yu (The University of Tokyo), Yoji Okabe (The University of Tokyo), Naoki Shigeta (IHI Corporation)* The paper developed a remote measurement configuration to achieve a stable AE detection using a fiber Bragg grating (FBG) sensor. Using the configuration, we proposed a novel method to identify the damage types in carbon fiber reinforced plastic (CFRP) laminates from the detected AE signals.	5214-3 **MECHANICAL PROPERTIES OF NON-CRIMP FABRIC REINFORCED QUASI-ISOTROPIC LAMINATE LOADED IN BIAXIAL TENSION-COMPRESSION** *Songhe Meng, Leying Song, Chenghai Xu, Xinxing Han, Wei Wang (Harbin Institute of Technology)* The current paper presents research on the evaluation of the mechanical properties subjected to biaxial tensile-compressive loading of the NCPC quasi-isotropic laminate.Some mechanical properites including stress-strain response and failure mechanism, as well as the influence of loading state on these properties are explored.	5215-3 **CURING RESIN INFUSED COMPOSITES IN THE AUTOCLAVE** *Robert Wilkinson, Richard K. Cullen, John Summerscales (Plymouth University)* This paper considers the optimisation of autoclave cure of resin-infused composites and extends an earlier feasibility study for composite plates referenced to equivalent systems manufactured by hand-lamination, or by resin infusion without autoclave cure.	5216-3 **3D FLEXIBLE AND STRETCHABLE CONDUCTORS WITH NEGATIVE POISSON'S RATIO** *Chuanxin Weng (National Center for Nanoscience and Technology, Beijing; University of Chinese Academy of Science), Lugi Liu (National Center for Nanoscience and Technology, Beijing), Zhaohe Dai (National Center for Nanoscience and Technology, Beijing; University of Chinese Academy of Science), Zhong Zhang (National Center for Nanoscience and Technology, Beijing)*	5217-3 **OPTIMISATION OF MULTISTABLE HELICAL STRUCTURES USING AFP MANUFACTURING** *R. Telford, P.M. Weaver, (University of Limerick)* Taking advantage of the speed and accuracy of AFP manufacturing, a morphing helical structure is presented that features an additional multistable shape configuration. Similar to the tendril perversion observable in nature, this additional shape configuration locally reverses the helix orientation and vastly increasing morphing capabilities.	5218-3 **A MICROMECHANICS APPROACH TOWARDS DELAMINATION OF THERMOPLASTIC COMPOSITE PIPE FOR OFFSHORE APPLICATIONS** *Sandeep Namdeo, Henk de Boer, Jens de Kanter (Airborne Oil & Gas B.V.)*	5219-3 **IN-SITU BUBBLE CHARACTERIZATION DURING RESIN INFUSION FOR PROCESS SIMULATION OF VOIDS** *Brock Zobell, Andrew George (Brigham Young University)* A methodology to observe bubble/void formation and mobility in situ, in carbon reinforcement materials, during liquid composite molding.	5220-3 **WETTABILITY OF A SINGLE CARBON FIBER** *Si Qiu (Harbin Institute of Technology, KU Leuven), Carlos Fuentes (KU Leuven), Dongxing Zhang (Harbin Institute of Technology), Aart Willem Van Vuure (KU Leuven), David Seveno (KU Leuven)* A new method was developed to measure the dynamic contact angles of a single carbon fiber at low and high velocities, taking into consideration both the intrinsic variability of the carbon fiber diameter and the extremely small amplitude of the capillary forces. The effectiveness of the method was strengthened by fitting the experimental contact angle values by the MKT which permitted to assess the static advancing contact angle as well as the dynamic wetting parameters of the carbon fibers considered in this work.	5221-3 **EXPERIMENTAL INVESTIGATION OF CFRP TRIMMING BY MEANS OF SHEARING** *F. Klocke, A. Shirobokov, R. Hild, A. Feuerhack, D. Trauth , S. Kerschnawe* Manufacturing technology shearing is applicable to finish processing of CFRP. Cause and efect relationships between the sheraring process parameters and the resulting cutting resistance, sheared edge quality, and delaminations are investigated on the example of a trimming process.	
Lunch										
PLENARY LECTURE at Qujiang Auditorium: **Technologies Overview for Composite Materials and Automotive Components in Korean Automotive Industry** Hee June Kim, LG Hausys R&D Center, Korea										
Coffee Break										
5312 Sandwich Structures and Materials 11	5313 Ultrasound, Acoustic Emission, and Electromagnetic waves 3	5314	5315 Processing-Manufacturing Technologies 7	5316 Sensing and Self-Diagnosis 5	5317	5318 Offshore and Subsea 2	5319 Experimental Methods for Process Characterization 3	5320 Fibers 6	5321 Machining of Composites 3	
5312-1 **THE INFLUENCE MECHANISM OF TRABECULAR RADIUS AND HEIGHT OF CORE STRUCTURE ON THE COMPRESSIVE PROPERTIES OF BEETLE ELYTRON PLATES** *Jinxiang Chen, Xiaoming Zhang(Southeast University), Yoji Okabe(The University of Tokyo), Ning Hao, Mengye Xu(Southeast University)* The influence of the trabecular radius and height of the core structure on the compressive property of beetle elytron plates were investigated. And the existence of trabeculae in beetle elytra enable the biological functions of facilitating flight and protecting the body of the insect.	5313-1 **RESEARCH OF DISCRETE ELEMENT IMPACT TEST BASED ON ACOUSTIC EMISSION** *H. Han (Aircraft Strength Research Institute, Xi'an), Y. Yang (Aircraft Strength Research Institute, Xi'an), X. Zhong (Shenyang Aircraft Design and Research Institute), H. Zhang (Aircraft Strength Research Institute, Xi'an)* Aiming at accaluating the monitoring probability of the impact damage and the location reliability based on AE, impact tests on a composite wing box were carried out. Several researches were delved deeply.		5315-1 **MANUFACTURING OF HIGH COMPLEXITY AIRCRAFT STRUCTURE IN PREIMPREGNATED CARBON FIBER BY MEANS OF DOUBLE VACUUM DEBULKING PROCESS** *L.Garcia-Fernandez, A.Garcia-Garcia (FIDAMC)* This paper considers the optimisation of autoclave cure of resin-infused composites and extends an earlier feasibility study for composite plates referenced to equivalent systems manufactured by hand-lamination, or by resin infusion without autoclave cure.	5316-1 **A FACILE STRATEGY FOR REALIZATION OF MULTI-MODE FLEXIBLE SENSOR CAPABLE OF CONTACT AND CONTACTLESS SENSING** *Pei Huang, Xiao-Guang Yu, Wei-Bin Zhu, Yuan-Qing Li, Shao-Yun Fu (Chongqing University)* A facile strategy for the fabrication of flexible sensor integrated with the contact and contactless sensing capacities has been proposed. The as-made sensor shows high sensitivity towards strain and magnetic field, which shows great potential in the fields of vehicle, health monitoring and etc.		5318-1 **A CAPACITY STUDY OF COMPOSITE SANDWICH CYLINDRICAL SHELL UNDER HYDROSTATIC PRESSURE** *Zixu Zhu, Yongqing Li, Xi Zhu, Libao Zhu (Navy University of Technology)* This paper studied the composite sandwich cylindrical shell structure, using experiment and finite element calculation method to compare the capacity of two shell models under hydrostatic pressure.	5319-1 **THE DETECTION METHOD OF PARTICLE DISTRIBUTION IN TERNARY COMPOSITES CONSISTING OF PARTICLES, RESIN MATRIX AND 3-D WOVEN REINFORCEMENT** *Y. Zhou, M. Li, Y. Li, Y. Gu, Z. Zhang (Beihang University)* Two kinds of microscopic methods and three kinds of macroscopic methods were compared in analyses of particles, resin matrix and 3-D woven reinforcement.	5320-1 **HIGH THROUGHPUT NANOFIBER PRODUCTION BY ROTATION-AIDED NEEDLELESS ELECTROSPINNING** *Kolos Molnár, Tibor Czigány (Budapest University of Technology and Economics, MTA–BME Research Group for Composite Science and Technology)* In this study a novel, needleless electrospinning method is introduced. The system allows high throughput, simple maintenance and works with an insignificant free liquid surface.	5321-1 **DESIGN OF A NEW ONE-SHOT TOOL WITH DOUBLE MARGINS STRUCTURE IN DRILLING TITANIUM/ COMPOSITE STACKS** *Chong Zhang (Dalian University of Technology), Zhenyuan Jia, Fuji Wang, GuangJian Bi, Boyu Zhang, Junwei Yin* Develop a new geometrical drill to through multilayer materials in only one shot, a novel step-structure with broaching part, special reaming part and cutting edge is presented and to make the modification of the one short drill.	

Friday 25 August

Time	ROOM 1 (Presidium Conference Room)	ROOM 2 (402)	ROOM 3 (406)	ROOM 4 (405)	ROOM 5 (305)	ROOM 6 (International Reporting Hall)	ROOM 7 (VIP 303)	ROOM 8 (VIP 304)	ROOM 9 (306)	ROOM 10 (308)	ROOM 11 (311)
15:10	5301-2 **EVALUATION OF A VARIETY OF VACUUM ASSISTED RESIN INFUSION PROCESSES** *Yan Oosterom, S., Allen T., Battley M. A., Bickerton S (University of Auckland)* Six different vacuum infusion methods have been compared to investigate the benefits and drawbacks of the process modifications made relative to standard VARTM. Utilising parameter measurements during processing, and quality measurements on manufactured laminates, the processes are assessed against different manufacturing scenarios.	5302-2 **UNDERSTANDING AND TAILORING INTERFACIAL BONDING STATES OF A DIAMOND-AL COMPOSITE FOR THERMAL MANAGEMENT APPLICATIONS-GANG JI** *Zhangju Tan, Run Xu, Genlian Fan, Ding-Bang Xiong, Zhiqiang Li, Di Zhang (Shanghai Jiao Tong University)* The age hardening behaviors in CNT/Al alloys and Al alloy matrix at different temperatures are investigated. The age hardening kinetics of CNT/ Al alloys are found much faster than that in the Al alloy counterparts due to the presence of CNTs.	5303-2 **IN-SITU MONITORING OF AIR REMOVAL DURING VACUUM BAG-ONLY (VBO) PROCESSING** *Wei Hu, Steven Nutt (University of Southern California)* In this study, an in-situ visualization technique was used to investigate void evolution in unidirectional prepregs during vacuum bag-only cure. The effects of key process parameters on void evolution are determined, yielding a clearer understanding of air removal mechanisms.	5304-2 **FINITE BEAM ELEMENTS BASED ON LEGENDRE POLYNOMIAL EXPANSIONS AND NODE-DEPENDENT KINEMATICS FOR THE GLOBAL-LOCAL ANALYSIS OF COMPOSITE STRUCTURES** *G. Li, A.G. de Miguel, A. Pagani, E. Zappino, E. Carrera (Politecnico di Torino)* Hierarchical Legendre Expansions (HLE) are used as cross-sections functions in combination with node-dependent kinematics. Such an approach enables one to refine the kinematics of beam models locally ant any desirable node by simply increasing the polynomial degree.	5305-2 **DELAMINATION GROWTH RATE IN COMPOSITE LAMINATES UNDER INCREASING LOW-VELOCITY IMPACT ENERGY** *M. Francesca Pernice, Andrew T. Rhead (University of Bath)* Fifty-three impact tests were performed under a range of impact energies providing results for 48 stacking sequences. Rate of growth of delaminations with increasing impact energy is shown to vary with interface angle. Correlation is seen with through thickness distribution of shear stresses during impact.		5307-2 **DETERMINATION OF THE POLY(LACTIC ACID) CRYSTALLIZATION THROUGH A SYNERGISTIC APPROACH, CONTAINING A BIOBASED CARBON NUCLEANT** *Michael Snowdon, Amar Mohanty, Manju Misra (University of Guelph)* The effect of crystallization on the mechanical and thermo-mechanical properties of poly(lactic acid) through plasticizer, nucleating agent and mold temperature.Demonstrating the difference in performance of a biocarbon versus a talc based nucleating agent under similar conditions.	5308-2 **OPTICAL EXPERIMENTAL AND NUMERICAL STUDY ON THE COMPRESSION BUCKLING BEHAVIORS OF COMPOSITE PANEL STIFFENED BY I-TYPE RIBS** *Zhenkun Lei, Ruixiang Bai (Dalian University of Technology)* Full-field buckling deflection of I-type stiffened composite panel were measured by a multi-frequency phase-shifting method of fringe projection profilometry.Numerical simulation was verified by the experiments.	5309-2 **DESIGN OPTIMISATION OF 3D WOVEN T-JOINT REINFORCEMENTS** *Shibo Yan, Andrew Long, Xiaesen Zeng (University of Nottingham)* Through the new-established N-Notation of finite element formulation with full commutativity of displacement, Koiter's initial post-buckling theory has been successfully implemented.	5310-2 **MODELLING OF GEOMETRICAL INSTABILITIES IN ASYMMETRIC COMPOSITES PLATES REINFORCED WITH 3D INTERLOCK FABRICS** *Benavente, M. (École Polytechnique), Marcin L. (SAFRAN), Godon, T. (SAFRAN), Levesque, M. (École Polytechnique), Ruiz, E. (École Polytechnique)* Fully integrated simulation code for the RTM process that takes into account numerous physical phenomena. Residual stresses developed during the manufacturing of composite parts reinforced with 3D interlock fabric are presented in this work.	5311-2 **THE EFFECTS OF PRE-BOND MOISTURE AND ENVIRONMENTAL AGING ON THE FRACTURE TOUGHNESS OF BONDED COMPOSITE REPAIRS** *A. Rodriguez-Bellido (AIRBUS Paseo John Lennon s/n), S. Wedmer (AIRBUS Airbus Allee), C. Czirr (Deutsches Zentrum für Luft- und Raumfahrt (DLR) Lilienthalpl), J. Renart (Universitat deGirona Campus Montilivi s/n)* The effect of pre-bond moisture, operating conditions and environmental aging on the fracture toughness (Mode I) and failure behaviour of repair joints bonded with an adhesive film was investigated. For the material combinations investigated in this study the response to pre-bond moisture was found to be modulated by the reinforcement, the environmental history of the pre-cured adherent and the post-bond environmental aging. This knowledge is essential for the proper definition of the repair process and for the substantiation of the repair.
15:30	5301-3 **NUMERICAL SIMULATION OF INFUSION AT MICROSCALE PERMEABILITY CALCULATIO**N *Chen Li, Arthur Cantarel, Xiaqing Gong (University of Toulouse)* A random configuration model for fiber arrangement is proposed and implemented in a computer code in this paper. Morris method for Global Sensitivity Analysis (GSA) is used to study the influence of four structrual parameters on the permeability and the flow properties.	5302-3 **FABRICATION AND IMPACT PROPERTY OF MULTI-SCALE TiB/Ti6Al4V COMPOSITES BY POWDER METALLURGY** *S. Wang, L.J. Huang, L. Geng (Harbin Institute of Technology)* A kind of Ti6Al4V-TiB/ Ti6Al4V multi-scale titanium matrix composite is fabricated by powder metallurgy to improve impact property of titanium matrix composite.		5304-3 **HIGH-FIDELITY MODELLING AND DYNAMIC ANALYSIS OF DAMAGED TAPERED COMPOSITE STRUCTURES** *E. Carrera, A. Viglietta, E. Zappino (Politecnico di Torino)* The refined one-dimensional models, based on the Carrera Unified Formulation, have been used to give a high-fidelity description of structures with complex geometries taking into account stiffness variation due to local damages. The dynamic behavior of complex structures subjected to various damage conditions has been investigated.	5305-3 **SIMULATION OF THE OPEN-HOLE TENSILE RESPONSE OF COMPOSITE LAMINATES USING A COMBINED DISCRETE AND CONTINUUM DAMAGE APPROACH** *Mina Shahbazi, Reza Vaziri (The University of British Columbia)* A model is developed and implemented in a finite element framework to integrate fluid flow and stress development in processing of polymeric composite materials. In a seamless and continuous fashion, the model connects two extremes of processing, i.e. when initially resin behaves as liquid and when finally it is fully cured and solidified to form a solid composite material.		5307-3 **SIZE EFFECT OF OIL PALM FIBERS ON TENSILE PROPERTIES OF OIL PALM FIBER-REINFORCED POLYPROPYLENE COMPOSITES** *A. Nordin (Yamaguchi University), K. Sakamoto (Yamaguchi University), H. Azhari (Yamaguchi University), K. Goda (Yamaguchi University), M. Okamoto (Technology Develop Center, TOCLAS Co.), H. Ito (Technology Develop Center, TOCLAS Co.), T. Endo (Research Institute for Sustainable Chemistry)* This study aims to investigate and identify the possibility of Malaysian oil palm fibers (OPF) to be utilized for structural material in the same way as wood in wpo-polymer composites (WPC) application. Thus, this study focuses on the effects of different loads and sizes of OPF on the mechanical properties of OPF filled polypropylene composites, produced through an extrusion and injection-molding.	5308-3 **INVESTIGATION INTO THE HIGH STRAIN-RATE TENSILE DEFORMATION OF ENERGETIC COMPOSITE AT LOW TEMPERATURES WITH DIC AND DMA** *Zheiun Wang (Xi'an Hi-Tech Institute), Hongfu Qiang (Xi'an Hi-Tech Institute), Guang Wang (Xi'an Hi-Tech Institute), Chang Liu (Xi'an Hi-Tech Institute), Xinyu Yang (The People'Liberation Army 96630 Unit)* To further study the high strain-rate (0.40~42.86 s-1) uniaxial tensile deformation of HTPB propellant, a typical particulate-reinforced energetic composite, at different temperatures (233~298 K), the DIC method and DMA experiment were successfully used in this investigation.	5309-3 **CONSTITUTIVE MODELLING OF THE HYSTERETICAL BEHAVIOR OF TEXTILE COMPOSITES UNDER LARGE STRAIN** *Yvan Denis, Nahiene Hamila, Julien Colmars, Fabrice Morestin, Philippe Boisse (Institut National des Sciences Appliquées de Lyon (INSA))*	5310-3 **THE EFFECT OF SATURATION ON RESIN FLOW IN INJECTION PULTRUSION: A PRELIMINARY NUMERICAL STUDY** *J. Spangenberg (Technical University of Denmark), M. Larsen (Fiberline A/S), R. R. Rodriguez (Technical University of Denmark), P. M. M. Sánchez (Technical University of Denmark), F. Rasmussen (Technical University of Denmark), M. F. Sonne (Technical University of Denmark), J. H. Hattel (Technical University of Denmark)* In this study, a 2-D Darcy's law based numerical model is developed in order to investigate the effect of saturation on the propagation of the resin in the die chamber of a pultrusion line. The results of the numerical model highlights the importance of accurately determining the saturation curve when included in a numerical solver that is used to predict the resin flow in injection pultrusion.	5311-3 **EASY REPAIR OF INTERLAMINAR DAMAGE USING INTERLEAVED CARBON FIBRE/EPOXY COMPOSITES** *P. Robinson , R. Zhang (Imperial College London, South Kensington Campus) , A. Bismarck (Imperial College London, South Kensington Campus & University of Vienna), H.A. Maples (University of Vienna), C. Burgstaller (transferzentrer für Kunststofftechnik (TCKT))* An easy repair concept for interlaminar damage of carbon fibre/epoxy composite using an interleave strategy is investigated.

ROOM 12 (313)	ROOM 13 (204)	ROOM 14 (205)	ROOM 15 (206)	ROOM 16 (207)	ROOM 17 (208)	ROOM 18 (VIP101)	ROOM 19 (VIP 102)	ROOM 20 (VIP105)	ROOM 21 (VIP 106)	Room 22 (209+210)
5312-2 **LOW-VELOCITY IMPACT RESPONSE OF SANDWICH PLATES WITH A METAL FOAM CORE** *Qinghua Qin, Xiaoyu Zheng, Jianxun Zhang, T. J. Wang(Xi'an Jiaotong University)* An analytical model is developed to predict the dynamic response of fully clamped square sandwich plate with metal foam core struck transversely by a heavy mass with low-velocity.	5313-2 **MID-INFRARED LASER ULTRASONIC TESTING FOR COMPOSITE MATERIALS** *Masahiro Kusano, Hideki Hatano, Kanae Oguchi, Hisashi Yamawaki, Makoto Watanabe, Manabu Enoki (National Institute for Materials Science, Japan)* The purpose of the present study is to evaluate the performance of the mid-IR LUT system in reflection mode. We investigated the effects of the CFRP and the laser properties on the generated ultrasonic waves and obtained clear C-scan images by the system.		5315-2 **INTRODUCTION OF AN IN-MOULD INFRARED HEATING DEVICE FOR PROCESSING THERMOPLASTIC FIBRE-REINFORCED PREFORMS AND MANUFACTURING HYBRID COMPONENTS** *J. Reuschel, R. Schnurr, A. Müller, M. Kühn and K. Drodler (Braunschweig University of Technology)* Processing fibre reinforced thermoplastics (TP-FRP) within injection molding involves challenges of ensuring the processing temperature of the inserts. An infrared heating device integrated into the mould using transparent ceramics shall increase the process.	5316-2 **STRUCTURE OF RADIOACTIVE WASTE DISPOSAL WITH THE FBG SENSORS** *Sung-Kyu Cho (ICES Co., Ltd). Ki-Soo Kim (Hongik University)* Safety Monitoring the Silo Structure of Radioactive Waste Disposal with the FBG Sensors.		5318-2 **A NEW RECOMMENDED PRACTICE FOR THERMOPLASTIC COMPOSITE PIPES** *Andreas T. Echtermeyer, Odd E. Sund, Knut O. Ronold, Ramin Moslemian, Per A. Hassel (DNV GL)*	5319-2 **TRACKING THE EVOLUTION OF A DEFECT, CHARACTERISTIC OF AFP LAYUP, DURING CURE WITH IN-PROCESS MICRO-CT SCANNING** *Laura Rhian Pickard, Katie Smith, James Kratz, Kevin Potter (University of Bristol)* Scanning of a composite sample during cure has been used to track the evolution of an AFP-style defect, a 2 ply thick gap in the centre of a sample of M21/carbon fibre prepreg. Using repeated fast scans the initial closure of the gap and later appearance of voids along the gap edges can clearly be seen, and compared to the evolution of resin viscosity and degree of cure, thus demonstrating the potential of the technique while increasing our understanding of defect evolution.	5320-2 **MICROSCOPIC MODELING OF TOW MECHANICAL BEHAVIOR IN WOVEN FABRIC FORMING** *Mohammad Tahaye Abadi (Aerospace Research Institute)* A micromechanical modelling is derived for a bundle of carbon filaments in a tow having polymer coating produced by sizing process. The mechanical response of tow is examined on the compressive loading condition considering large deformation and rearrangement of filaments in the microstructure as well as the contact properties between filaments and filaments with the polymeric coating.	5321-2 **SIMULATION OF HEAT TRANSFER MODEL BASED ON FINITE ELEMENT METHOD FOR EDGE TRIMMING OF CFRP** *Jamal Sheikh-Ahmad, Fahad Almaskari, Farrukh Hafeez, Fanyu Meng (Department of Mechanical Engineering, The Petroleum Institute)* In this work, finite element analysis is employed to simulate temperature fields near and away from the trimming zone. The flux introduced in the model is calibrated by measuring these temperatures experimentally. This work provides heat partition evacuating into the CFRP Work piece.	
5312-3 **MECHANICAL RESPONSE OF PYRAMIDAL LATTICE TRUSS CORE SANDWICH STRUCTURES BY ADDITIVE MANUFACTURING** *Ge Qi(Harbin Institute of Technology), Bin Ji, Han Han(Aerospace System Engineering Shanghai), Bing Wang, Li Ma(Harbin Institute of Technology)* In this study, metallic pyramidal lattice truss core sandwich structures are fabricated utilizing additive manufacturing method. Experimental investigations were carried out to determine the mechanical response of the structures.			5315-3 **THE PERMEABILITY CHARACTERISTICS OF DRY FIBER PREFORMS MANUFACTURED USING AUTOMATED DRY FIBER PLACEMENT** *Alia R Aziz (Khalifa University of Science, Technology and Research (KUSTAR)), Rehan Umer (KUSTAR), Xuesen Zeng (The University of Nottingham), Sanjeev Rao (KUSTAR), Wesley J Cantwell (KUSTAR)* This work aims towards gaining on understanding of the permeability characterization of automated dry fiber placement preforms.	5316-3 **CEMENT BASED NANOCOMPOSITES WITH SELF-DIAGNOSTIC CHARACTERISTICS** *Zoi S. Metaxa, Stavros K. Kourkoulis (National Technical University of Athens)* The overall objective of this research is to develop nanocomposite cement based materials with "smart" characteristics that can be used as embedded sensors in a concrete structure for structural integrity monitoring. The final product is a smart nanocomposite with piezoresistive characteristics, enhanced post-cracking fracture properties, increased flexural strength and stiffness, fully compatible with concrete structures.		5318-3 **GRAPHENE FILLED EPOXY COATINGS FOR ENHANCED CORROSION PROTECTION** *A.Y.L. Leong (Imperial College London, PETRONAS Research), M.A. Mahtar (PETRONAS Research), C. Mattevi (Imperial College London), K.H. Leong (PETRONAS Research), E.Saiz (Imperial College London), W.S. Sum (Imperial College London, PETRONAS Research)*	5319-3 **EXPERIMENTAL RESEARCH ON THERMAL RESPONSE AND ABLATION PERFORMANCE OF A LIGHTWEIGHT THERMAL PROTECTION MATERIAL** *Yanwei Zhu, Fajun Yi, Weizhen Pan, Songhe Meng (Harbin Institute of Technology)* The ablation experiment of a thermal protection material is conducted under various heating load and aerodynamic pressure environment. Its' ablation performance are evaluated according to the information.		5321-3 **ARTIFICIAL INTELLIGENCE BASED TOOL FOR PREDICTING OF DAMAGE DURING DRILLING OF FRPS** *Hitesh Sharma (National Institute of Technology Uttarakhand), Upendra Kumar Komal, Inderdeep Singh, Dinesh Kumar (Indian Institute of Technology Roorkee)* The article reports the versatility and flexibility of knowledge based intelligent tool in predicting the damage during drilling of FRPs. The tool has the capability of being developed into a web based mobile app.	

Friday 25 August

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15:50		5302-4 **IMPROVING DAMAGE TOLERANCE OF CARBON FIBRE LAMINATES VIA BIO-INSPIRED MICRO-STRUCTURAL DESIGN** *Wenqiang Hu, Zhenying Huang, Hongxiang Zhai, Leping Cai, Cong Lei, Yang Zhou (Beijing Jiaotong University)* The purpose of this study is to fabricate a novel TiCx-Ni3(Al,Ti)/ Ni alloy composite from TiAlC2 and Ni alloy starting powders by hot-pressing technology. The microstructural evolution and the corresponding mechanical properties of obtained composites are carefully studied, which includes hardness, flexural strength (25oC-800oC), fracture toughness.		5304-4 **EVALUATION OF IMPACT FRACTURE TOUGHNESS OF ADHESIVELY BONDED CFRP JOINTS** *Yongsik Choo (Ritsumeikan University), Sota Oshima (Ritsumeikan University), Hisayoshi Ishida (Ritsumeikan University), Takayuki Kusaka (Ritsumeikan University), Tomo Takeda (Japan Aerospace Exploration Agency)* In this study, a novel experimental method is proposed for evaluating the nonlinear and propagation behavior of crack growth in adhesively bonded joints under impact loading using the digital image correlation (DIC) technique.				5308-4 **ON THE DETERMINATION OF INTERLAMINAR FRACTURE TOUGHNESS OF FIBRE REINFORCED POLYMER LAMINATES USING ORTHOGONAL CUTTING** *Hongjian Wang, Freeda A. Amir, Li Chang, Lin Ye (The University of Sydney)*	5309-4 **A PROPOSAL OF CONVENTIONAL FE-MODELING FOR LAYERED BRAIDED COMPOSITES** *Takuya Yamamoto (Itochu-Techno Solutions Corporation (CTC)), Aki Imaoku (Itochu-Techno Solutions Corporation (CTC)), Tatsuo Sakakibara (Itochu-Techno Solutions Corporation (CTC)), Masaru Zako (Osaka University)* This presentation proposes a FE-modeling for layered braided composites tubes having crimped and undulated bundles. The model constructed was validated by a bundle pattern obtained by cross-sectional observation of tubes.	5310-4 **QUANTIFICATION OF MICRO-PULLWINDING PROCESS AS BASIS OF DATA MINING ALGORITHMS FOR PREDICTIVE PROCESS MODEL** *Christian Wasiak, Henning Janssen and Christian Brecher (Fraunhofer Institute for Production Technology IPT)* Cost efficient manufacturing of customized goods calls for a profound knowledge of the relationships between inputs and outputs of the related manufacturing process. In this context, this work presents the initial steps to create a model of a miniaturized pullwinding process which will be used to produce customized medical devices.	
16:10								5308-5 **LINEAR LASER FAST SCANNING THERMOGRAPHY NOT FOR DISBONDS IN THERMAL BARRIER COATINGS (INVITED TALK)** *Dacheng Jiao (Beijing Institute of Technology), Zhanwei Liu (Beijing Institute of Technology), Wenying Zhu (Beijing Institute of Technology), Wenxiong Shi (Tsinghua University), Huimin Xie (Tsinghua University)* A Linear Laser Fast Scanning Thermography (LLFST) method, combing with novel post-processing algorithms for thermal images, such as constructing directional carrier of temperature field and three-moment windowing amplitude method, is used to detect disbond defects in TBCs.			
17:00	Dinner										

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5312-4 **NANO FILLED POLYBENZIMIDAZOLE (PBI) FILM COATING FOR IMPROVED ENVIRONMENTAL PERFORMANCE IN SPACE** *Sarath Kumar Sathish Kumar, Yunho Kim, Chunghyeon Choi, Chun-Gon Kim(Korea Advanced Institute of Science and Technology)* This paper discusses the effectiveness of using CNT as a filler on a surface coating in improving the resistance to environmental effects of a space structure employed in the Low Earth Orbit. The structures are tested for environmental parameters like Atomic Oxygen, Thermal Cycling, High Vacuum, Ultraviolet Radiation and Hypervelocity Debris Impact.			5315-4 **PROCESSING OF CARBON REINFORCED THERMOPLASTIC COMPOSITES** *P. J. Novo, J. P. Nunes, J.F. Silva, A. T. Marques (Polytechnic Institute of Leiria)* With the aim to produce and optimize the processing of carbon fibres thermoplastic matrix pre-impregnated materials (towpregs and PCT s) using a dry powder coating equipment, pultrusion and heated compression moulding were the selected manufacturing methods. The optimization of those processes was made by studying the influence of the most relevant processing parameters in the final properties.	5316-4 **THE MONITORING OF WEAR CONDITION AND DAMAGE USING LUMINESCENT MATERIALS (INVITED TALK)** *Y. He (Harbin Institute of Technology), S.C. Wang, P.A.S. Reed (University of Southampton)* Continuous health monitoring of composite structures has been considered of great importance in recent years. In this paper, mechanoluminescent materials that exhibit visible light emission under the application of mechanical stress have been embedded in composite or electrodeposited on the surface of equipment for detection of damage and wear occurred on critical components.		5318-4 **OFFSHORE PIPELINE REHABILITATION APPLICATION OF REINFORCED THERMOPLASTIC PIPE (RTP)** *Xianghai Jing (Aerosun Corportion), I Wayan Eka Putra Mas (PETRONAS), Mac Nazli Azah Bt M Adnan (PETRONAS), Yuxi Liu (Chuzhou University).*	5319-4 **A COMPARISON OF MATERIAL STATE MONITORING TECHNIQUES APPLIED TO RESIN TRANSFER MOULDING** *Daniel Griffin (National Physical Laboratory, UK), Alper Aktas (National Physical Laboratory, UK), Maria Lodeiro (National Physical Laboratory, UK), Tim Young (National Composites Centre, UK), Ian Hamerton (University of Bristol), Ivana Partridge (University of Bristol)* Initial trials of a multi-sensor setup for cure monitoring of resin transfer moulding process, investigating two room-temperature, slow-curing thermoset resin systems: epoxy and unsaturated polyester.			
5312-5 **PREDICTING THE UNDERWATER BLAST RESPONSE OF SANDWICH PLATES WITH ELASTIC CORES** *Gang Zhou, Qingchun Jiang(Loughborough University), Yiqu Shen(Tongji University)* This work characterises the indentation behaviour of sandwich panels, especially the effects of varying core density and identifies dominant mechanisms dictating the indentation behaviour. It paves the way for significantly improving the indentation laws used for composite skinned honeycomb sandwich panels.										
Dinner										

POSTERS AND MINI-ORALS PROGRAM

Wednesday 23 August 09:05-11:45

Stage 1
(Chairs: Nam Seo Goo/ Hao Wang)

P1101-1 Effects of inorganics on thermal property of silicone rubber composites
Jiuqiang Song, Yan Qin, Liangdian Liu, Xi Zhang, Zhixiong Huang (Wuhan University of Technology)

A hard dense protective ceramic layer was formed under the high temperature on the surface of the ceramifiable silicone rubber composite prepared with hydrated zinc borate as flame retardant and flux agent, kaolin as ceramic filler and high silica glass fiber as reinforce, which isolated the internal material from the oxygen in the air to prevent the loss of quality and heat transfer.

P1101-2 Effect of surface braided angle on vibration modal of a novel three-dimension and four-direction braided composite t-beam
Xiaoyuan Pei (Tianjin Polytechnic University)

This study focuses on the influence of a novel three-dimension (3 Dim) and four-direction (4 Dir) braided composite T-beam structural design on vibration properties. The results show that the structural design of the T-beam can meet various requirements of dynamic performance.

Stage 2
(Chairs: Yan Li/ Tong Earn Tay)

P1102-1 Hot deformation behaviour and microstructural evolution of bimodal size particulates reinforced (TiB+La2O3)/Ti composites
Xiangdong Sun, Yuanfei Han, Lixiang Wang, Weijie Lu (Shanghai Jiao Tong University)

1. The continuous dynamic recrystallization of primary α grains and dynamic globularization of lamellar α (α+β phase region), necklace recrystallization of β grains and dynamic recovery of lamellar α (β phase region) are the deformation mechanisms.
2. Both micro-sized TiB and nano-sized La2O3 can impede the movement of dislocations and TiB can facilitate the dynamic recrystallization of α phase and grain refinement.

P1102-2 Drysliding wear behavior of the composites fabricated by reaction synthesis from an al-B2O3 system
Zhu Heguo, Sun Xiaodong (Nanjing University of Science and Technology)

Stage 3
(Chairs: Raj Das/ Frank K. Ko)

P1103-1 Positively charged graphene derivatives modified with two silane molecules for multiple applications
Jincan Cui, Jing Li, Junhe Yang (University of Shanghai for Science and Technology)

Graphene oxide was modified by two silane molecules. The silanized graphene oxide can be used as the surfactant to stablize the Pickering emulsion in a wide range of pH value.

P1103-2 Shape-memory polymer nanocomposites with a 3D conductive network for bidirectional actuation
Xu Zhao, Qingyu Peng, Xiaodong He and Yibin Li (Harbin Institute of Technology)

Shape-memory polymer nanocomposites with a 3D conductive network for bidirectional actuation.

Stage 4
(Chairs: Jayantha A. Epaarachchi/ Jian Xiong)

P1104-1 Properties analysis of composite materials for the manufacture of space mirror
Zhiyong Yang (Beihang University), Qin Lei (Beihang University), Lingying Pan (Beihang University), Zhanwen Tang (Beihang University), Yongjie Xie (Chinese academy of sciences), Boming Zhang (Beihang University), Jianbo Sun (Beihang University), Xijun He (Beihang University)
This work puts forward requirements of carbon fiber composite for space mirror, and compares properties of common intermediate modulus and high modulus carbon fibers and common resins of composites. Results show that carbon fiber composite for manufacturing space mirror should select high modulus carbon fiber and high toughness resin matrix. High toughness cyanate ester resin C705 and carbon fiber M55J were selected for manufacturing the prototype space mirror.

P1104-2 The mechanical response of braided composite tube under three points bending loading
Zhenyu Wu (Zhejiang SCI-Tech University)

The paper presents the mechanical response of braided composite tube under the transverse loading.

Stage 5
(Chairs: Ning Hu/ Kok Hoong Leong)

P1105-1 In-situ synthesis and initial stress measurement of ultralong carbon nanotube bundles
Yunxiang Bai (Tsinghua University), Zhenxing Zhu (Tsinghua University), Huanhuan Xie (Tsinghua University), Rufan Zhang (Tsinghua University, Stanford University), Boyuan Shen (Tsinghua University), Dali Cai (Tsinghua University), Fei Wei (Tsinghua University)

P1105-2 Ply-tailored nanoparticle matrix modification in cross-ply CFRP laminates
Christian Leopold, Andreas Schelle, Julia Kosmann, Bodo Fiedler (Hamburg University of Technology)

The influence of a FLG matrix modification in the different layers of CFRP cross-ply laminates are investigated. Either the 90°-layers or the 0°-layers are modified with FLG nanoparticles. Superior mechanical properties are obtained.

Stage 6
(Chairs: Limin Zhou/ Faxiang Qin)

P1106-1 Thermal modeling strategies for laser assisted tape winding process
S.M.A. Hosseini, I. Baran, R. Akkerman (University of Twente)

Global thermal modeling of the in-situ temperature-dependent consolidation of the pre-preg tape in Laser Assisted Tape Winding(LATW) process is investigated. Physical thermal phenomena taking place during the LATW process is explained using various thermal models.

P1106-2 Study on resin layer polishing of carbon fiber mirror based on ion beam figuring
Ding Jiao Teng (Xi'an Institute of Optics and Precision Mechanics of CAS), Xu Liang (Xi'an Institute of Optics and Precision Mechanics of CAS), Ma Zhen (Xi'an Institute of Optics and Precision Mechanics of CAS), Fan Xue Wu (Xi'an Institute of Optics and Precision Mechanics of CAS), Xie Yong Jie (Xi'an Institute of Optics and Precision Mechanics of CAS), Wang Yong Jie (Xi'an Institute of Optics and Precision Mechanics of CAS), Luo Yao (Xi'an Branch of China Academy of Space Technology)

ICCM21
PROGRAMME AND BOOK
OF ABSTRACTS

Stage 1
(Chairs: Nam Seo Goo/ Hao Wang)

P1101-3 Uniaxial dynamic compressive properties of HTPB casting explosives
Youcai Xiao, Yi Sun (Harbin Institute of Technology)

P1101-4 Study on the heat resistance and mechanical properties of polytriazole resin matrix composite influenced by graphene oxide
Shen Zhen, Zeng Jin-fang, Dai Panyao, Wang Kaijie, Wang Xiu-yun (Xi'an Aerospace Composites Research Institute)

The introduction of alkynyl-pendant GO could make great contribution to the good heat resistance and high mechanical properties of PTA resin matrix composites at the appropriate post-treatment temperature and time, and it might have a good prospect in the application of solid rocket motor case.

P1101-5 Framework for process-related resin selection and optimisation for the resin transfer moulding (rtm) of composite materials
M. Rutt (University of Surrey, McLaren Technology Centre), C. Lekakou (University of Surrey), P.A. Smith (University of Surrey), I. Hamerton (University of Bristol), G. Meeks (McLaren Technology Centre), A. Sordon (McLaren Technology Centre), C. Santoni (McLaren Technology Centre)

A framework for process-related resin selection and optimisation for the resin transfer moulding (RTM) of composite materials is proposed in the context of research and development for industrial applications. The proposed framework and the associated test and analysis methodologies are applied to three epoxy resin systems which are assessed against different RTM process requirements.

Stage 2
(Chairs: Yan Li/ Tong Earn Tay)

P1102-3 Fabrication of uniform niobium coating layer for the coated fuel particle of the very high temperature reactor
Pengpeng Lv, Chuanlin Fan, Qingshan Zhu (Chinese Academy of Sciences)

Uiform niobium coating layer for the coated fuel particle of the very high temperature was fabricated via a fluidized bed chemical vapour deposition (FBCVD) process.

P1102-4 The effect of prolonged heat treatments on the microstructural evolution and mechanical properties of TiNi multi-layered composites fabricated by accumulative roll bonding (ARB)
Bing Zhang, Zhijuan Zhang, Xunhui Zhang, Su Yao, Xiaodi Shang, Wen Wang, Le Wang, Kuaishe Wang, Jun Cai (Xi'an University of Architecture and Technology)

P1102-5 Estimation of effective thermal conductivity of metal matrix composites by using image analysis
Kenjiro Sugio, Yong-Bum Choi, Gen Sasaki (Hiroshima University)

Statistical relationship between three-dimensional and two-dimensional effective thermal conductivity of particle dispersed composites was investigated with considering the interfacial thermal resistance.

Stage 3
(Chairs: Raj Das/ Frank K. Ko)

P1103-3 Planetary dispersion methods on mechanical behavior of GNPs/epoxy nanocomposites
Chin-Lung Chiang (Hung Kuang University), Chin-Hsing Chen (Chinese Culture University), Wei-Jen Chen (China University of Science and Technology), Chen-Chi M. Ma (National Tsing-Hua University), Ming-Yuan Shen (China University of Science and Technology)

P1103-4 Electrical and optical properties of LSMO/Monolayer MoS2 photodiodes
Yue Niu (IMDEA-Nanociencia, Harbin Institute of Technology), Riccardo Frisenda (IMDEA-Nanociencia), Simon A. Svatek (IMDEA-Nanociencia), Gloria Ortiz (Universidad Complutense de Madrid), Weicheng Jiao (Harbin Institute of Technology), Rongguo Wang (Harbin Institute of Technology), Nicolás Agraït (IMDEA-Nanociencia, Universidad Autónoma de Madrid), Federico Mompean (Instituto de Ciencia de los Materiales de Madrid (ICMM-CSIC)), Carlos León (Universidad Complutense de Madrid), Alberto Rivera-Calzada (Universidad Complutense de Madrid), David Perez De Lara (IMDEA-Nanociencia), Jacobo Santamaria (Universidad Complutense de Madrid), Andres Castellanos-Gomez

We present a hybrid device based on the stacking of a single layer MoS2 onto a lanthanum strontium manganite (La0.7Sr0.3MnO3) thin film, showing a rectifying electrical transport with a ratio of 103, and a photovoltaic effect with Voc up to 0.4 V.

P1103-5 Water permeation through graphene nanosilt by molecular dynamics simulation
T. Yamada, R. Matsuzaki (Tokyo University of Science)

Stage 4
(Chairs: Jayantha A. Epaarachchi/ Jian Xiong)

P1104-3 Experimental investigation on off-axis tensile initial fracture behaviour of glass plain fabric/ unsaturated polymer (up) composites
Defang Zhao (Kyoto Institute of Technology), Zhilan Xu (Kyoto Institute of Technology), Kai Mao (Kyoto Institute of Technology), Yuqiu Yang (Donghua University), Hiroyuki Hamada (Kyoto Institute of Technology)

The AE data revealed that the damage development thresholds are lower for the composites at θ = 0, 5, and 10° indicating an earlier onset of damage. It is also found that initial fracture strain shows no obvious difference obtained from knee point method, AE events method and AE energy method.

P1104-4 Modeling biaxial-tension coupling in woven fabric
Yuan Yao, Gong Youkun, Xiongqi Peng, Xiaoshuang Huang (Shanghai Jiao Tong University)

An nonlinear anisotropic hyperelastic constitutive model is developed for woven fabrics by considering biaxial tensile coupling.

P1104-5 Investigation into the dynamic bending behavior and failure mechanism of 3D MWK carbon/epoxy composites
Dian-sen Li, Hong-wei Duan, Lei Jiang (Beijing University of Aeronautics and Astronautics)

The dynamic bending behavior and failure mechanism of 3D MWK carbon/epoxy composites were studied.The influence of strain rate and fiber articeture on the properties and failure were also analyazed.

Stage 5
(Chairs: Ning Hu/ Kok Hoong Leong)

P1105-3 Numerical investigation of progressive damage in a type of 2.5D woven composites
Huaiyu Lu, Licheng Guo, Li Zhang, Gang Liu (Harbin Institute of Technology)

The paper is a summarization about recent research and development of fabricating SiC/SiC composites by electrophoretic deposition.

P1105-4 Effect of voids on transverse mechanical properties of unidirectional composites based on micro-mechanical analysis
Wang Xiaodong, Guan Zhidong, Han Geng, Li Zengshan, Zhang Mi, Qiu Cheng, Du Shanyi (Beihang University)

This paper proposes a reliable and easy random model to generate RVEs with random distribution of inclusions (fibres and two typical voids existing in the interlaminar). And the effect of the two typical voids on mechanical properties of the composites under transverse tension and compression load is studied by RVEs generated by random model combining with reasonable material model.

P1105-5 Numerical and experimental study of the Mode I interlaminar failure of chopped carbon fiber tape reinforced thermoplastics
Qitao Guo, Bohan Xiao, Ye Zhang, Bijan Spitzlei, Isamu Ohsawa, Jun Takahashi (The University of Tokyo)

Research on the Mode I interlaminar failure of chopped carbon fiber tape reinforced thermoplastics has been conducted by DCB tests and FEM, unstable crack growth can be seen while good agreement between numerical and experimental results can be achieved.

Stage 6
(Chairs: Limin Zhou/ Faxiang Qin)

P1106-3 Development of using electrophoretic deposition for processing SiC/SiC composites
Hou Huining, Li Mingyuan, Zhou Xingui (National University of Defense and Technology)

The paper is a summarization about recent research and development of fabricating SiC/SiC composites by electrophoretic deposition.

P1106-4 Extrusion of endless fiber reinforced thermoplastic elastomer composites with crinkled p-aramid fiber
Johannes Gattinger, Benedikt Kirchebner, Michael Kirsch (Technical University of Munich)

Investigation of manufacturing process for crimped-fiber reinforced elastomer strands through thermoplastic extrusion with sleeve-dies.

P1106-5 Winding movement trajectory optimization of composite elbows based on four-dof winding machine
Xu Jia Zhong (Harbin University of Science and Technology)

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P1101-6 Effect of double-sided irradiation dose difference on ILSS for polymer-matrix composites fabricated by in-situ curing with low energy E-Beam *Jingjing Zhang, Yuqing Duan, Hongxiao Wang, Zhongqiu Ding, Xiaohui Zhang (Xi'an Jiaotong University)* For polymer-matrix composites fabricated by in-situ curing with low energy E-Beam, the ILSS of the laminates can be significantly improved by tuning the dose difference between the two irradiated surfaces of the prepreg. Both the curing degree and the curing rate difference between the adhesive layers contribute to the ILSS improvement.	**P1102-6 Effect of sic particle size on dynamic recrystallization critical strain** *Hao Shi-ming, Xie Jing-pei, Wang Ai-qin (Henan University of Science and Technology)* Dynamic recrystallization critical strain model of 30%SiCp/Al composites were established. With the decrease of the SiC particle size, the critical strain occurs in advance.	**P1103-6 Study on dielectric and thermal conductive properties of Zn/ ZnO/Al$_2$O$_3$/epoxy composite** *Jun Zhou, Kai Wu, Yonghong Cheng (Xi'an Jiaotong University)*	**P1104-6 Compression properties and damage mechanisms of 3D MWK carbon/epoxy composites at room and liquid nitrogen temperatures** *Hong-wei Duan, Dian-sen Li, Lei Jiang (Beijing University of Aeronautics and Astronautics)* A progressive damage model based on extended Hashin criteria and cohesive model was developed to investigate the position effect of designed delamination on compressive behavior of CFRP laminate in thick direction.	**P1105-6 A numerical model on compressive behavior of CFRP laminate with a designed delamination** *Yi-Qi Wang, Xianggian Zeng, Xueshu Liu, Yongjie Rao, Hang Gao (Dalian University of Technology)* The paper investigates the process ability of epoxy pre impregnated carbon fiber roving (Towpreg) with the Tailored Fiber Placement (TFP) technology. Relevant modifications of the TFP device and necessary process conditions have been successfully identified and the effect of the TFP process on the mechanical properties of the Towpreg were determined.	**P1106-6 Tailored fiber placement based on epoxy preimpregnated carbon rovings (towpreg)** *Kai Uhlig, Axel Spickenheuer, Lars Bittrich, Gert Heinrich (Leibniz Institute of Polymer Research)* The paper investigates the process ability of epoxy pre impregnated carbon fiber roving (Towpreg) with the Tailored Fiber Placement (TFP) technology. Relevant modifications of the TFP device and necessary process conditions have been successfully identified and the effect of the TFP process on the mechanical properties of the Towpreg were determined.
P1101-4 Study on the heat resistance and mechanical properties of polytriazole resin matrix composite influenced by graphene oxide *Shen Zhen, Zeng Jin-fang, Dai Panyao, Wang Kaijie, Wang Xiuyun (Xi'an Aerospace Composites Research Institute)* The introduction of alkynyl-pendant GO could make great contribution to the good heat resistance and high mechanical properties of PTA resin matrix composites at the appropriate post-treatment temperature and time, and it might have a good prospect in the application of solid rocket motor case**.**	**P1102-4 The effect of prolonged heat treatments on the microstructural evolution and mechanical properties of Ti/Ni multi-layered composites fabricated by accumulative roll bonding (ARB)** *Bing Zhang, Zhiyuan Zhang, Xunhui Zhang, Su Yao, Xiaodi Shang, Wen Wang, Le Wang, Kuaishe Wang, Jun Cai (Xi'an University of Architecture and Technology)*	**P1103-4 Electrical and optical properties of LSMO/Monolayer MoS2 photodiodes** *Yue Niu (IMDEA-Nanociencia, Harbin Institute of Technology), Riccardo Frisenda (IMDEA-Nanociencia), Simon A. Svatek (IMDEA-Nanociencia), Gloria Ortiz (Universidad Complutense de Madrid), Weicheng Jiao (Harbin Institute of Technology), Rongguo Wang (Harbin Institute of Technology), Nicolás Agraït (IMDEA-Nanociencia, Universidad Autónoma de Madrid), Federico Mompean (Instituto de Ciencia de los Materiales de Madrid (ICMM-CSIC)), Carlos León (Universidad Complutense de Madrid), Alberto Rivera-Calzada (Universidad Complutense de Madrid), David Perez De Lara (IMDEA-Nanociencia), Jacobo Santamaria (Universidad Complutense de Madrid), Andres Castellanos-Gomez* We present a hybrid device based on the stacking of a single layer MoS2 onto a lanthanum strontium manganite (La0.7Sr0.3MnO3) thin film, showing a rectifying electrical transport with a ratio of 103, and a photovoltaic effect with Voc up to 0.4 V.	**P1104-4 Modeling biaxial-tension coupling in woven fabric** *Yuan Yao, Gong Youkun, Xionggi Peng, Xiaoshuang Huang (Shanghai Jiao Tong University)* An nonlinear anisotropic hyperelastic constitutive model is developed for woven fabrics by considering biaxial tensile coupling.	**P1105-4 Effect of voids on transverse mechanical properties of unidirectional composites based on micro-mechanical analysis** *Wang Xiaodong, Guan Zhidong, Han Geng, Li Zangshan, Zhang Mi, Qiu Cheng, Du Shanyi (Behang University)* *This paper proposes a reliable and easy random model to generate RVEs with random distribution of inclusions (fibres and two typical voids existing in the interlaminar). And the effect of the two typical voids on mechanical properties of the composites under transverse tension and compression load is studied by RVEs generated by random model combining with reasonable material model.*	**P1106-4 Extrusion of endless fiber reinforced thermoplastic elastomer composites with crinkled p-aramid fiber** *Johannes Gattinger, Benedikt Kirchebner, Michael Kirsch (Technical University of Munich)* Investigation of manufacturing process for crimped-fiber reinforced elastomer strands through thermoplastic extrusion with sleeve-dies.
P1101-7 Preparation and characterization of polyurethane-polyacrylic acid co-polymer composite electrolyte for supercapacitors *Chen-Chi M. Ma (National Tsing Hua University), Jeng-An Wang (National Tsing Hua University), Chi-Chang Hu (National Tsing Hua University), Chin-Lung Chiang (Hung Kuang University), Ming-Yuan Shen (China University of Science and Technology)*	**P1102-7 Effect of Si content on impact abrasive wear performance of Al2O3p/ steel composites prepared by squeeze casting** *Dehong Lu, Haizhou Li, Bo Ren, Yehua Jiang (Kunming University of Science and Technology)* In this work, Si powder ranged in 0-25% (5%, 10%, 15%, 20% and 25%) of Al2O3p's mass was added in the Al2O3p preforms, respectively, and the Al2O3/40Cr steel composites was fabricated by squeeze casting. With the increasing of Si added, ferrite phase increased in the matrix, the micro-hardness of the ferrite and the pearlite increased, reached the maximum at 10% Si and 15%Si, respectively, the contact angles between steel and Al2O3p decreases, therefore, the volume loss of the composites by impact-abrasion wear first decreases and then increases, reaches the minimum at 10% Si.	**P1103-7 Comparative study of carbon-based nano-fillers/polyaniline hybrids reinforced polymer composites** *Xiuyan Cheng (University of Tokyo), Michihiro Yamamoto (Tokyo University of Science), Jun Koyanagi (Tokyo University of Science), Tomohiro Yokozeki (University of Tokyo)* Development and characterization of carbon-based nano-fillers/polyaniline hybrids reinforced polymer composites.	**P1104-7 A study on hybridization of springbacked carbon fiber reinforced thermoplastics** *Daiki Kobayashi, Taro Nakamura, Yi Wan, Isamu Ohsawa, Jun Takahashi (The University of Tokyo)* The study how to solve the problems for practical application using springbacked CFRTP and to apply springbacked CFRTP for making lightweight composites by several combinations of hybridization.	**P1105-7 Delamination modeling in a double cantilever beam using s-version finite element method and cohesive zone model** *Wei Xie (Northwestern Polytechnical University)*	**P1106-7 Probabilistic characterization of porosity defect in a laminated composite** *Edouard Gauthier (IRT Jules Verne), Laurent Guillaumat (LAMPA ENSAM)* This work presents the deterministic and probabilistic characterization of the porosity for a glass/epoxy laminated composite by comparing plates manufactured with different processing parameters.

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P1101-8 Low loading of grafted thermoplastic polystyrene strengthened and toughened transparent epoxy composites *Chao Ma, Hongbo Gu (Tongji University)*	**P1102-8 Microstructural and dry sliding wear behavior of TiB2 reinforced copper matrix composite fabricated by in situ casting process** *Cunlei Zou, Huijun Kang, Zongning Chen, Wei Wang, Rengeng Li, Tongmin Wang (Dalian University of Technology)* A traditional casting method for the preparation of copper matrix composite with high strength, high electrical conductivity and good wear performance.	**P1103-8 Impact of gd3+/ graphene substitution on the strucural and magnetic properties of magnesium ferrite** *Ebtesam E Ateia, Seham K. Abdel-Aal, Asmaa Abd Allah (Cairo University)* Graphene nanoparticles an attractive carbon material, is promising for improving adsorption capacity, high chemical stability, good electrical properties, strong mechanical stability, and large specific surface area.	**P1104-8 Compressive property reinforcement of unidirectional FRP by filament cover method** *Fangtao Ruan, Zhenzhen Xu, Li Yang, Wei Li (Anhui Polytechnic University)* A novel manner, named filament winding is proposed to improve the longitudinal compressive properties of unidirectional fiber reinforced plastic based on improving the compressive buckling critical load of FRP by preventing fiber buckling with a shortening of the buckling critical wavelength.	**P1105-8 FE modelling to simulate the axial crushing behavior of CFRP composites** *Kei Saito, Masato Nishi (JSOL Corporation)* This paper examined the influence of FE modelling on the crushing response of composite tube.It was found that debris wedge formation plays an important role in the deformation mode and the reaction force.	**P1106-8 Effect of flake distribution in mould in compression moulding of unidirectional long fibre thermoplastic composite flakes** *A. Bhakta (University of Twente), H.J.M. Geijselaers (University of Twente), U. Sachs (ThermoPlastic composites Research Centre), M. I. A. Rasheed (University of Twente), A.H. van den Boogaard (University of Twente)* The paper discusses the compression molding process of chopped unidirectional (UD) flakes. It shows the mechanisms of flake deformation generally observed during the molding process & also the redistribution of the material. The higher the pressure and its duration used better is the redistribution of the material.
P1101-9 Novel phenylethynyl-terminated polyimide with excellent processability and hight thermal peoperties *Xiuting Li, Jie Dong, Xin Zhao, Qinghua Zhang (Donghua University)* My paper is mainly about novel phenylethynyl-terminated polyimide with excellent processability and the imide oligomers solubility in the NMP and DMAc more than 50% are suitable for solution impregnation method and the minimum melt viscosity of the oligomers below 11 Pa.s are suitable for RTM method to prepare composite material.	**P1102-9 Study of the room temperature fracture toughness of Nb/Nb5Si3 in-situ composites strengthened with CNTs study on microstructure and room temperature fracture toughness of nb/nb5si3 insitu composites strengthened with CNTs** *Long Wenyuan Chen Benlong (Nanchang Hangkong University)* The Nb/Nb5Si3 In-Situ composite material strengthened with CNTs were prepared by Spark Plasma Sintering (SPS). The effects of CNTs content on microstructure and room temperature fracture toughness of Nb/Nb5Si3 composites were investigated. Fracture toughness of Nb/ Nb5Si3 composites with 3 wt.% MWCNTs reached a maximum and increased by ~35.6%.	**P1103-9 Enhanced fracture toughness in epoxy composites with iron oxide nanorods** *Yu-Ting Li (Guilin University of Electronic Technology), Chuan-Guo Ma (Guilin University of Electronic Technology, Guangxi Key Laboratory of Information Materials), Qi-Ju Ou (Guilin University of Electronic Technology), Hua-Mei Wan (Guilin University of Electronic Technology), Shuai Wang (Guilin University of Electronic Technology), Pei-Rang Dai (Guilin University of Electronic Technology, Guangxi Key Laboratory of Information Materials)* FeOOH and Fe2O3 nanorods were synthesized and surface modified with the silane coupling agent, and for first time used to significantly improve the fracture toughness of epoxy resin. Especially, KIC and GIC of modified FeOOH/EP are increased by 177% and 735% compared to that of pure epoxy resin, respectively.	**P1104-9 The synthesis of polyurethane microcapsules and evaluation of self-healing paint protection properties** *Sooyoul Park (Korea Research Institute of Chemical Technology), Eunjoo Koh (Kyung Hee University)* Self-healing polymers have been considerably focused upon as a new paradigm of smart materials that have the capability to repair themselves without the need for detection or manual intervention when they are damaged. Microencapsulation has been one of the most efficient techniques which has been widely used in self-healing systems.	**P1105-9 The stress intensity factors and interactions of multiple inclined cracks in a composite laminate** *Shu Li, Jianxiang Wang (Peking University)* The stress intensity factors at the tips of an isolated and inclined crack, and two neighbouring cracks with different lengths which are embedded in the central layer of an angle-ply composite laminate subjected to tensile loading are solved by the Fourier integral transform method and analysed.	**P1106-9 Online cure monitoring of a rtm process: correlation of dielectric analysis with the thermal properties of epoxy resins** *Martin Demleitner (University of Bayreuth), Gökhan Bakis (University of Bayreuth), Aline Sanchez (University of Bayreuth), Tobias Pflock (NETZSCH Gerätebau GmbH), Alexander Chalupka (NETZSCH Gerätebau GmbH), Volker Altstädt (University of Bayreuth)* Process control of thermoset curing is generally hardly possible, thus requiring the need for time-consuming external quality control of composite parts. Here, we describe the application of a novel dielectric sensor to accomplish online cure monitoring and to show the direct correlation with the degree of cure and the glass transition temperature of an epoxy system.

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P1101-10 Numerical analysis of anisotropic elasto-plastic deformation of porous materials incorporating the effect of inner gas pressure *Zhimin Xu, Xueling Fan, T. J. Wang (Xi'an Jiaotong University)* The short summary of my paper: Based on the face-center-cubic(FCC)models, this work numerically investigate the effects of the inner gas pressure on the uniaxial stress-strain curves, Poisson's ratio and the initial yield surface of the anisotropic porous materials.	**P1102-10 Interfacial delamination and multiple tunnel cracks toughening mechanisms of laminated Ti-(TiBw) composites under three point bending testing** *BaoXi Liu (Hebei University of Technology, TianJin key laboratory of materials laminating fabrication and interfacial controlling technology), Lin Geng (Harbin Institute of Technology), LuJun Huang (Harbin Institute of Technology), XueWen Li (Harbin University of Science and Technology), XiPing Cui (Harbin Institute of Technology), FuXing Yin (Hebei University of Technology, TianJin key laboratory of materials laminating fabrication and interfacial controlling technology)*	**P1103-10 Improved electric heating properties of epoxy nanocomposite films containing mwcnts** *Wenyan Liang, Fangxin Wang, Zhiwei Duan, Liang He, Hailing He (Harbin Engineering University)* The electrical and electrothermal properties of the MWCNT/epoxy nanocomposite films, which can transform electrical energy into thermal energy as heat.	**P1104-10 Polybutadiene–poly(styrene-co-4-vinylpyridine)-based supramolecular shape memory elastomers using metal coordination interactions** *Kiho Kim, Seokgyu Ryu, Jooheon Kim (Chung-Ang University)*	**P1105-10Multiscale analysis on toughness enhancement of epoxy/ silica nanocomposites with interfacial partial and progressive deboning** *J. -G. Han, H. Shin, M. Cho (Seoul National University)* In this study, multiscale analysis is conducted to investigate toughness enhancement of epoxy/ silica nanocomposites in view of energy dissipation by toughening mechanisms when interfacial partial and progressive debonding occurs.	**P1106-10 Resin pressure and resin flow inside a composite joint during thermal expansion process** *Weibo Zhang, Min Li, Yizhuo Gu, Shaokai Wang, Zuoguang Zhang (Beihang University)* Resin pressures inside a carbon fiber composite joint during thermal expansion process with R10301 silicone rubber core mold and Aircast 3700 silicone rubber core mold were measured by means of a self-developed resin pressure online monitoring system. And resin flow at different positions of the composite joint was analyzed according to the resin pressure variation.
P1101-11 Microwave absorption performance simulation of a facile yet unexpectedly effective microwave absorption composite material *Yang Mingliang, Yuan Ye, Li Yibin (Harbin Institute of Technology)* Microwave absorption performance simulation for a honeycomb structure filled with graphene-based spherical shells.	**P1102-11 Co-Spray forming and tailored heat treatment of composite tool steels** *Chengsong Cui, Alwin Schulz, Dawid Nadolski (Foundation Institute for Materials Science, Germany)* Composite tool steels have been produced by means of a novel spray forming process and a tailored heat treatment for the composite material has been developed based on middle frequency induction heating and oscillation of the inductor. Fine and homogeneous microstructures could be achieved in both tool steels, with a gradual transition of chemical and physical properties in between. The microstructures and properties of the composite material are clearly correlated with their austenitization conditions during the induction heating.	**P1103-11 Preparation and characterization of super-black surface coating using carbon nanomaterials** *Wenfu Cai, Hui Zhang, Zhong Zhang (National Center for Nanoscience and Technology)*	**P1104-11 Nonlinear optical enhancement induced by synergistic effect of g/cds hybrids** *Baohua Zhu, Yuzong Gu (Henan University)* In this paper, we investigate the three phton absorption induced synergistic effect of G/ CdS nanocomposites in near-infrared, which is very important for potencial applications in optelectronic devices.	**P1105-11 Numerical analysis of interlaminar stress on symmetric angle-ply laminates interleaved with cnt networks** *Lulu Shen, Wei Wang, Ling Liu (Tongji University)* Finite elementanalysis (FEA), based on cohesive zone model (CZM), was used to analyses the interlamiar stressat the +θ/–θ interfaces (cohesive layers) with and without CNT networks.Numerical simulations results show that the introduction of CNT networks will improve the major interlaminar stress which leads to delamination initiation and propagation. Whilst the improved interlaminar stress will have an effect on the failure tensile stress of the studied composite laminates.	**P1106-11 An environment-friendly approach for the large-scale preparation of aligned mat using recycled carbon fiber** *Guoxin Luo, Yapeng Rong, Xianhua Huan, Xiaolong Jia, Xiaoping Yang (Beijing University of Chemical Technology)*
P1101-12 Facile synthesis of nickel manganese sulfide anchored graphitic carbon nitride/graphene electrode for supercapacitor application *Parthasarathi Bandyopadhyay, Thanh Tuan Nguyen, Dai Ju Yi, Nam Hoon Kim, Joong Hee Lee (Chonbuk National University)* The nickel manganese sulfide anchored graphitic carbon nitride/graphene electrode (Ni-Mn-S/g-C3N4-G) was fabricated for supercapacitor application in a three electrode setup using 6M KOH.	**P1102-12 Preparation of halogen-free flame retardant polyurethane composites** *Ming-Yuan Shen (China University of Science and Technology), Wei-Jen Chen (China University of Science and Technology), Chen-Feng Kuan (Far East University), Hsu-Chiang Kuan (Far East University), Jia-Ming Yang (Hung-Kuang University), Chin- Lung Chiang (Hung-Kuang University)*	**P1103-12 Nanocomposites made from NOGF and 3D nanostructuring** *Seokwoo Jeon (KAIST)*	**P1104-12 Polymer nanocomposites based on reactive blends of PETG-block-PTMO containing hybrid system of nanofillers** *Sandra Paszkiewicz, Elżbieta Piesowicz, Izabela Irska, Daria Pawlikowska, Anna Szymczyk, Zbigniew Roslaniec (West Pomeranian University of Technology)* Single-Walled Carbon Nanotubes (SWCNT)/ Graphene Nanoplatelets (GNP)/ Carbon Black (CB)/PETG-block-PTMO hybrid nanocomposites were synthesized via in situ polymerization, that consisted of glycolysis of PETG post-consumer foil and subsequently polycondensation in the presence of poly(tetramethylene oxide) (PTMO). A remarkable synergistic effect between carbon nanofillers on improving electrical and mechanical properties of nanocomposites based on block copolymers was observed, thus allowing to lower the final price of the finished product (suitable selection of properties at the optimum price).	**P1105-12 Kink–band formation of fiber reinforced polymer (frp)** *Kangmin Niu (University of Science & Technology Beijing), Yanan Yuan (Tsinghua University), Xuefeng Yao (Tsinghua University)* Unlike other common practice that introduces a certain misalignment (e.g., a sinusoidal imperfection) to trig kink-band formation, perfect straight fiber layers with ideal elastic-plastic matrix are used in the FEM model under compressive loads with small lateral loads as perturbation, which will be resulted in an upper bound solution of the buckling load.	**P1106-12 Research on mt300/603a composite material automated fiber placement processing technology** *Zhang Jianbao, Wang Junfeng, Ling Hui, Sun Hongjie, Jiang Wenge (Aerospace Research Institute of Materials & Processing Technology)*

Stage 1 (Chairs: Nam Seo Goo/ Hao Wang)	Stage 2 (Chairs: Yan Li/ Tong Earn Tay)	Stage 3 (Chairs: Raj Das/ Frank K. Ko)	Stage 4 (Chairs: Jayantha A. Epaarachchi/ Jian Xiong)	Stage 5 (Chairs: Ning Hu/ Kok Hoong Leong)	Stage 6 (Chairs: Limin Zhou/ Faxiang Qin)
P1101-13 Effect of boric acid on the oxygen gas barrier properties of poly(vinyl alcohol-co-ethylene)/ graphene oxide nanocomposite films *Xuyang Li, Parthasarathi Bandyopadhyay, Tolendra Kshetri, Nam Hoon Kim, Joong Hee Lee (Chonbuk National University)* Borate cross-linked poly(vinyl alcohol-co-ethylene)-graphene oxide (GO) composites coated nylon films were prepared for the improvement of oxygen barrier properties.	**P1102-13 Recycling of end-of-life textile materials by fabrication of green composites** *Behnaz Baghaei, Mikael Skrifvars (University of Borås)* End-of-life textiles cannot yet be recycled as a raw material in a feasible way. Structural composites are an excellent use area for recycled materials, as they are durable and light-weight products, with excellent mechanical properties. In this study, denim woven fabrics as end-of-life textiles were employed to improve the mechanical and thermal properties of high bio-content epoxy resin.	**P1103-13 The effects of irradiation modification on the floating carbon nanotube film** *Yanjie Wang (Beihang University), Min Li (Beihang University), Mengsi Zhang (Beihang University), Yizhuo Gu (Beihang University), Shaokai Wang (Beihang University), Qingwen Li (Suzhou Institute of Nano-Tech and Nano-Bionics), Zuoguang Zhang (Beihang University)* This paper makes an attempt to enhance the floating CNT film by irradiation, and then investigates influences of some process factors on the film's mechanical and electrical properties.	**P1104-13 A critical assessment of computer tools for calculating properties of bridge girders with different cross-section** *Zhong Yifeng, Xia Zhenting, Mei Baoping (Chongqing University)*	**P1105-13 Relation between fatigue life and tensile strength of wood plastic composites** *K. Sakamoto (Yamaguchi University), H. Azhari (Yamaguchi University), H.M. Joseph (Mahatma Gandhi University), A. Nordin (Yamaguchi University), K. Goda (Yamaguchi University), M. Okamoto (TOCLAS Co.), H. Ito (TOCLAS Co.)* Wood plastic composite (WPC) is a composite material made of wood fibers and plastic matrix, resulting in supplementing mutual drawbacks. Because of high stiffness of cellulose contained in wood fibers, WPC is expected as a practical structural material. In this study, we aimed to clarify the relation between tensile strength and fatigue life of the WPC materials.	**P1106-13 Numerical study of special drill bit for cfrp materials** *N. Feito, J. López-Puente, H. Miguelez (Charles III University of Madrid)* This study presents a numerical analysis based on a 3D model developed to predict the responses of CFRP woven laminates under drilling machining. The model was validated for two geometries in terms of delamination and axial force comparing numerical results with experiments.
P1101-14 Elastic parameters prediction under dynamic loading based on the unit cell of composites considering end constraint effect *Wang Meng, Fei Qingguo, Zhang Peiwei (Southeast University)* With the unit cell model of composites and the elastic parameters of constitutes dependent on strain rates, elastic parameters under dynamic loading in plane condition were predicted using the explicit dynamic method.	**P1102-14 Processing and characterization of green composites with chopped kenaf fibers and recycled expanded polypropylene** *Donghwan Cho (Kumoh National Institute of Technology), Jeonghoon Kim (Kumoh National Institute of Technology), Oh Hyeong Kwon (Kumoh National Institute of Technology), Won Ho Park (Chungnam National University)* The processing and property evaluation of a natural fiber composite material with kenaf fibers and recycled expanded polypropylene (EPP) produced by an injection molding process, without extrusion, were explored, focusing on the effect of chopped kenaf fibers on the thermal and mechanical properties of recycled EPP.	**P1103-14 Modification of graphene oxide with amorphous silica coating for electrically insulating and thermally conductive fillers of thermal interface materials** *Chaowan Shen, You Zeng (Chinese Academy of Sciences)* Polymer based nanocomposites was fabricated by incorporating a silica-coated graphene (SiO2@G) nanomaterial into the PDMS matrix. The addition of SiO2@G enhanced the thermal conductivity of the composites while maintain the electrical insulation of matrix.	**P1104-14 Structural numerical simulation and verification for the butt-joint of the composite web** *Wang Zhuanli (Chinese Society for Composite Materials)*	**P1105-14 The experimental study of cotton fiber reinforced ice impact on stringer-stiffed composite panels** *Wang Jizhen (Aircraft Strength Research Institute of China)*	**P1106-14 Cfrp drilling mechanism at low temperature based on the temperature-dependent properties of resin and interface** *Hongxiao Wang, Yugang Duan, Wencheng Chen (Xi'an Jiaotong University)* An experimental study was conducted to analyze the impact of cryogenic cooling conditions on holes quality when drilling CFRP laminate. The experimental results showed that the drilling zone temperature has a great influence on the material removal mechanisms and surface integrity of CFRP drilling.
P1101-15 Loading rate and temperature dependence of flexural behaviour of GFPP fabricated by injection molding method *Lichao Yu, Xiaofei Yan, Shuhei Yasuda, Shinji Nojima, Yuqiu Yang, Hiroyuki Hamada (Kyoto Institute of Technology)* This paper is concerned with the influence of water absorption on the time-temperature dependence flexural strength of glass fiber reinforced polypropylene (GFPP) Composites Fabricated by injection molding.	**P1102-15 Study on normalization of the mechanical properties of jute-glass/ vinylester hybrid composites** *Dong-Woo Lee (Changwon National University), Byung-Jin Park (Changwon National University), Byoun-Sun Kim (Korea Institute of Materials Science), Jung-Il Song (Changwon National University)* In this study, Jute/Glass composites were fabricated using Vacuum assisted Resin Infustion (VaRI) with various laminate structure. After normalization were conducted for check that most efficient laminate structure.	**P1103-15 Enhanced tribological properties of graphene-based nanocomposites** *You Zeng, Han Wang, Tengxin Zhang, Zhe Ying (Chinese Academy)* The presence of graphene could increase tribological performance of the graphene/poly(vinyl chloride) composites and graphene-based lubricating oils due to high flexibility and excellent self-lubricating characteristics of crumpled graphene.	**P1104-15 Optimization of composite wing using genetic algorithm** *Haigang Zhang, Xifao Zheng, Wenchong Yang, Chenxi Lv (Northwestern Polytechnical University)* The paper developed a method to optimize composite wing , including optimization of ply thickness, ply ratio, and ply sequence , and improved composite wing's load mass ratio	**P1105-15 Effect of the hole position on composite laminates under low velocity impact** *Zhou Xihui, Tie Ying, Sun Zhenhui, Du Jiangtao (Zhengzhou University)* This paper investigates the effect of the different hole positions on composite laminates under low velocity impact.It can be seen that the hole position of composite laminates seriously affect the specimens' properties under low velocity impact.	**P1106-15 Numerical study of special drill bit for cfrp materials** *N. Feito, J. López-Puente, H. Miguelez (Charles III University of Madrid)* This study presents a numerical analysis based on a 3D model developed to predict the responses of CFRP woven laminates under drilling machining. The model was validated for two geometries in terms of delamination and axial force comparing numerical results with experiments.

Stage 1
(Chairs: Nam Seo Goo/ Hao Wang)

P1101-16 Durability of glass fibers and their composites
Yucheng Zhong (Wuhan University of Technology, Nanyang Technological University), Sunil Chandrakant Joshi (Nanyang Technological University), Shuxin Li (Wuhan University of Technology)

P1101-17 Adhesive of benzoxazine resin and adhesion property
Hongfeng Li, Chunyan Qu, Dezhi Wang, Changwei Liu (Heilongjiang academy of sciences)

In this paper, a benzoxazine resin-based (BZ) adhesive with high temperature resistant was developed with BA-a benzoxazine resin. It is expected to be used in aerospace, high-speed rail and other applications.

P1101-18 Multifunctional structural batteries based on carbon fiber reinforced plastic composites: investigation on mechanical and electrochemical properties
Yalin Yu, Boming Zhang (Beihang University)

In this study, the feasibility of multifunctional structural lithium ion batteries (LIBs) based on carbon fiber reinforced plastic (CFRP) composites was investigated. The CFRP composites based on liquid/epoxy structural electrolytes were proved to have the ability to insert and extract lithium, and can be considered as the potential candidate for the multifunctional structural LIBs.

Stage 2
(Chairs: Yan Li/ Tong Earn Tay)

P1102-16 Improvement of mechanical performances of carbon fiber/epoxy composites by incorporating natural nano materials
Gibeop Nam, Chang-uk Kim, M. N. Prabhakar, Song Jung-Il (Changwon National University)

In this paper, bio waste materials are studied for replacing cellulose nano fiber and improving mechanical properties of carbon fiber/epoxy composite.

P1102-17 Encapsulation of chitosan as an efficient flame retardant for Thermoplastic starch
M. N. Prabhakar, Gibeop Nam, Syed Nabeel Ahmed, Salman Khalid, Muhammad Latif, Jung-Il Song (Changwon National University)

The research focused on fabrication of flame retardant thermoplastic starch green composites by utilizing low cost starch, flax fabric and chitosan through compression molding technique.

P1102-18 In-situ preparation of antistatic natural rubber
Dongning He (University of Southern Queensland, Chinese Academy of Tropical Agricultural Sciences), Jinlong Tao (Chinese Academy of Tropical Agricultural Sciences), Yueqiong Wang (Chinese Academy of Tropical Agricultural Sciences), Wei Gong (Chinese Academy of Tropical Agricultural Sciences), Yongxue Luo (Chinese Academy of Tropical Agricultural Sciences), Zheng Peng (Chinese Academy of Tropical Agricultural Sciences), Hao Wang (University of Southern Queensland)

An antistatic natural rubber nanocomposites were prepared using graphene oxide, as conductive filler, reduced by vitamin C in natural rubber latex. The in-situ preparation, and latex mixing approaches were employed to fabricate antistatic NR latex with 2.0 parts of reduced graphene oxide per hundred parts of NR under mild condition.

Stage 3
(Chairs: Raj Das/ Frank K. Ko)

P1103-16 Improving Insulating Properties of Epoxy Polymer by a trace of Fullerene Particles
Pengfei Chu, Hui Zhang, Feng Gao, Zhong Zhang (National Center for Nanoscience and Technology)

A very small amount of fullerene particles can improve the insulating properties of epoxy materials effectively owing to the formation of deep-level traps in epoxy composites.

P1103-17 Positive temperature coefficient effect of nanocarbon/ polymer composites
Han Wang, Cheng Yang, Zhe Ying, You Zeng (Chinese Academy)

P1103-18 Eco-freindly preparation and characterization of carbon nanotubes-filled carboxymethyl cellulose nanocomposite films
Yeong-Rae Son, Hyo In Lee, Yifan Zhang, Soo-Jin Park (Inha University)

CNTs-filled carboxymethyl cellulose (CMC/CNT) nanocomposites were prepared by a simple solution casting method. The mechanical properties of the CMC/CNT nanocomposites were improved significantly.

Stage 4
(Chairs: Jayantha A. Epaarachchi/ Jian Xiong)

P1104-16 Verification of flexural rigidity of thickness optimized structure made of discontinuous CFRTP
Wataru Sato, Ryusuke Shida, Hideki Toyoda, Michinobu Fujita, Jun Takahashi (The University of Tokyo)

This paper focuses on molding pressure of thickness optimized structure made of chopped carbon fiber tape reinforced thermoplastics (CTT) and verify its flexural rigidity. As a result, the appropriate molding pressure was the same as flat panels and the bending test results showed that the actual molded structure had the theoretical rigidities.

P1104-17 Lightweight design of battery box for electric vehicle
Zhao Xiaoyu (Changchu University of science and technology), Zhang Boming (Beihang University), Zhang Shuren (Changchu University of science and technology)

Aiming to the lightweight design of the battery box for electric vehicle, this paper research the design process and the strength analysis method of long carbon fiber reinforced thermoplastic (LCFT) for a battery box of a sanitation vehicle. The analysis results show that the battery box saves about 42% weight compared to the aluminum alloy.

P1104-18 Research of carbon fiber composite valve used in small compressor
Zheng Chuanxiang, Lian Jiaoyuan, Wu Jiayi, Zhang Guojiang (Zhejiang University)

This paper researched composite material valves for small compressor used in refrigerators and airconditioners instead of traditional metal material. After this changing, the COP is same with metal valves, but the noisy reducecg from 39 dB(A) to 36 dB(A).

Stage 5
(Chairs: Ning Hu/ Kok Hoong Leong)

P1105-16 Nonlinear vibration analysis of 3d braided composite cylindrical panels resting on elastic foundations in thermal environments
Tao Liu, Zhi-Min Li, Quan Zhang (Shanghai Jiao Tong University)

In this paper, nonlinear vibration analysis for a 3D (three-dimensional) braided composite cylindrical panel of finite length subjected to static or periodic axial forces has been presented with consideration ofthermal loads, based on a micro-macro-mechanical model.

P1105-17 Experimental investigation of NCF-on-tool contact
E.I. Avgoulas, M.P.F. Sutcliffe (University of Cambridge)

P1105-18 FaBrication, mechanical properties and tribological behaviors of ti2al1-xsnxc solid solutions
Leping Cai, Zhenying Huang, Wenqiang Hu, Suming Hao, Hongxiang Zhai (Beijing Jiaotong University)

A series of pure Ti2Al(1-x)SnxC(x=0~1) solid solution powders was synthesized by the way of pressureless sintering. Ti, Al, Sn, and TiC powders were used as the raw materials. The grain morphology of powder showed a board-shaped and presented the unique layer structure of MAX phase.

Stage 6
(Chairs: Limin Zhou/ Faxiang Qin)

P1106-16 Cfrp drilling mechanism at low temperature based on the temperature-dependent properties of resin and interface
Hongxiao Wang, Yugang Duan, Wencheng Chen (Xi'an Jiaotong University)

An experimental study was conducted to analyze the impact of cryogenic cooling conditions on holes quality when drilling CFRP laminate. The experimental results showed that the drilling zone temperature has a great influence on the material removal mechanisms and surface integrity of CFRP drilling.

P1106-17 Study on curing kinetics and curing process of CF/BPR composite
Ye Tian, Haiming Huang (Beijing Jiaotong University)

The heating rate had the effect on the compressive strength of CF/BPR and should be considered during the conventional heating curing process of CF/BPR. With increasing heating rate during the curing process, the micro-cracks increased and the compressive strength of CF/BPR escreased. Once the heating rate exceeded a certain value, the micro-cracks no longer increased and the heating rate had little effect on the compressive strength.

P1106-18 Application of LEF approach in the certification of aeronautical composite structures
Cheng Chen, Lin Chen, Ye Zhang, Chuanjun Liu (Beijing Aeronautical Science & Technology Research Institute of COMAC)

This paper presents the outline of LEF testing supporting full scale composite structural substantiation. Scatter analysis of coupon fatigue tests is introduced, and LEF generation is also shown.

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Stage 1
(Chairs: Nam Seo Goo/ Hao Wang)

P1101-19 Reinforcement on epoxy-based composites by dopamine-coated graphene prepared through high energy ball-milling
Shuiie Ren, Rongrong Xie, Wengang Yang, Xiaolong Jia, Xiaoping Yang (Beijing University of Chemical Technology)

P1101-20 Prediction of modulus and fracture toughness of the carbon nanotubes/polymer composites by using modified halpin-tsai equations
Bin Ya, Bingwen Zhou, Linggang Meng, Xingguo Zhang (Dalian University of Technology)

We proposed a modified the Halpin-Tsai model to fit experimental data on the mechanical characteristics, such as modulus and fracture toughness of random orientation nanotubes-polymer composites at high volume fractions of the CNT fillers.

P1101-21 Investigation of the mechanical and thermal properties of functionalized CNTs/polypropylene (PP) composites
Xi Nan, Jing Ma, Jiangxing Liu, Weihui Zhu, Wen Qin (Taiyuan University of Technology)

In order to improve the properties of CNTs/ polypropylene composites, the infulence of covalent and noncovalent functionalized CNTs on the mechanical and dynamic thermo-mechanical properties of these composites was investigated.

Stage 2
(Chairs: Yan Li/ Tong Earn Tay)

P1102-19 Mechanical properties characterizations of composites made from poly(lactic acid) and milled carbon fibers with a melt mixing extruder for additive manufacturing applications
Yuan Wang, Naoya Kobayashi, Daisuke Higurashi, Keigo Ishizuka, Kohji Suzuki, Masahiro Hosoya (Chiba Institute of Technology)

In this study, PLA, composites, which is reinforced with two different kinds of reinforcing fibers in the form of milled filler, i.e., kenaf and carbon fibers, were molded by melt mixing and then filament extruding processes to make green composite filaments for 3D printing additive manufacturing purposes.

P1102-20 Preparation and characterization of nanocellulose/SA sponge for hemostasis
Feng Cheng, Xinjing We, Tingsheng Yan, Jinmei He (Harbin Institute of Technology)

(1) Oxidized cellulose nanocrystal/ alginate composite films and sponges were successfully prepared and their usages as the hemostatic materials were investigated. (2) The potential hemostatic mechanism of TOCN/SA composites was discussed.

P1102-21 Effect of cellulose nanofiber (CeNF) and dispersing agent on scratch resitance and transparency of poly(vinyl alcohol) (PVA)/CeNF composites
Shiagi Konagaya (Nagoya Industrial Science Research Institute)

The addition of thinner CeNF and K3PO4 as a dispersing agent was effective for the enhancement of transparency of PVA/CeNF/CL composites without lowering their pencil hardness (scratch resistance).

Stage 3
(Chairs: Raj Das/ Frank K. Ko)

P1103-19 Multiscale study on load trasnfer of epoxy nanocomposites
Byungio Kim, Joonmyung Choi, Hyunseong Shin, Maenghyo Cho (Seoul National University)

The load transfer ability of epoxy nanocomposites is investigated using a multiscale approach combined with molecular dynamics (MD) simulations and a homogenization-based finite element model.

P1103-20 Fast exfoliation and functionalisation of 2D carbon nitride by framework charging
Jingjing Jia (Imperial College London), Edward R. White (Imperial College London), Adam J. Clancy (Imperial College London), Theo Suter (University College London), Thomas S. Miller (University College London), Paul F. McMillan (University College London), Veronika Brázdová (University College London), Furio Corà (University College London), Chris A. Howard (University College London), Cecilia Mattevi (Imperial College London), Milo S. P. Shaffer (Imperial College London)

Single and few-layered 2D intact crystalline carbon nitride nanosheets in an AB stacking structure were synthesized by a scalable one-pot reductive framework charging process. They can be further rationally functionalized by alkylation to tailor the properties of carbon nitride.

P1103-21 Synthesis of Pd/graphene nanocomposites via chemical reduction method
Jinfeng Leng, Haocheng Zhang, Zhibin Wang, Qi Wang, Peng Song (University of Jinan)

Stage 4
(Chairs: Jayantha A. Epaarachchi/ Jian Xiong)

P1104-19 Multi-scale reliability based optimization of laminated composite structures based on fiber volume fractions with genetic algorithm
Y. Jiang (National University of Defense Technology), D. Xu (Naval Academy of Armament), S. Zhang (National University of Defense Technology), L. Zhang (National University of Defense Technology), X. Chen (Naval Academy of Armament)

P1104-20 Design and analysis of a morphing trailing edge structure
Z. Wang (Aircraft Strength Research Institute), Y. Yang (Aircraft Strength Research Institute), S. Duan (Aircraft Strength Research Institute), X. Sun (Chinese Aeronautical Establishment)

This paper presents an overview of the chain of a morphing trailing edge design, analysis and test. In this chain a parametric topology optimization method based on compliant is proposed.

P1104-21 Controlling the conductive network formation of polymer nanocomposites filled with nanorods through the electric field
Yangyang Gao, Liqun Zhang(Beijing University of Chemical Technology)

Stage 5
(Chairs: Ning Hu/ Kok Hoong Leong)

P1105-19 Plasmonic annealing of Ag nano-films under low ambient temperature
Han Dai (Yantai Nanshan University, Shandong Nanshan Aluminum co. LTD.), Kun Yu (Yantai Nanshan University, Central South University), Hongjie Fang (Yantai Nanshan University), Junfeng Zhao (Yantai Nanshan University), Jie Sun (Yantai Nanshan University), Tongjian Huang (Shandong Nanshan Aluminum co. LTD.), Fang Yu (Shandong Nanshan Aluminum co. LTD.)

P1105-20A comparative study on mechanical properties of surface modified polypropylene (pp) fabric reinforced concrete composites
Guyu Feng, Kun Qian (Jiangnan University)

Acrylic acid (AA) and grapheme oxide (GO) were grafted onto the surface of PP fabric in order to improve surface hydrophilicity of PP fabric, which indirectly improve interfacial properties between PP fabric and concrete, thus leading to enhancement in freeze-thaw durability and mechanical properties of PP fabric reinforced concrete composites.

P1105-21 Bounds for percolation threshold of interfacial transition zones surrounding complex geometric aggregates in cementitious composites
Peng Lan, Wenxiang Xu (Hohai University)

We derive an explicit formula for the excluded volume of the composite body between an interphase layer and a complex geometric aggregate in terms of the interphase layer thickness, and the volume, surface area and the radius of mean curvature of the aggregate and ITZ.

Stage 6
(Chairs: Limin Zhou/ Faxiang Qin)

P1106-19 The mechanical behavior of 3D carbon/carbon composites under pure shear and biaxial compressive/ shear stresses
Chenghai Xu, Xinxing Han, Leying Song, Songhe Meng, Weihua Xie, Hua Jin (Harbin Institute of Technology)

The mechanical behavior of 3D carbon/carbon composites under pure shear and biaxial compressive/shear stresses.

P1106-20 Experiment studies and numerical simulation of composite laminates opening plates with asymmetric reinforcement
Zheng Quan, Yang Yanzhi, Lin Renbang (Aerospace System Engineering Shanghai)

In this work, three different forms of asymmetric reinforcement were compared mainly by experiment. And according to experiment, the boundary condition of specimen and the torsion control at the loaded end are the key factors for the success of the experiment. I hope this work has reference for the composite designers.

P1106-21 Fabrication and evaluation of chitosan/plga bilayered nanofibrous sheet as an effective barrier for preventing tissue adhesion
Oh Hyeong Kwon (Kumoh National Institute of Technology), Donghwan Cho (Kumoh National Institute of Technology), Won Ho Park (Chungnam National University)

Chitosan/PLGA bilayered nanofibrous sheet was fabricated by electrospinning and evaluated its barrier property in preventing post-operative tissue adhesion.

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P1101-22 Dielectric and thermal-properties of polyvinylidene fluoride composites filled with surface-functionalized reduced graphene oxide *Weihui Zhu, Jing Ma, Xi Nan, Jianqiang Liu, Wen Qin, Yongzhen Yang (Taiyuan University of Technology)* We prepared functionalized reduced graphene oxide (RGO) via in-situ polymerization by two macromolecules, polyimide and polyamine (PI and PANI) as dispersants. Moreover, the dielectric and thermal properties by combining surface-functionalized RGO fillers with PVDF were investigated.	**P1102-22 Preparation and properties of jute / poly(lactic acid) / acetylated kraft lignin based thermoplastic polyurethane biocomposites** *Jongshin Park, Hyun-gyoo Roh (Seoul National University)* Alkali-treated jute (AJ) / poly(lactic acid) (PLA) / acetylated softwood kraft lignin based thermoplastic polyurethane (ASKLTPU) biocomposites were prepared as bioplastics with high content of natural resources and biodegradability. Mechancial, thermal, and other properties of the biocomposites were investigated.	**P1103-22 Examining the influence of graphene species on toughening mechanisms in industrially relevant epoxy resins** *Ian Gent (University of Bristol), Cristina Vallés (University of Manchester), Robert J Young (University of Manchester), Ian Kinloch (University of Manchester), Ian Hamerton (University of Bristol)* In this study, a commercial epoxy system (Cycom 977, ex Solvay) is modified using graphene oxide (GO) in order to modify mechanical properties. The blends demonstrate that the incorporation of a modest quantity of GO may lead to enhancements of thermal and mechanical characteristics as evidenced by fracture toughness data.	**P1104-22 Failure analysis of composite laminates subjected to thermal stresses: A tran-scale approach** *Xin Chang, Mingfa Ren, Xu Guo(Dalian University of Technology)* We propose a trans-scale framework to evaluate the matrix failure of unidirectional FRC laminates, The results highlighted the significance of micro-based analysis because it has shown that macro failure analysis may overestimate the material failure in some particular situation.	**P1105-22 Effects adhesive thickness on the interface performance of FRP-concrete structure** *Zhao Huijian, Guo Qingyong, Chen Lei, Mao Jize (Harbin Engineering University)*	**P1106-22 Study on fabrication and properties of the aluminum foil/bubble composite** *Weiwei Wang(Nanjing University of Aeronautics and Astronautics, Suzhou Junyue New Material Technology co.,ltd), Zhaofeng Chen(Nanjing University of Aeronautics and Astronautics), Xinyang Zhang(Nanjing University of Aeronautics and Astronautics, Suzhou Junyue New Material Technology co.,ltd), Lihe Chen (Nanjing University of Aeronautics and Astronautics, Suzhou Junyue New Material Technology co.,ltd)* A new insulation material is made up of the aluminum foil and PE bubble layer which has low thermal conductivity and will lead to great energy saving.
P1101-23 Lightweight carbon nanotube conductor with high electrical conductivity and stability for scale-up manufacturing and power transmission application study *Songlin Zhang, Jin Gyu Park, Nam Nguyen, Claire Jolowsky, Ayou Hao, Richard Liang (Florida State University)* Highly aligned carbon nanotube (CNT) based sheets with large size were fabricated by a simple mechanical stretching method, resulting in a compact structure and highly electrical performance. Chemical doping of iodine further improved the conductivity to an unprecedentedly high range of 10,000 S/cm, competitive to other tiny CNT fiber or nano CNT ribbon for potential engineering application.	**P1102-23 Effect of twist on stress recovery length for single yarn natural fiber composites** *Takashi Yoshimura, Takahiro Shimizu, Junji Noda, Koichi Goda (Yamaguchi University)* This study is to investigate the effect of the amount of twist obtained by the spinning process of natural fiber yarns on multiple fiber breakages and stress recovery behavior for natural fiber composites.	**P1103-23 Mechanical properties of functionalized graphite oxide PP nanocomposites** *R. Mikael Larsen (Aalborg University)* In this work the mechanical properties including creep resistance of polypropylene nanocomposites with octadecylamine functionalized and reduced graphitic oxide are shown and compared with other carbonaceous nanofillers.	**P1104-23 Analysing the influence of manufacturing cooling rate on the impact response of Carbon Fibre/ PolyPhenylenesulfide (CF/PPS)** *Stuart McCallum, Takuhei Tsukada , Nobuo Takeda(The University of Tokyo)* This study investigates the influence of cooling rate on the impact response of aerospace grade Carbon Fibre/PolyPhenyleneSulfide (CF/PPS). The results highlight the importance of cooling rate on impact force and delamination. Higher cooling rates were shown to increase fracture toughness reducing impact damage and delamination.	**P1105-23 Creep properties of polycrystalline Al2O3-based ceramic composites** *F.A. Huamán-Mamani (Universidad Católica San Pablo), M. Jiménez-Melendo (Universidad de Sevilla)* Sintered Al2O3-Y2O3-ZrO2 (AYZ) and Al2O3-ZrO2-Er2O3 (AEZ) polycrystalline composites in the eutectic composition with densities higher than 95% have been fabricated by solid-state reaction and high-temperature sintering. The creep properties have been investigated at 1300 – 1450 ºC by means of mechanical tests in compression. The compounds exhibit extended steady states of deformation in the ductile regime, with a stress exponent n of 2. Mechanical data and microstructural features suggest that grain boundary sliding is the main deformation mechanism.	**P1106-23 An experimental demonstration of the pressurizer** *Song-su Chae, Sang-hyun Song and Jin-hwe Kweon(Gyeongsang National University)* Repair methods using heatblanket cannot apply curing pressure to composite structures. For higher strength recovery rates, it is necessary to apply curing pressure. We have developed a pressurizer to apply the curing pressure, and in this paper we will demonstrate the validity and necessity of the pressurizer.
P1101-24 Preparation, characterization and thermo-regulating performances of CNT-hybrid phase-change microcapsule/epoxy resin composites *Haixia Wen, Suzhen Xu, Chen Ling, Yilian Huang, Siyi Qin, Chen Dazhu (Shenzhen University)* The carbon nanotube-doped microencapsulated phase-change materials were incorporated into epoxy resin to form a temperature-regulating composite, which, as the electronic packaging material, shows a good potential for thermal management of electronic devices.	**P1102-24 Transient response analysis of 1D flexible electronics component by the method of reverberation ray matrix** *Fuxing Miao (Ningbo University), Huanyu Chen (The Pennsylvania State University), Ji Wang (Ningbo University)*	**P1103-24 Enhanced thermal conductivity of epoxy based composites with self-assembled graphene-pa hybrids** *D. Wu, G. Li, X.P. Yang (Beijing University of Chemical Technology)* The self-assembly hybrid filler was fabricated via electrostatic absorption of thermal reduction of graphene oxide (TrGO) and polyamides (PA), and the effect of the self-assembly hybrid filler (TrGO-PA) on dispersion state and thermal conductivity of epoxy composites were studied.	**P1104-24 Analysis and test study of thermal deformation on a grid reinforced CFRP mirror** *Xu Liang, Ding Jiao-teng, Wang Yong-jie, Xie Yong-jie, Ma Zhen, Fan Xue-wu(Chinese Academy of Sciences)* Due to the low density and extremely low thermal expansion, carbon fibre reinforced plastic (CFRP) is one of potential materials applied as precise dimension components, for very strict thermal stability required. A novel grid reinforced CFRP structure was adopted to improve stiffness and resistance of thermal deformation. The thermal deformation test based on the vacuum tank verifies the reliability of the finite element analysis results.	**P1105-24 Compressive creep behavior of zirconia/nickel oxide composites** *F.A. Huamán-Mamani (Universidad Católica San Pablo), M. Jiménez-Melendo (Universidad de Sevilla)* NiO/8YSZ and NiO/3YTZP composites with different NiO contents have been fabricated by conventional ceramic routes. The mechanical behavior of the composites has been characterized by compressive constant strain rate tests at high temperatures between 1100 and 1350 ºC. The overall mechanical response of the composites is mainly related to the softer phase because of its interconnection within the composite, acting as short-circuit for deformation.	**P1106-24 Simulation of the single z-pin pull-out test by the finite element method** *Chung-Ki Sim, Nam Ju Lee, Seong Kyun Cheong (Seoul National University of Science and Technology)*

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P1101-25The role of internal stresses in microwires on their soft magnetic and microwave absorbing characteristics *X.F. Zheng, F.X. Qin, H. Wang, H.X.Peng (Zhejiang University)* On this work, internal stress has been modified by removal of glass and joule annealing, resulting in the different microwave behaviors by tailoring the domain structure and local anisotropy field.	**P1102-25 A novel composite material with flame retardant and antibacterial properties in interior system** *Jianbo Sun, Qian Liu, Yi Zhang, Dongbing Geng, Baogang Sun, Kai Yi, Zhiyong Yang (Aerospace Research Institute of Materials and Processing Technology)* To meet the special standards of interior systems in space station or high-speed rail, a novel series of T700/602 prepregs with flame retardment and antibacterial properties were prepared by hot melt impregnation. In this study, their mechanical properties, production of combustion, flame retardment, antibacterial and mildew proof properties were systematicly studied to get the relationship between additives and properties.	**P1103-25 Synthesis, characterization, and microwave absorption properties of bi1-xZnxFeO3 nanoparticles** *Song Bi, Jun Li, Xunjia Su, Genliang Hou, Bing Mei, Hao Li (Xi'an Research Institute of High-Tech)*	**P1104-25 Shear behaviour and deflection response of wood-based inclined lattice truss core sandwich structures** *Xin Zhao, Yingcheng HU, Mingmin JIN (Northeast Forestry University)*	**P1105-25 CNT enabled fabric sensors for monitor resin infusion and curing of composites** *Sida Luo (Beihang University), Yong Wang (Beihang University), Guantao Wang (China University of Geosciences), Liuhe Li (Beihang University), Yun Luo (China University of Geosciences)* CNT enabled fiber sensors co-braided in polymeric composites could realize non-invasive, high-sensitive and large-area monitoring of various processing events, including resin infusion, onset of crosslinking, gel time, degree and rate of curing.	**P1106-25 Experimental study on the environmental effects on the damping properties of a cantilever beam with an internal ferrofluid flow** *Ryan Tancin (Stony Brook University), Ya Wang (Stony Brook University), Dan Inmanb (University of Michigan, Ann Arbor)*
P1101-26 Preparation and characterization of epoxy resin with low amount of polyetherimide *Min-Joo Kang, Young-Jung Heo, Yinhang Zhang , Ji Won Lee and Soo-Jin Park (Inha University)* Epoxy resin reinforced by blending a low amount of polyetherimide.	**P1102-26 Thermal conductivity and impact performance of graphene/ epoxy nanocomposites** *Hsien-Kuang Liu, Wei-I Chien (Feng Chia University)* Both thermal conductivity and impact energy of GO/epoxy and RGO/epoxy composites increase with graphene weight fraction. Low power ultrasonication dispersion of RGO/epoxy resin significantly improves impact energy of RGO/ epoxy.	**P1103-26 Ultradispersed nanocomposites membrane of copper@reduced graphene oxide/pvdf for enhanced thermal conductivity** *Li Shuang, Ye Li ,Zhao Yan(Beihang University)* We did a research on the designing of the nanoarchitecture of copper@reduced graphene oxide (RGO) to improve the thermal conductivity of the PVDF membrane.	**P1104-26 Effect of rolling temperature on bonding strength of hot roll bonded Ti steel clad plates with V and IF steel interlayer** *Boxin Li, Zejun Chen, Weijun He, Ting Zhou(Chongqing University)* Ti/steel clad plates with V and IF steel interlayer successfully manufactured by roll bonding process. There exists an inverse relationship between shear strength and rolling temperature.	**P1105-26 The value and development of optical fiber sensing in structural health monitoring of composite materials** *Jing Feng Xue (AVIC Changcheng Institute of Metrology & Measurement)*	
P1101-27 Study on a modified phthalonitrile resin system suitable for hot-melt prepreg preparation *Chengyuan Shang, Mengin Fan, Dongxia Zhang, Hongjie Sun, Yi Zhang (Aerospace Research Institute of Materials&Processing Technology)* A modified phthalonitrile resin system suitable for impregreg (PN1001) was prepared. The corresponding carbon fiber reinforced composites owned superior mechanical properties and exhibited excellent mechanical property retention at elevated temperature as high as 350oC.	**P1102-27 A new theory considering the coherent interface effect in nanomaterials** *Yin Yao (Chinese Academy of Science), Shaohua Chen (Beijing Institute of Technology), Daining Fang (Beijing Institute of Technology)*	**P1103-27 Comparison on the performance of domestic QZ5526 and Toray T800H carbon fibre** *Haichao Huang (Weihai Guangwei Composites Co.,Ltd)* The microstructure and mechanical properties of domestic QZ5526 carbon fiber and Japan's dongli T800H carbon fiber are compared and analyzed. The results showed that the tensile strength, tensile modulus and elongation of the carbon fiber of QZ5526 were higher than that of the T800, and the body density was less than T800H. QZ5526 carbon fiber's roundness, shear strength, degree of orientation, the degree of graphitization, the bonding force between the microcrystalline layer and the microcrystalline band are all better than the T800H.	**P1104-27 An experimental and numerical study on the blast resistance of single-curvature sandwich panels with layered-gradient metallic foam cores** *Lin Jing(Southwest Jiaotong University&Xi'an Jiaotong University),Xingya Su(Southwest Jiaotong University),Longmao Zhao,Zhihua Wang (Taiyuan University of Technology)* The shock resistance of single-curvature sandwich panels with two aluminum alloy face-sheets and a layered-gradient closed-cell aluminum foam core, under air-blast loading, was investigated experimentally and numerically in this study. Two radii of curvature and six various layered-gradient core configurations were examined.	**P1105-27 An online strategy for monitoring damage growth of composites in static test** *Hu Sun, Aijia Zhang, Yshou Wang , Xinlin Qing(Xiamen University)* In this paper, a piezoelectric and guided wave-based load compensation method is exploited to eliminate the load effect on real-time monitoring damage growth of composite in static test.	

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P1101-28 Fiber reinforced HNBR *Xianzeng Chang, Xiaozhen He, Ya Xiao, Xinyan Shi (Qingdao University of Science and Technology)* The influence of carbon nanoparticle morphology in epoxy on the mechanical properties is investigated regarding the size effect. Three types of particles are used, representing spherical, tubular and layered morphologies.	**P1102-28 Influence of carbon nanoparticle geometry in epoxy matrix on mechanical properties and failure initiation regarding the size effect** *Christian Leopold (Hamburg University of Technology), Till Augustin (Hamburg University of Technology), Thomas Schwebler (Hamburg University of Technology), Wilfried V. Liebig (Karlsruhe Institute of Technology (KIT)), Hans Wittich (Hamburg University of Technology), Bodo Fiedler (Hamburg University of Technology)* The influence of carbon nanoparticle morphology in epoxy on the mechanical properties is investigated regarding the size effect. Three types of particles are used, representing spherical, tubular and layered morphologies.	**P1103-28 Oxidation of carbon fiber and its effect on mechanical properties** *Fei Su, Pengfei Huang, Tenghui Li, Ruixia Yao, Xiaoxu Pan (Beijing University of Aeronautics and Astronautics)* Oxidation of carbon fiber and its effect on mechanical properties.	**P1104-28 Visco-elastic bending of sandwich beam with light core** *Cerny M.J, Slapak P.(Czech Technical University in Prague)* The formulation and analysis for visco-elastic bending of sandwich beam with light core will be described in the paper.	**P1105-28 Low-cost fabrication methods for organicinorganig hybrid optoelectronic structure on a flexible substrate** *David Schmidt, Lin Li, Yongmin Liu, Yingzi Lin (Northeastern University)*	
P1101-29 A branched silicon-containing arylacetylene resin *Manping Ma, Qiaolong Yuan, Farong Huang (East China University of Science and Technology)* A branched silicon-containing arylacetylene resin has excellent high-temperature properties and good mechanical properties	**P1102-29 Relaxation-induced piezoresistivity in carbon-based monofilament hierarchical polymer composites** *Cair-Ortiz (Centro de Investigación Científica de Yucatán A.C.), F. Avilés (Centro de Investigación Científica de Yucatán A.C.), J. L. Abot (The Catholic University of America)* Relaxation phenomena in multi-scale polymer composites is sensed in situ by using the electrical signal of monofilament composites modified by carbon nanostructures.	**P1103-29 Study on the radiation resistance of commercial glass fibers** *Qun Zu, Yan Zhang, Sanxi Huang, Songling Huang, Wei Song, Yang Chen (Nanjing Fiberglass Research & Design Institute, Sinona Science & Technology Co., Ltd)* We have investigated two types of radiation-resistant glass fiber (the R and HS glass), applied in the thermal insulation and composite reinforced structure of nuclear power industry. The strength retention ratio for roving was more than 93% after gamma-irradiation at 1.7*10^5 Gy, while for impregnated yarn was more than 91% after 1.7*10^7 Gy.	**P1104-29 Compressive properties of the hollow glass microsphere filled resin-matrix composite materials** *Xiaodong Wang, Yingie Qiao, Xiaohong Zhang, Zhipeng Xing(Harbin Engineering University), Ting Zheng(Biomaterials Innovation Research Center, Division of Biomedical Engineering, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School)* The density, compressive properties of hollow glass microsphere (HGM) filled resin composites were investigated in the present paper. The results showed that the density, compressive strength and modulus of the composites decreased simultaneously with increasing HGM content, the results indicated mechanical properties of resin-matrix composites could be modified by changing the HGM weight fraction, this discover would make it become a promising engineering material in the related fields.	**P1105-29 The fabrication and properties characterization of the radiation crosslinked shape memory EVA/HDPE** *Wei Liang, Songhe Meng, Hai Liu, Hua Jin, Liuwei Wang (Harbin Institute of Technology)* The Fabrication and Properties Characterization ofthe Radiation Crosslinked Shape Memory Blend of Ethylene-VinylAcetate (EVA) and High Density Polyethylene (HDPE).	
P1101-30 Influence of graphene derivatives on the selected properties of post-consumer PETG foil *Izabela Irska, Sandra Paszkiewicz, Elżbieta Piesowicz, Daria Pawlikowska, Anna Szymczyk, Zbigniew Rosłaniec (West Pomeranian University of Technology)* In the present work, we have studied the effect of graphene derivatives forms (GDFs) on the processing properties and gas barrier permeability of the glycol modified poly(ethylene terephthalate) (PETG) - based nanocomposites. Preliminary study revealed that GDFs have the potential to improve the permeability toward gases, like oxygen molecules, while, on the other hand, the barrier efficiency of GDFs is strongly affected by the degree of exfoliation of graphene nanoplatelets in polymer matrix, their size and presence of functional group on their surface.	**P1102-30 Effect of functionalized nanomaterials on the flammability of the composites** *Tao Yu, Changqing Hu, Fei Sun, Yan Li (Tongji University)*	**P1103-30 Controllable synthesis of aligned carbon nanotube/aluminum oxide hybrid fibers by atomic layer deposition** *Mingyang Li, Mei Zu (National University of Defense Technology)* With the aim of obtaining thermal resistant fibers with higher tensile strength, we synthesized the multi-functional aligned CNT/aluminum oxide (Al2O3) hybrid fibers involving CNT-based continuous fibers coated by Al2O3 through the atomic layer deposition (ALD).	**P1104-30 Effect of polypropylene grafted maleic anhydride film on the mechanical behavior of fiber-metal laminates interface** *W.J.Fang,X.J.Yang,K.Wei,Y.J.He(Hunan University)* The effect of a viscous film material on the interface strength of glass fiber reinforced thermoplastic resin composites with metal sheet was investigated.	**P1105-30 Humidity-sensitive smart clothes with reversible response** *Fenghua Zhang, Ying Zhon, Yanjiu Liud, Sungho Jine, Renkun Chenf, Jinsong Leng (Harbin Institute of Technology)* Based on the humidity responsive property of Nafion, two different structures of smart clothes are designed to realize the reversible and adaptive functionality in an individual's perspiration level.	

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P1101-33 Experimental investigation on the high temperature oxidation of ceramic matrix composites *Lixia Li (Xi'an Jiaotong University, Aviation Industry Corporation of China), Xueling Fan (Xi'an Jiaotong University), Tiejun Wang (Xi'an Jiaotong University)* The research described the relationship between CMC cracks and the high-temperature oxidation preservation time.	**P1102-33 Selective laser sintering of polyamide12 composites** *Mengxue Yan, Xiaoyong Tian, Gang Peng (Xi'an Jiaotong University)* The composites of CF/PA12 were prepared by Selective Laser Sintering, which is one kind of Additive Manufacturing. The thermal influence of carbon fiber (CF) on the PA12 in the laser sintering process was assessed by physical experiments and a three dimensional simulation model.	**P1103-33 Mirrors fabricated by all cfrp composites and their dimensional stability in air** *Y.J Wang, L Xu, J T Ding, Y.J Xie, Z Ma (Xi'an Institute of Optics and Precision Mechanics of Cas)* To improve the humid tolerance of CFRP mirror, a polymer coating was applied on the mirror surface through physical vapor deposition. the initial surface accuracy can be maintained above λ/10 for more than 200 days (λ=632.8nm).	**P1104-33 Temperature distribution and evolution of W-Cu/Ti/CoSb$_3$ thermoelectric joint during spark plasma sintering** *Degang Zhao, Di Wu, Jiai Ning (University of Jinan)*	**P1105-33 Preparation of aramid/ bn reinforced self-healable nanocomposites and their performance** *Lixin Xing, Li Liu , Xueqin Wang, Yudong Huang (Harbin Institute of Technology)* The "mutual irradiation grafting" aramid micro-fibers were used to reinforce boron nitride nanosheets(BNNSs)-healable nanocomposites. The mechanical strength, dielectric properties and self heal ability of aramid/BNNSs self-healable nanocomposite were studied.	
P1101-34 Abstract-Fabrication and microstructure of C/C-ZrC-SiC and C/C-HfC-ZrC-SiC composites *Lin Xu, Jia Chen, Xinchao Li, Zhen Fan, Yin Zhang, Botao Han, Zhihai Feng (Aerospace Research Institute of Materials & Technology)* Two kinds of C/C-UHTCs composites namely C/C-ZrC-SiC and C/C-HfC-ZrC-SiC composites were prepared by PIP process using liquid ZrC/SiC and HfC/ZrC/SiCprecursor. The obtained composites have good mechanical and excellent ablative properties at ultra high temperature.	**P1102-34 Ultra-conductivity low thermal conductivity of highly oriented and hollow sphere-attaching walled graphene/pi nanocomposite foam** *Qingyu Peng, Yuyang Qin, Xiaodong He, Yibin Li (Harbin Institute of Technology)*	**P1103-34 A modeling method of curing deformation for cfrp composite stiffened panel** *Wang Yang, Gao Jubin, Bo Ma, Shi Peng (Beijing Aeronautical Science & Technology Research Institute of COMAC)* Based on the finite element analysis a simulation process is developed to predict the deformation of CFRP composite panel after cure.The modelling procedure is straight forward, and compared with the multi-physics coupling method it requires less memory resources. Curing deformation of two panel with different stacking sequence are successfully predicted with is method. The result shows that the modelling method described in this paper can effectively analysis the curing deformation of composite panel with relatively simple steps. Additionally, numerical simulation results from this method can support the ply optimization on composite panel curing deformation.	**P1104-34 Experimental research on dynamic shear properties of C/C composite pins** *Guo Fei, Fei Qing-guo, Zhang Pei-wei (Southeast University)* The shear strain rate sensitivity of C/C composite pins was investigated in this paper. And the shear strength and the shear failure mechanism of C/C composite pins varied with the strain rates.	**P1105-34 Theoretical investigation on the adsorption and diffusion of atoms/ions on the surface of two-dimensional nanocrystal** *Li-Jun Zhou (Tianjin University of Technology and Education), Jian-Gang Guo (Tianjin University), Xin-Xin Yao (Tianjin University)* Theoretical investigations are made on adsorption and diffusion of atoms/ions on the surface of two-dimensional nanocrystal based on an analytical continuous model. The influence of the surface structure of crystal, diffusion path and initial position of atom/ion on the adsorption and diffusion of atoms/ions on nanocrystal surface is studied.	
P1101-35 Novel aerogel-porous zirconia composite with ultra-low thermal conductivity *Rubing Zhang, Xianbo Hou (Beijing Jiaotong University)* Highly porous zirconia fibers networks with a quasi-layered microstructure were successfully fabricated using vacuum squeeze moulding. Al2O3–SiO2 aerogel was impregnated into fibrous porous ceramics, and the microstructures, thermal and mechanical properties of Al2O3–SiO2 aerogel/porous zirconia composites were studied.	**P1102-35 Biomfn/bioxiy/go nanocomposites: synthesis, characterization, and photcatalytic activity** *Jing-Ya Fu, Chiing-Chang Chen (National Taichung University of Education)* This is the first report that a series of bismuthoxyfluoride/bismuth oxyiodide/graphene oxide (BiOmFn/BiOxIy/GO) nanocomposites with different GO contents are synthesized through a simple hydrothermal method. The photocatalytic activity of Bi5OO59F32/BiOI/GO composites reaches a maximum rate constant of 0.2539 h−1, which is 1.1 times higher than that of Bi5OO59F32/BiOI, 1.3 and 110 times higher than that of BiOI and Bi5OO59F32.	**P1103-35 Preparation and interfacial property of graphene oxide/ BPEI/carbon fiber hierarchical reinforcement** *Wang Due (Harbin Institute of Technoloqe)* This paper use a more environmentally friendly, convenient and quick way to modify carbon fibers' surface, prepared and study the mechanism of the corresponding changes in interfacial properties of branched polyethylenimine grafted carbon fiber hierarchical reinforcement and graphite oxide graphene grafted carbon fiber hierarchical reinforcement.	**P1104-35 Thermo-mechanical de-bonding of composite-titanium single-lap adhesive joints** *A.S.Ganapathia, S.Vijay Sankarb, I Sridhara(Nanyang Technological University), Charles Ng(Rolls-Royce Singapore Pte Ltd)* The shear strength of carbon-titanium single lap joints was investigated at elevated temperatures. The de-bonded metal and composite surfaces with minimal or no damage were cleaned with suitable techniques. The re-bonding strength of the joint was investigated and presented in this paper.	**P1105-35 Nitrogen-doped carbon for lithium-ion batteries** *Jinle Lan, Yuan Liu, Yunhua Yu , Xiaoping Yang (Beijing University of Chemical Technology)*	

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P1101-36 Effects of high-temperature annealing on the phase evolution and microstructure of hafnium carbide derived from HfC(N) precursors without Hf-O bond *J. Cheng, S.X. Hu, X.Z. Wang, J. Wang (National University of Defense Technology)* Effect of high-temperature annealing on the phase evolution and microstructure of hafnium carbide derived from HfC(N) precursors, prepared using hafuium chloride and dicyandiamide with the different mole ratios, was reported.	**P1102-36 The strength of graphene and its application in nanocomposites** *Xin Zhao, Robert J. Young (University of Manchester)* Monolayer graphene flakes were prepared by mechanical exfoliation and pressed onto PMMA beams. The deformation and fracture behaviour of the one-atom-thick graphene flake has been studied in detail through applying uni-axial tensile stress to the one-atom-thick graphene flake via the van der Waals bonding between the graphene flake and the PMMA beam by bending the beam.	**P1103-36 Preparation and properties of zirconia fiber reinforced boron phenolic resin for ceramic and high temperature composites** *Zhen Yue Zou (Wuhan University of Technology)* In this paper, the ablative composite materials were prepared by adding alumina, magnesia, silicon carbide, mica and other fillers, and being reinforced with zirconia fiber to test its mechanical properties and the properties of high temperature ablation. The results show that the bending strength of the material is very good, and the bending strength can reach 19.33MPa. After sintering at 1400℃, the new phase of zircon was produced, and the bending strength is also great which can reach 12.03MPa. And the corrosion resistance of the composites is excellent, and the oxygen-acetylene line ablation rate is 0.03 mm/s when the fiber content is 30wt%.	**P1104-36 Experimental investigation on mechanical behaviors of novel hybrid structure of composite to metal** *Tang Huaqing, Liu Longguan(Shanghai Jiao Tong University)* Experimental investigation on mechanical behaviors of novel hybrid structure of composite to metal.	**P1105-36 Preparation and properties of solid composite polymer electrolyte for structural capacitor** *Bong-Sang Cho, Do Hyung Park, Jun Choi, Da Hee Choi , Ki-Young Kim (Korea Institute of Industrial Technology)* We prepared composite solid polymer electrolytes (SCPEs) composed of poly (ethylene glycol) monomethyl ether acrylate (PEGA), 1-ethyl-3-methylimidazolium trifluoromethanesulfonate ([EMIm][OTF]) and inorganic filler. We produced structural capacitor made from carbon fiber/epoxy prepreg and composite solid polymer electrolyte.	
P1101-37 CF ceramic hybrids with great homogeneously arranged carbon fibers prepared by rolling-compaction *Yuan Cheng, Ping Hu, Xinghong Zhang (Harbin Institute of Technology)* A simple but effective method to fabricate Cf/Ceramic hybrids with great homogeneously arranged carbon fibers was put forward and verified to be feasible by experiments preliminarily.	**P1102-37Light-weight, super-elastic and mechanically flexible graphene/polyimide nanocomposite foam for compression sensor application** *Yuyang Qin (Harbin institute of technology)*	**P1103-37 Short fiber reinforced composite materials mechanics performance analysis** *Li Xiang (Beihang University)* In this paper, an embedded element technique is used to simplify mesh generation for random short fiber reinforced composite materials when we do finite element analysis for RVE, but this technique is sensitive to the meshing size, Using control variable method to study the effect of some parameters of the fiber to the mechanical performance of composite material.	**P1104-37 Development of lightweight corrugated cylinder for satellite primary structure** *Gao Feng, Ma Haiquan, Wang Han, Han Mingfei(BeiLing Institute of Spacecraft System Engineering), Li Yu, Chen Weiqiang(Beijing Satellite Manufacturing Factory)* Lightweight corrugated shell cylinder which is the primary structure of a typical communication satellite platform, was developed based on novel composite system BHM3/BS4. Multi-objective optimization was performed and structural weight reduction was achieved. The full-size corrugated shell cylinder was manufactured and qualified by static test and sine-vibration test. The test data shows that the cylinder met various technical requirements successfully.	**P1105-37 Numerical analysis and simulation of bimorph macro-fiber composite undergoing large displacements and rotations** *Zhang Shu-yang (Northwestern Polytechnical University), Zhang Shun-gi (Northwestern Polytechnical University, Dalian University of Technology), Wang Zhan-xi (Northwestern Polytechnical University), Qin Xian-sheng (Northwestern Polytechnical University)* A electromechanical coupled geometrically nonlinear finite element model for thin-walled composite structures based on Reissner-Mindlin plate theory and large rotation nonlinear theory (LRT56).	
P1101-38 A novel digital light processing technology of short sic fiber reinforced sic matrix composites *Rujie He, Dong Liang, Kegiang Zhang, Lu Zhang, Lei Hu, Zongwei Tong (Beijing Institute of Technology)*	**P1102-38 Superhigh thermal conductivity of three-dimensional graphene-based nanocomposite** *Yibin Li, Xianxian Sun, Fan Xu, Zaishan Lin, Qingyu Peng, Xiaodong He (Harbin Institute of Technology)*	**P1103-38 Effects of surface-dissolution process multivariables on the morphology, mechanical properties and crystallization of all-aramid composites** *Jian Min Zhang (Qingdao University), Zeinab Mousavi (Queen Mary University of London), Nattkan Soykeabkaew (Mae Fah Luang University), Ton Peijs (Queen Mary University of London)* A new self-reinforced polymer composite based on high-performance aramid fibers was successfully prepared by applying an elaborately designed surface-dissolution method to fuse poly(p-phenylene terephthalamide) (PPTA) fibers and consolidate them into "all-aramid" composites.	**P1104-38 Experimental investigation on the energy absorption behaviour of nacre-inspired composite circular tubes under axial compression** *Zhibo Xin, Yugang Duan, Xiaohui Zhang(Xi'an Jiaotong University)* A new crashworthy composite tubular structure, which can significantly improve the specific energy absorption up to 51% as compare to the UD continuous composite structure, is explored by an experimental method.	**P1105-38 Analysis of concrete columns with shape memory alloy reinforced** *Zhen-qing Wang, Jing-biao Liu, Xiao-yu Sun, Li-dan Xv (Harbin Engineering University)* In this work, SMA is used to reinforce concrete columns based on the memory effect, SMA can effectively repair the cracks of concrete and thereby improve crack resistance of concrete to ensure the structural safety.	

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	P1102-39 Friction and wear properties of carbon nanotube/alumina composites under water lubricated conditions *Keiichi Shirasu, Takuto Miyaura, Go Yamamoto, Toshiyuki Hashida (Tohoku University)* In this study, multi-walled CNT (MWCNT)/alumina composites are prepared, and tribological properties of the composites in distilled water were investigated and compared with those of the MWCNT-free alumina. It has been demonstrated that the composite shows lower coefficient of friction (COF) (μ ~ 0.1) compared with the MWCNT-free monolithic alumina (μ ~ 0.2) in the mixed regime.	**P1103-39 A novel development and application of self-crosslinking strengthening for polyamideamidemine-epichlorohydrin(PAE) resin in polyacrylonitrile (PAN) sheet** *Sufeng Zhang, Dongyan Zhao, Chen Hou, Miaoxiu Yang, Nan Zhang, Lina Liu (Shaanxi University of Science & Technology)* PAE resin reinforced polyacrylonitrile (PAN) fiber sheet (PAE-PAN) was successfully prepared.This work suggests a promising PAN fiber enhancement strategy with outstanding mechanical properties by adding PAE resin used as excellent self-crosslinking material and may have great practical application prospects in some other synthetic fiber sheet.	**P1104-39 Tensile properties of FRP ply splice structures** *CHEN Dingding, WANG Manyi(National/University of Defense Technology), ARAKAWA Kazuo(Kyushu University),JIANG Shiyi(NISSAN SHATAI CO.,LTD), WU Kegang,HU Qigao (National/University of Defense Technology)* Two modifications were made based on the previous work on ply spliced structures. The results prove again that the interlaminar shear stress and the tensile stress in the through-thickness direction, instead of the tensile stress along the fiber direciton, are the key factors deciding the fibal strength.	**P1105-39 Polymer composite material with inherent function of damage visual indication** *O. Bulderberga , A. Aniskevich (University of Latvia)* The new concept of non destructive testing for polymer composites is presented by bio-inspired "bruisable" GFRP composite with inherent function of damage visual indication.	
P1101-40 Potentials of nano- and micro- reinforcements applied to ceramic matrix composites *Hui Mei, Laifei Cheng, Litong Zhang (Northwestern Polytechnical University)* Potentials of micro/nano reinforcements to CMCs.	**P1102-40 Turning the amphiphilicity of graphene oxide by grafting lauryl groups for self-assembly of nanostructures at the interface** *Guomin Ding, Weicheng Jiao, Rongguo Wang, Jun Li, Yue Niu, Yifan Huang (Harbin Institute of Technology)*	**P1103-40 Study on the acetylation of rice straw biogas residues and its properties characterization** *Enhui Sun, Tengfei Xia, Guofeng Wu, Zhizhou Chang, Hongying Huang (Jiangsu Academy of Agricultural Sciences)*	**P1104-40 Post impact analysis of damaged variable-stiffness curved composite plates** *Hessam Ghasemnejad(Cranfield University)* The need to design an analytical model capable of evaluating the impact and post impact response of curved variable stiffness plates were identified through research. This paper aims to address that issue by developing two new analytical modelling models.	**P1105-40 Smart surfaces fabrication based on shape memory polymer** *Lingyu Zhao (National Center for Nanoscience and Technology, Beijing, Peking University), Jun Zhao (National Center for Nanoscience and Technology, Beijing), Zhong Zhang (National Center for Nanoscience and Technology, Beijing)* Shape memory polymers (SMP) are one kind of smart materials that can keep temporary shape stable for a long time and recover to permanent shape upon exposure to an external stimulus, such as light, heat and pH change. To design smart surfaces by using their shape memory effect (SME) should be of great interest. With the shape recovery by controlling the temperature or time, the surface structures can be tuned effectively so that the properties of surface can be regulated.	
P1101-41 Effect of fiber surface treatment on thermal/mechanical properties of liquid silicon infiltrated ceramic matrix composites *Jong Seob Song (Korea Institute of Energy Research, Chungnam National University), Seyoung Kim (Korea Institute of Energy Research), Insub Han (Korea Institute of Energy Research), Young-hoon Seong (Korea Institute of Energy Research), Soo-hyun Kim (Korea Institute of Energy Research)* After surface treatment of carbon fiber with nitric acid, C/SiC composites were made through LSI process. The thermal conductivity and mechanical properties of C/SiC composites were analyzed.	**P1102-41 Effect of TiO2 on thermal stability, flame retardancy and mechanical properties of graphene oxide/polypropylene Nanocomposites** *Hongda Chen, Aiqing Ni, Jihui Wang (Wuhan University of Technology)*	**P1103-41 Preparation of carbon fiber sizing agent on different types of epoxy resin** *C. C. Ji, P. Li, X.P. Yang (Beijing University of Chemical Technology)*	**P1104-41 A new pre-design methodology for innovative composite structures** *Florian Neveu, Bruno Castanié, Philippe Olivier(Université de Toulouse)* This work aims to define a new design methodology for composite structures by considering the specificities of composite materials, their architectures and their manufacturing processes.	**P1105-41 Automobile brake squeal noise suppression using piezoelectric-based devices** *Jae Han Park, Jeong Ha Song, Gyuhae Park (Chonnam National University); Tae Ho Jung, Jeong Kyu Kim (Hyunai Motor Company)* Automobile brake squeal noise suppression using Piezoelectric-based devices- the two vibration control techniques are used to suppress squeal noise in brake system(dither control, shunt damping) and experiment results under the laboratory demonstrate the effectiveness of the dither control.	

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P1101-42 Study on tantalum coating on titanium alloy surface by laser cladding *Rongjuan Yang (Tsinghua University), Dongyun Ge (Tsinghua University), Zongde Liu (North China Electric Power University), Li zhang (Schneider electric (China) Co., Ltd.))*	**P1102-42 Multifunctional nano silver/carbon/epoxy conductive adhesive** *Xiaojiang Xu, Hongbo Gu (Tongji University)*	**P1103-42 Manufacture and characterization of CF/CNT paper reinforced epoxy composites by resin infusion method** *Da Hee Choi (Korea Institute of Industrial Technology(KITECH), Hanyang University), Do Hyung Park (Korea Institute of Industrial Technology(KITECH)), Bong-Sang Cho (Korea Institute of Industrial Technology(KITECH)), Tae Hee Han (Hanyang University), Ki-Young Kim (Korea Institute of Industrial Technology(KITECH))* CF/CNT nonwoven fabrics were manufactured by wet laid method of a mixed CF/CNT aqueous dispersion, which were prepared by an epoxy resin injection process to manufacture a CF/CNT/epoxy composite. This paper reports the electrical conductivity measurement of CF/CNT nonwoven fabrics and the mechanical properties of nonwoven fabrics and polymer composites.	**P1104-42 Experimental study on buckling and progressive damage of pre-delaminated composite laminates under compression** *Xing Li, Shaohua Ji, Tian Zhang(Beijing Aeronautical Science & Technology Research Institute of COMAC), Zhidong Guan(Beihang University), Chuanjun Liu(Beijing Aeronautical Science & Technology Research Institute of COMAC)*		
P1101-43 In-situ synchrotron study of the deformation behavior of Ti5Si3/TiNi composite *Dapiang Jiang (China University of Petroleum-Beijing), Yinong Liu (The University of Western Australia), Yang Ren (Argonne National Laboratory), Lishan Cui (China University of Petroleum-Beijing)* An in situ nanolamellar Ti5Si3/TiNi composite is prepared by arc melting based on the design principle of load sharing between a hard component and a phase transforming matrix. In this new composite design strategy, the function of the SMA matrix is to support the nanomaterials to harness their intrinsic qualities to achieve extraordinary mechanical properties. The composite showed a compressive strength of 2.5 GPa and a fracture strain of 35%.	**P1102-43 Polystyrene controlled formation of carbon nanocomposites for environmental remediation** *Hongbo Gu (Tongji University)*	**P1103-43 Preparation of carbon fiber sizing agent and characterization of its properties** *Kun Ming Yang, Peng Li, Yun Ping Zhang (Beijing University of Chemical Technology)* An improved epoxy functional emulsifier is synthesized in this paper with PEG, which has two epoxy functional groups at both ends.The property of the carbon fiber sized with our sizing agent has been significantly improved.	**P1104-43 A two-dimensional fourier** *Jian Liu, Jongchol Choe, Rui Xu,Qun Huanga, Heng Hu(Wuhan University)*	**P1105-43 Application of flex-compressive piezoelectric energy harvesting cell in railway system** *Wanfeng Wang , Zhifei Shi (Beijing Jiaotong University)* An energy harvesting concept using flex-compressive energy harvesting cells embedded in the track structure is proposed. Numerical results demonstrate that the power generation of one flex-compressive energy harvesting cell could approaches watt level.	
P1102-44 Investigation on the properties of barium ferrite/epoxy nanocomposites *Hongyuan Zhang, Hongbo Gu (Tongji University)*	**P1102-44 Investigation on the properties of barium ferrite/epoxy nanocomposites** *Hongyuan Zhang, Hongbo Gu (Tongji University)*	**P1103-44 The sizing agent for carbon fiber strand reinforcing thermoplastic resins** *Lei Wu, Kunming Yang, P. L. X P. Yang (Beijing University of Chemical Technology)* In our study,the PP wax was acidified and then reacted with a high molecular weight polyether amine.In certain conditions,the stable aqueous emulsion was prepared by the melting way or solution way.The emulsion can be used as a sizing agent in glass fiber or carbon fiber reinforced PP thermoplastic resin.	**P1104-44 Toughening effect and shape memory performance of epoxy resin with AGE** *Jingbiao Liu, Zhenqing Wang(Harbin Engineering University)*	**P1105-44 Deformation and recovery properties of shape memory polymer composites tube** *Tianzhen Liu, Liwu Liu, Xin Lan, Yanjiu Liu, Jinsong Leng (Harbin Institute of Technology)* In this paper deformation and recovery properties of shape memory polymer composites tube were investigated in detail.	

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P1101-45 Effects of Chromium on tribological properties of Ni3Al under dry sliding *Jin Yunxue, Chen Yanan,Niu Muye (Jiangsu University of Science and Technology)* Ni-25 at% Al intermetallic with different Cr contents was successfully produced by vacuum arc melting. Dry sliding tribological tests of the Ni3Al alloys were undertaken against Si3N4.The results showed that hardness, friction coefficient and wear rate of the alloys increased with increasing of Cr contents.	**P1102-45 Ultradispersed nanocomposites membrane of copper@reduced graphene oxide/pvdf for enhanced thermal conductivity** *Shuang Li, Yan Zhao, Ye Li, Xiaoran Zhao (Beihang University)* We did a research on the designing of the nanoarchitecture of copper@reduced graphene oxide (RGO) to improve the thermal conductivity of the PVDF membrane.	**P1103-45 Relationship of carbon fiber surface composition to surface energy** *Fenghui Shi, Baoyan Zhang, Jia li, Yanwei Hei (AVIC Composite Corporation Ltd)* Inverse gas chromatography (IGC) and X-ray photoelectron spectroscopy (XPS) was applied for the determination of the surface properties of a series of commercial sized carbon fibers. The carbon fibers were found to exhibit a dominant acidic nature and exhibited a better correlation with the total carbon-oxygen functional groups content.	**P1104-45 Full 3d interior deformation of a composite beam with prepared slot under 3-point bending using digital volumetric speckle photography and micro-focus x-ray computed tomography** *Lingtao Mao,Haizhou Liu,Zyan Zhu (State Key Laboratory of Coal Resources and Safe Mining),Fu-pen Chiang (Stony Brook University)* The internal deformations of a sandwich plate under three-point bending were obained by using Digital Volumetric Speckle Photography combined with Micro focus X-ray Computed Tomography.	**P1105-45 Thermal effects of electromagnetic field exposure on CFRP** *A. Horoschenkoff (Munich University of Applied Sciences)* Within the context of inductive charging of e-cars closed carbon fiber loops and CFRP plates having different stacking sequences were investigated to study thermal effects of electromagnetic field exposure.	
P1101-46 Influence of TiB2 particles on aging behavior of in-situ TiB2/Al-4.5Cu composites *Rui Du, Qi Gao, Shusen Wu, Shulin LÜ (Huazhong University of Science and Technology)* The Influence of TiB2 particles on aging behavior of in-situ TiB2/Al-4.5Cu composites and the the evolvements of composites' microstructure and mechanical properties, and the mechanism of these evolutions.	**P1102-46 Polyethylene glycol600-assisted solvothermal synthesis of nano-LiFePO$_4$/C cathode materials for lithiumion batterie** *Huihui Chen (Xi'an University of Architecture and Technology)* Nano-sized LiFePO4/C(LFP/C)composite cathode materials have been synthesized in a binary solvent of Polyethylene glycol600(PEG600) and water via solvothermal route. The paper mainly focuses on preparing LFP/C by using the PEG600-H2O mixtures in varying proportions. We briefly studied the effect of surfactant Na2EDTA on the result of the experiment.	**P1103-46 Molding Process optimization of a fast curing epoxy resin prepreg with long time storage at room temperature** *Jia Li, Baoyan Zhang, Fenghui Shi, Jiajun Gui, Zhaodan Ma (AVIC Composite Co. Ltd)* We have developed ACTECH®1201 fast curing epoxy resin system which could cure in less than five minutes under temperatures ranging from 130 to 150 Celsius with long time storage(≥60d) at room temperature , excellent mechanical properties and high Tg up to 146C. Prepreg compression moulding manufacturing process suitable for automated production and fast manufacturing were investigated using Differential Scanning Calorimetry (DSC), Dynamic thermal Mechanical Analysis (DMA), Gel time test and mechanical properties characterization.	**P1104-46 Mechanical properties of HTPB propellant strip biaxial tension specimen** *Qiang Hongfu, Liu Chang, Wang Zheiun, Wang Guang, Wang Xueren (Xi'an Institute of High Technology)* With the decrease of temperature and the incr ease of strain rate, the stress value gradually i ncreases.	**P1105-46 Analysis on the band-gap properties of the light-weight periodic structures by the spectral element method** *Zhi-Jing Wu, Feng-Ming Li (Harbin Engineering University)* The spectral element method is an available and effective approach to model the complicated light-weight periodic structure and to analyze the band-gap properies.	
P1101-47 The microstructure, martensitic transformation behaviors and mechanical properties of TiNiHf composite containing TiB whisker and (Ti,Hf)2Ni particle *Xiaoyang Yi, Xiangfong Meng, Wei Cai, Liancheng Zhao (Harbin Institute of Technology)* The Ti-Ni-Hf shape memory alloy composite containing the (Ti,Hf)2Ni particles and TiB whiskers not only exhibits the superior mechanical properties, but also maintains the higher transformation temperatures, which can meet the disign of the higher temperature shape memory alloy with the higher strength.	**P1102-47 Spreading dynamics of pp, pvdf, and mapp on glass substrates** *Chi Zhang (KU Leuven), Adri C. T. van Duin (Pennsylvania State University), Jin Won Seo (KU Leuven), David Seveno (KU Leuven)* Investigating the interactions between polypropylene, maleic anhydride-grafted polypropylene, poly(vinylidene fluoride) and glass, we evidenced the suitability of the classical wetting theories to model the spreading dynamics of molten polymers. This triggered a novel view on the adhesion between thermoplastics and glass substrates.	**P1103-47 Interface property improvement of aramid fiber composites with effectively adhesive epoxy matrix** *Limin Liu, Gang Li, Xiaoping Yang (Beijing University of Chemical Technology)* An effectively adhesive epoxy (EAEP) has been synthesized, and the interface properties of aramid fiber composites with EAEP matrix were studied.	**P1104-47 Validation of a novel model for the compressive response of frp: numerical simulation** *S. Costa (Swerea SICOMP, Chalmers University of Technology), R. Olsson (Swerea SICOMP), T. Blru (Swerea SICOMP, Chalmers University of Technology)* A mesoscale model for transverse crash is improved by an addition of an abrupt failure behaviour, a mesh objective response and some orthotropic effects that distinguish in- and out-of-plane response. The model is validated against experiments.	**P1105-47 Dynamic response suppression of space truss structure using periodic tuning technique** *Chun-Chuan Liu, Feng-Ming Li (Harbin Engineering University)*	

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P1101-48 The effect of heat treatment on thermal stability of ti matrix *Jiuxiao Li, Han Yuan Fei, Mao Jianwei, Liqiang Wang, Weijie Lu (Shanghai Jiao Tong University)* The microstructures of in situ synthesized (TiB+La2O3)/Ti composite after b and TRIPLEX heat treatment are investigated. The room temperature tensile properties of the titanium matrix composites (TMCs) are tested, and thermal stability is carried out at 873K, 923K and 973K for 100h, respectively. The results show that the microstructure of specimen after b heat treatment is widmanstätten, while it is similar to basketweave after TRIPLEX heat treatment. Room tensile properties of specimen after TRIPLEX heat treatment are better than those of β heat treatment. After thermal exposure, the strength of specimens treated by β and TRIPLEX heat treatment increases, while the ductility decreases sharply, this is attributed to the precipitation of Ti3Al and silicides. The thermal stability of specimen after TRIPLEX heat treatment is better than that after b heat treatment.	**P1102-48 Preparation and properties of aligned mwcnt-reinforced thermoplastic polyimide composites** *T.H. Nam (Japan Aerospace Exploration Agency), K. Goto (Japan Aerospace Exploration Agency), Y. Shimamura (Shizuoka University), Y. Inoue (Shizuoka University), S. Kobayashi (Tokyo Metropolitan University), S. Ogihara (Tokyo University of Science)* This paper presents new development and studies with emphasis on improving the mechanical properties of high temperature composites based on thermoplastic polyimide resin and aligned multi-walled carbon nanotubes.	**P1103-48 Characterization of through thickness thermal conductivity of wind turbine blade CFRP materials using a steady-state technique** *E.C. Senis, I.O. Golosnoy, J. Dulieu-Barton, O.T. Thomsen (University of Southampton), S.F. Madsen (Global Lightning Protection Services A/S)* The through-thickness thermal conductivity of unidirectional CFRP laminates was examined by means of a steady-state technique based on the Guarded Hot Plate (GHP) method. Unidirectional CFRP laminates with a fibre volume content of 57% were manufactured using Vacuum Assisted Liquid Resin Infusion in three different thicknesses to assess the measuring capabilities of the apparatus.	**1104-48 Influence of gripping condition and matrix type on tensile properties of unidirectional carbon fiber reinforced thermoplastic composites** *Tsuyoshi Matsuo (The University of Tokyo), Masaki Hojo (Kyoto University), Kazuro Kageyama (The University of Tokyo)*	**P1105-48 Vibration band gaps of two-dimensional improved phononic crystals** *Guochang Lin, Yuliang Li , Songqiao Chen (Harbin Institute of Technology)*	
P1101-49 Manufacturing process of hybrid aluminum matrix composite by low pressure casting *Yoshiki Kataoka, Fei Gao, Yongbum Choi, Zhefeng Xu, Kazuhiro Matsugi, Kenjiro Sugio, Hiroyuki Suzuki (Hiroshima University)*	**P1102-49 Effects of graphene mass fraction and aspect ratio on elastic properties of Graphene-based composites** *Zhenmeng Xia, Changguo Wang, Huifeng Tan (Harbin Institute of Technology)* The elastic properties of graphene are predicted accurately by a pseudo beam model. Considering graphene as the rectanguler inclusion, the elastic properties of graphene-based composites are predicted based on the Mori-Tanaka scheme.	**P1103-49 Study on impact resistance property of carbon fiber reinforced plastic after high and low temperature cycle** *Lin Xiao, Guanhui Wang, Dongxing Zhang (Harbin institute of technology)*	**P1104-49 In-situ damage monitoring and correlation with acoustic emission in cfrp composites** *Fatih E. Oz (Bogazici University), Nuri Ersoy (Bogazici University), Stepan V. Lomov (KU Leuven)* This study presents the AE characteristics of damage modes induced in quasi-isotropic laminates during tension tests. Damage modes are correlated with corresponding AE properties with the help of in-situ optical obervations.	**P1105-49 Thermal optimization of pultruded composites** *R. C. Santos (The Federal University of Rio de Janeiro), L. S. Santos (The Fluminense Federal University) a V. M. A. Calado (The Federal University of Rio de Janeiro)* This paper wants to find the optimal heat flux and the optimal processing speed in order to increase the production rate and to obtain a pultruded part with a minimum established degree of cure. We have applied an approach that links PSO-based algorithm and a CFD code to optimize a L-shaped pultruded composite.	

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P1101-50 Energy dissipation mechanism of ceramic matrix composites during the process of dwell *Gao Jubin (Beijing Aeronautical Science and Technology Research Institute of COMAC), Wang Yangwei (Beijing Institute of Technology), Wang Fuchi (Beijing Institute of Technology), Sun Jianzhuo (Beijing Aeronautical Science and Technology Research Institute of COMAC)* The dwell process of SiC-Al ceramic matrix composites was studied by utilizing micro numerical simulation method.The plastic deformation of metal can prevent crack propagation effectively or change the crack propagation path, and also can create hydrostatic stress around the ceramic phase to enhance the full damaged strength.	**P1102-50 Effects of surface modification and cross-linked graphene oxide with ethylenediamine on electrical properties of reduced graphene oxide films** *Shaofeng Lin, Jianwei Zhang, Gang Shi, Dazhi Jiang (National University of Defense Technology)*	**P1103-50 Penetration and diffusionof crude oil containing CO_2 in GFRP under different condition** *Guanhui Wang, Lin Xiao, Ruiyan Sun, Shigang Wang, Jia Jin, Dongxing Zhang (Harbin Institute of Technology)*	**P1104-50 Analytical and experimental studies of damage in composite plates containing initial openings** *Tie Ying, Sun Zhenhui, Zhou Xihui, Li Cheng (Zhengzhou University)* This paper uses the method combining analytical calculation and tensile test to study the hole-edge stress and damage of the composite plate which contains initial openings. Using the conformal mapping method of complex-variable function, the principal stress and first damage load coefficient of each layer which satisfies the Tsai-Hill failure criterion are provided.	**P1105-50 Temperature dependent rheological properties of ultra-thin chopped carbon fiber tape reinforced thermoplastics** *Cheng Bi, Hanchul Lee, Isamu Ohsawa, Jun Takahashi (The University of Tokyo)* A rheological model of randomly oriented strands (ROS) carbon fiber composites containing microscopic fiber-fiber and fiber-matrix interactions is established and shows good validity in different temperatures.	
P1101-51 Influence of graphene on morphologies of substrate copper foils during CVD process and fabrication of high conductivity graphene-copper composite *Mu Cao, Ding-Bang Xiong (Shanghai Jiao Tong University)* Changes of orientation and crystallinity in Cu matrix and ultrahigh interface conductivity result in the improvement of the electrical properties of Gr/Cu composites.	**P1102-51 Ultrahigh performance emi shielding materials of thermal reduced graphene aerogel/PDMs nanocomposites** *Li Yibin, Chen Ruofan, Xu fan, Peng Qingyu (Harbin Institute of Technology)*	**P1103-50 M55j/cyanate ester composites' properties and application** *Shi Peiluo, Rai Xuelian, Fu Pingjun, Ling Hui, Jiang Wenge (Aerospace Research Institute of Materials and Processing Technology)* High modulus carbon fiber/cyanate ester composites are new materials increasingly used in aerospace structures. In this study, M55J/ cyanate ester hot-melt prepregs and laminates are prepared and a M55J/cyanate ester telescope is produced.	**P1104-51 The mechanics of interface fracture inlayered composite materails: (2) cohesive interfaces** *S. Wang (Loughborough University, Hebei University of Engineering), C.M. Harvey (Loughborough University), L. Guan (Jinzhou University of Engineering)* Pure modes for general cohesive interfaces are determined and used to partition cohesive interface fractures. The results provide bench mark solutions for cohesive zone modelling (CZM).	**P1105-51 Simulation of thermal residual stresses of cfrp wing structure due to manufacture process by fea** *S. Guo, W. Liu, P. Paophongnguam (Cranfield University)* The thermally-induced residual stress and the corresponding strain of the CFRP asymmetrical laminate, stiffened panel and the integrated wing structure are studied using Finite Element Analysis (FEA). The effective temperature difference validated by the asymmetrical laminate and modelling techniques by the stiffened panel are finally applied to a wing model, showing that the stress is at maximum when the wing is fully clamped at the spars on one end, whereas the thermal stress between components reduces if the wing is allowed to freely deform when cured, resulting in large deformation of the overall structure.	

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P1101-52 The effects of particles size and volume fraction on microstructure and mechanical properties of in-situ nano tib2/al 7050 composites *Wenchong Yang, Xitao Zheng, Haigang Zhang, Chenxi Lv (Northwestern Polytechnical University)* The major target is studying the effects of TiB2 particles size and volume fraction on mechanical properties of in-situ nano-TiB2/Al 7050 composites. A new formula deduced to predict equivalent Young's modulus and the numerical calculation based on XFEM indicates the good agreement between the calculational and the experimental results.	**P1102-52 FFlexible strain sensors based on printed carbon nanotube layers on polydimethylsiloxane** *Jihua Gou (University of Central Florida)* A flexible strain sensor was developed based on printed carbon nanotube layers on PDMS. The sensor exhibits a high stretchability (>45%) and high sensitivity with a strain gauge factor of 35.		**P1104-52 The mechanics of interface fracture in layered composite materials: (3) experimental assessments – macrosopic interface fractures** *C.M. Harvey (Loughborough University), M.R. Eplett (Loughborough University), Z. Yang (University of Science and Technology Beijing), S. Wang (Loughborough University, Hebei University of Engineering)* Some most thorough and extensive experimental test results are used to assess several valuable and popular mixed mode partition theories. It is concluded that the Wang-Harvey classical partition theory gives the most accurate predictions of interface delamination toughness for macroscopic fracture.	**P1105-52 Optmization of curing temperature patterns for frp plate with uneven temperature distribution** *Tatsuro Kosaka, Go Ueyama, Kazuhiro Kusukawa (Kochi University of Technology)* Optimization of curing temperature of FRP was conducted when thickness-wise uneven distributions of temperature existed. It was found that the double-step temperature pattern could minimize both molding time and unevenness of degree-of-cure.	
P1101-53 Preparation of Ti/Al/Al-Cf multilayered laminated composites and its interfacial reaction *Y.C.Tang, L.S.Luo, B.S.Han, L.Lei (Harbin Institute of Technology)* In this work, we fabricated Ti/Al/Al-Cf multilayered laminated composites by foil-fiber-foil (FFF) method. The results show that the Ti/Al/ Al-Cf multilayered laminated composites are successfully prepared by the hot pressing process.	**P1102-53 Effects of thermal compressive strain on the orientation recovery for ultra-thin CNT-filled polypropylene molding** *Ziyue Guo (Northwestern University), Haihong Wu (Henan University of Technology, Zhengzhou University), Huang Ming (Zhengzhou University), Changyu Shen (Zhengzhou University)* This paper focus on the effects of thermal compressive strain on the electrical conductivity of CNT filled polymer composites.		**P1104-53 The mechanics of interface fracture in layered composite materials:(4) buckling driven delamination of thin layer materials** *S. Wang (Loughborough University, Hebei University of Engineering), C.M. Harvey, (Loughborough University), Q. Li (Hebei University of Engineering), B. Wang (Loughborough University), A. Watson (Loughborough University)* Analytical theories were developed for studying post-local buckling-driven delamination of thin layer materials under in-plane compressive stresses. Experimental results show again that the Wang-Harvey classical partition theory gives the most accurate predictions of delamination behaviour for macroscopic fracture.		

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