PROGRAM & SPEAKERS

WEDNESDAY 29 MARCH

PEER-REVIEWED PAPER

8.00AM TO 8.45AM	REGISTRATION AND ARRIVAL TEA/COFFEE		
8.45AM TO 8.55AM	Ms Leona Reif, President of Composites Australia **Welcome address**		
8.55AM TO 9.35AM	Dr John Russell, Technical Director, Manufacturing and Industrial Technologies, Air Force Research Laboratory **Carbon Fibre Composites for Next Generation Military Aircraft**		
9.35AM TO 10.05AM	Prof. Peter Schubel, Director of the Centre for Future Materials, The University of Queensland **Overview of the UK Composites Strategy - Using a National Strategy to Drive Innovation**		
10.05AM TO 10.35AM	Dr Jens Goennemann, Managing Director, Advanced Manufacturing Growth Centre **Advancing Australian Manufacturing**		
10.35AM TO 11.15AM	MORNING TEA		
	STREAM 1	STREAM 2	STREAM 3
11.15AM TO11.45AM	Dr Bronwyn Fox, Director, Manufacturing Futures Research Institute and Dr Nishar Hameed, Research Fellow, Swinburne University of Technology **Automated Manufacturing of Next Generation Composites in an Industry 4.0 Environment**	Dr Max Dehghan, Business Development Manager, ExcelPlas **Characterisation and Failure Analysis of Composite Materials**	Dr Nigel St John, Head Advanced Materials & Fabrication, Defence Science and Technology Group **Dimensional Stability of Composite Materials**
11.45AM TO 12.15PM	Prof. Gangadhara Prusty, Professor, UNSW Mechanical and Manufacturing Engineering, UNSW Australia **Robotic Manufacture of Advanced Composites - Current Trends and Opportunities**	Prof. Cheng Yan, Professor in the School of Chemistry, Physics and Mechanical Engineering, Queensland University of Technology **Fabrication and characterisation of nano carbon composites**	Prof. Hubert Debski, Researcher, Lublin University of Technology **Nonlinear Stability Analysis of Composite Profiles Under Uniaxial Compression**
12.15PM TO 12.45PM	Simon Karpeles, General Manager - Engineering, RPC Technologies **Composites as Structural Cast-in-Place Formwork for Major Civil Sewer Applications**	Peter Turner, PhD Student, University of Queensland **Towards the Design of an In Situ Braiding System for the Manufacture of Confined Concrete Columns**	Prof. Xiao-Ling Zhao, Chair of Civil Engineering, Monash University **Hybrid Construction Using Seawater Sea Sand Concrete and FRP**
12.45PM TO 1.45PM	LUNCH		
	STREAM 1	STREAM 2	STREAM 3
1.45PM TO 2.15PM	Helen Creagh, Customer Experience Manager, WorkCover Queensland **Navigating Through Workplace Injuries- Best Practice and Practical Tips for Employers**	Dr Rikard Heslehurst, Director, Heslehurst and Associates P/L **Delamination Secondary Behaviour Under Axial Compressive Loading**	Chengyuan Shang, Senior Engineer, Aerospace Research Institute of Materials & Processing Technology **Study on Processability and Thermal Properties of a Novel Phthalontrile Resin System**
2.15PM TO 2.45PM	David Reid, Business Development Manager, Employsure **Why Does Understanding your Obligations Under the Fair Work Act Matter?**	Dr Chuang Feng, Research Fellow (ARC DECRA Fellow), RMIT University **Eigenvalue Buckling Analysis of Functionally Graded Graphene Platelets Reinforced Cylindrical Shells**	Dr Luke Djukic, Chief Technical Officer, Omni Tanker Pty Ltd **Analysis and Testing of Thermoplastic Liners with Enhanced Chemical Resistance for Transport of Liquid Dangerous Goods**
2.45PM TO 3.15PM	Steve Brennan, Managing Director, BI Glass Fibre Pty Ltd **Let's Talk About the Wonderful World of Glass Fibre Reinforced Composites**	Wahid Ferdous, PhD Candidate, University of Southern Queensland **Performance of an Innovative Composite Railway Sleeper**	Dr Xuesen Zeng, Senior Research Fellow & Centre Manager, University of Southern Queensland **Modelling Enable Low Cost Composites Manufacturing and Design for Aerospace**
3.15PM TO 3.45PM	AFTERNOON TEA		
	STREAM 1	STREAM 2	STREAM 3
3.45PM TO 4.15PM	Dr Floreana Coman, Managing Director, Fabrics and Composites Science and Technologies **The Art and Science of Employing Carbon and Other Reinforcing Tows to Shape Composites in the Future**	Ali A. Mohammed, PhD Student, University of Southern Queensland **Composite Repair Systems for Damaged Concrete Columns**	Mahdireza Yarigarravesh, PhD Candidate, Sharif University of Technology **Effect of Alkaline and Sea Water Solutions on the Bond at the Interface Between Bidirectional Aramid Fiber and Masonry**
4.15PM TO 4.45PM	Dr Michael Heitzmann, Group Leader Composite Materials and Processes, The University of Queensland **High Temperature Composites: A Parallel Universe**	Dr Rik Heslehurst, Director, Heslehurst and Associates P/L **Successful Application of Composite Materials - A Deeper Materials Understanding**	Christopher Kourloufas, Aeronautical Engineer **Effect of Saltwater Absorption/ Desorption Cycling on Strength of Carbon Fibre/Epoxy Composites**
4.45PM	CLOSE - DEPART FOR CONFERENCE DINNER		

PROGRAM & SPEAKERS

THURSDAY 30 MARCH

8.00AM TO 9.00AM	ARRIVAL TEA/COFFEE		
9.00AM TO 9.40AM	Greg Williams, Senior Consultant CSIRO Futures, CSIRO **Advanced Manufacturing – Unlocking Future Growth**		
9.40AM TO 9.50AM	SHORT BREAK		
	STREAM 1	STREAM 2	STREAM 3
9.50AM TO 10.20AM	Michael Kemp, General Manager - Engineering, Wagners CFT Manufacturing Pty Ltd **Utilising Composites to Extend Performance Capability of Aging Infrastructure - a Case Study on the Chesterhope Bridge Cycleway Project, Hastings NZ**	Hongfei Zheng, Engineer, China Aerospace Research Institute of Materials & Processing Technology **Study on Cryogenic Carbon Fiber Reinforced Composite Pressure Vessel**	Hossein Mohammad Khanlou, PhD Student, Griffith University **Process Boundaries of the Degradation of Mechanical Properties for Natural-Fibre Bio-Polymer Composites**
10.20AM TO 10.50AM	Dr Charles MacDonald, Strategic and Technical Advisor, Sydney Motorway Corporation **An In Depth Analysis of WestConnex Project**	Flight Lieutenant Chris Kourloufas, F/A-18A/B Structural Integrity, Defence Aviation Safety Authority **Managing Composite Structural Integrity Hazards – A RAAF F/A-18A/B Case Study**	Dr Li Ying, Senior Lecturer, Nanyang Polytechnics **Reinforcing Capability of Hierarchical Structures in Starch-Based Biocomposites**
10.50AM TO 11.20AM	MORNING TEA		
	STREAM 1	STREAM 2	STREAM 3
11.20AM TO 11.50AM	Frank Cristiano, General Manager, Tricomposite & Hugh O'Donnell, Managing Director, High Performance Consortium **Tricomposite - Looking Outside our Industry for a Breakthrough in our Thinking and Performance**	Prof. Thiru Aravinthan, Professor of Structural Engineering, University of Southern Queensland **Civil Composites in Australia - Past, Present and Future**	Yueyou Wang, Graduate Student, Aerospace Research Institute of Materials and Processing Technology **High Performance Quartz/Cyanate Ester Composites Fabricated by RTM Process at Ambient Temperature**
11.50AM TO 12.20PM		Dr Sylwester Samborski, Researcher, Lublin University of Technology **Strain Energy Release Rate Distribution Along Delamination Front in CFRP Laminates with Mechanical Couplings**	Dr Peiluo Shi, Senior Engineer, Aerospace Research Institute of Materials and Processing Technology **M55J Carbon Fiber-Cyanate Ester Composites' Properties and Application**
12.20PM TO 12.50PM	Dr Lucy Cranitch, Materials Scientist, PATH **Selling Composites, Answers to Common Customer Questions**	Dr Allan Manalo, Senior Lecturer in Civil Engineering, University of Southern Queensland **Developments and Applications on FRP Reinforcing Bars in Concrete Structures**	Dr Chuang Feng, Research Fellow (ARC DECRA Fellow), RMIT University **Vibration of Functionally Graded Trapezoidal Nanocomposite Plates Reinforced with Graphene Nanoplatelets**
12.50PM TO 1.45PM	LUNCH		
	STREAM 1	STREAM 2	STREAM 3
1.45PM TO 2.15PM	Andreas Horbach, Technical Services Manage, Alliancys **Let's Talk Innovation**	Simeon Cheuk, PhD Candidate, Monash University **Effect of Carbon Black Powder Protective Layer on Reusable Carbon Fibre Epoxy Resin Composite Rocket Combustion Chamber**	Dr Si-Woo Park, Division Manager, Korea Textile Machinery Research Institute **Compression Molding Analysis of LFT-D System for Vehicle Trailing Arm**
2.15PM TO 2.45PM	Manny Tesfaye, Director of Technical Services, SCIGRIP Structural Adhesives **Innovative Adhesive Technologies for Composite Marine Structures**	Dr Dae Kyu Park, Director, Korea Textile Machinery Research Institute **A Study on the Tensile Properties of CFRP Composites Using Long Fiber Thermoplastic-Direct (LFT-D) Process**	Jianbao Zhang, Senior Engineer, Aerospace Research Institute of Materials and Processing Technology **Study on the Mechanical Properties of Intersection Ply Composite Laminate**
2.45PM TO 3.15PM	Raymond Ten Broeke, Field & Customer Support Engineer, AkzoNobel Polymer Chemistry **Recent Developments in Polyester Curing Systems**	Anita Hajetian, Senior Application Engineer, 3M **Ultralight TPO Technology Enabled by Long Polymer Fibres, 3MTM Glass Bubbles and MuCell® Microcellular Foam Injection Molding**	Dr Mazhar. H. Peerzada, Associate Professor, Mehran University of Engineering **Bi-Axial Bias Weave Method for Preform**
3.15PM TO 4.00PM	Dr Rik Heslehurst, Director, Heslehurst and Associates P/L **Future Opportunities**		
4.00PM	FAREWELL DRINKS & CLOSE		

The organisers have made every attempt to ensure the information is correct at time of publishing. The program is subject to change.

TIME	STREAM ! ROOM 1	STREAM 2 ROOM 2	STREAM 3 ROOM 3
0845	**Welcome address from the President of Composites Australia, Ms Leona Reif** Ms Reif is a Director and co-owner of Fibreglass Design Panels, a composites manufacturing business based in Queensland that has been running since 1999, with a primary market in the bus and coach industry. She came into the family business in 2008, and works with her brother John in the day- to-day running of the company's two facilities, in Brisbane and on the Sunshine Coast. Before the shift to manufacturing, she worked in the Queensland Government undertaking research and policy development in the youth and family services area. Ms Reif remains interested in the influence of research and knowledge, and how new technologies can influence our working environment. The importance of collaboration between businesses, government and universities in applying this knowledge is a focus in her role with Composites Australia.		
0855	**KEYNOTE ADDRESS: Dr John D. Russell, Technical Director, Manufacturing and Industrial Technologies Division of the US Air Force Research Laboratory** TOPIC: **Carbon Fiber Composites for Next Generation Military Aircraft** With the dramatic increase in the use of carbon fiber composites in commercial aviation, the defense industry is increasingly becoming a niche player. Military aircraft have greatly different requirements and will be purchased in much smaller quantities than commercial aircraft. This drives the need for rethinking how military composite aircraft are built in order to maintain high performance at an affordable cost. This presentation will discuss research needs on composite structures and turbine engine components that are unique to military aviation. **About the Presenter:** In his role as Technical Director of the United States Air Force Research Laboratory's Manufacturing and Industrial Technologies Division, Dr Russell is the Chief Technology Officer of the Air Force's Manufacturing Technology (ManTech) program and is the principal advisor to the Manufacturing and Industrial Technologies Division Chief on all matters related to the technical strategy for the Air Force's $265M per year program as well as the personnel and infrastructure required to execute that strategy. In addition, he is the chairman of the Joint Defense Manufacturing Technology Panel which coordinates manufacturing technology requirements and strategies across the military services and agencies. He has a Doctor of Science degree in chemical engineering from Washington University in St Louis. Dr. Russell is a Fellow of the Society for the Advancement of Materials and Process Engineering (SAMPE) and is currently secretary of the SAMPE North America Region.		
0935	**PLENARY: Professor Peter Schubel, Director of the Centre for Future Materials, University of Southern Queensland** **TOPIC: Overview of the UK Composites Strategy – Using a national strategy to drive innovation** In 2009 the UK composites community developed its first national strategy in order to leverage government funds to increase innovation through major initiatives, including the establishment of the National Composites Center (AU$130 Million). Advanced high-value manufacturing has since become a key pillar to the UK governments growth and employment strategy, with Composites sitting front and center. Following the successful delivery of the 2009 strategy, in 2016 the Composites Leadership Forum released the next five-year plan following extensive consultation road-mapping with all industry sectors and academia. This exercise looked at aerospace, defence, automotive, rail, construction, marine, oil & gas and renewables sectors. The roadmap now details the path, with government backing, to double the UK composites industry to AU$7.8 Billion by 2020 with an upper potential to achieve AU$20.8 Billion by 2030. The presentation will give an overview of the 2016 UK Composites Strategy with some insight to its development from the perspective of someone who co-authored the strategy. **About the presenter** Peter Schubel is a Professor of composites manufacturing and Director of the Centre for Future Materials (CFM) at the University of Southern Queensland (USQ). He joined USQ in Oct 2016 from the University of Nottingham, UK. Professor Schubel specialises in the design and processing of high-value composite components and structures, focusing in particular on automated manufacturing, process development, advanced infusion processing, surface metrology, biocomposites and cost modelling for the aerospace, automotive and wind energy sectors. Over the last eight years, Prof Schubel has secured over $40 million in research grants and external contracts.		
1005	**PLENARY: Dr Jens Goennemann, Managing Director of the Advanced Manufacturing Growth Centre** **TOPIC: Advancing Australian manufacturing** The manufacturing sector is a strong contributor to the Australian economy. The sector currently delivers more than $9 billion a month in export revenue, which amounts to 44% of total merchandise exports or 6.1 per cent of the economy's GDP, and employs close to 900,00 people or roughly, 7.5% of the Australian workforce. The AMGC recently released its Sector Competitiveness Plan (SCP) that provides new and compelling analysis of Australia's manufacturing landscape, and outlines how industry in partnership with government and Australia's research community can add $36 billion to the economy over the next 10 years. The first SCP provides analysis on the Aerospace and Medical Technology sub-industries. It identifies critical insight in how Australia can improve its overall competitiveness by increasing its technological leadership and value-adding services. The SCP translates these insights into specific actions for industry, government and research institutions, identifying knowledge priorities to help inform companies and the research community on business improvements and R&D efforts. The AMGC has provided co-funding for two collaboration hubs; the Geelong Advanced Fibre Cluster Hub and the Clayton Additive Manufacturing Collaboration Hub to demonstrate how firms can develop shared technical leadership and channel R&D to increase competitiveness. The investment into collaboration hubs will interconnect Australian manufacturers with fellow industry partners, researcher institutions and into global supply chains. **About the presenter:** Dr Goennemann has managed large manufacturing operations in Australia and Europe and served as MD of Airbus Group Australia Pacific and Airbus Helicopters. He spent six years in Germany with the European Aeronautic Defence and Space Company (EADS), today known as Airbus Group. He was Head of the CEO's office in Germany, and before that was in charge of Soldier and Parafoil Systems within the Defence Division. Previously, he spent two years in Athens, where he established and managed the Eurofighter Office of DaimlerChrysler Aerospace, one of the three founding partner companies of EADS.		
1115-1145	Prof. Bronwyn Fox, Director, Manufacturing Futures Research Institute and Dr Nishar Hameed, Research Fellow, Swinburne University of Technology **TOPIC: Automated Manufacturing of Next Generation Composites in an Industry 4.0 Environment** This presentation will describe the current capabilities of the Swinburne Manufacturing	Dr Max Dehghan, Business Development Manager, ExcelPlas **TOPIC: Characterization and Failure Analysis of Composite Materials** Due to their extraordinary properties, composite materials are being extensively used in a wide variety of industries, including	Dr Nigel St John, Head Advanced Materials & Fabrication, Defence Science and Technology Group **TOPIC: Dimensional Stability of Composite Materials** The major environmental factors that affect the dimensional stability of fibre reinforced polymer composites are temperature and moisture content. These factors act, primarily on

TIME	STREAM 1 ROOM 1	STREAM 2 ROOM 2	STREAM 3 ROOM 3
	Futures Research Institute (MFI) — Australia's first dedicated research institute focused on Industry 4.0 platforms that are aligned with the growth industry sectors — and will highlight the future directions for the development of new resin systems for high volume composite automation. **About the presenters** ***Professor Bronwyn Fox*** joined Swinburne University of Technology in December 2015 as the inaugural Director of the Factory of the Future, a state of the art suite of advanced manufacturing equipment to integrate the design, automation and control of manufacturing systems. Prior to this Professor Fox held the position of Research Director of the internationally recognised Carbon Nexus facility at Deakin University. Over a period of 15 years, Professor Fox successfully drove the University's carbon fibre and composites strategic research vision overseeing the growth of this area to a high impact, multidisciplinary research program in collaboration with industry. Professor Fox has published more than 150 refereed papers on polymers and composite materials. She completed a PhD in Engineering at the Australian National University, a Bachelor of Science (Honours) at The University of Melbourne. ***Dr Nishar Hameed*** joined the Factory of the Future at Swinburne University of Technology in July 2016. Prior to joining Swinburne, Nishar was a Research Fellow at Carbon Nexus, Deakin University, where he completed his PhD. Nishar's research is mainly focused on the novel and faster processing of next generation polymers and composite materials. He has published nearly 60 high impact journal papers, six (6) book chapters, two (2) edited books and two (2) patents. Nishar recently developed a new method to produce flexible, toughened and fast cure resins that can be integrated to make formable and rapid cure fibre reinforced composites, concrete preforms and graphene nanocomposites.	construction, coating, aerospace, automotive. Therefore, ensuring the product quality and the ability to accurately investigate the root cause of the product failure is vital for the composite industry. Existing reliable methods for chemical, mechanical, thermal, and microscopic characterization of composite materials are briefly discussed in this presentation. **About the presenter** Max Dehghan has a BSc of Chem. Eng. (Honours) and PhD of Materials Sci. Eng. He is Business Development Manager and Special Project Expert at independent nationally accredited NATA and ISO testing and analysis laboratory ExcelPlas. As a research engineer at Swinburne University of Technology, he conducted research on modification of epoxy and UPR systems using graphene nanoplatelets, and development of polymer concretes suitable for 3D printing of large structures. Max also worked for Momentive Speciality Chemicals and Hexion Pty Ltd as a Quality Technologist. He has published a number of papers on fabrication and thermomechanical characterisation of CNT-modified composites used in CFRP systems published in journals such as The Journal of Adhesion; Polymer Composites; Chemical Engineering Communications; and the International Journal of Adhesion and Adhesives.	the resin matrix and result in different behaviour in and out of the plane of the reinforcing fibres. While the dimensional changes may be small, they can be significant in applications where small tolerances are important – as in structures as diverse as composite propeller shaft bearings to space telescopes. Dimensional changes can also be significant when a composite is combined with different materials such as patches or joints, or when internal stresses need to be considered in combination with residual cure or thermal stresses from manufacture, such as spring back. To explore the role of these environmental factors on dimensional stability, a study has been undertaken measuring the thermal and moisture expansion coefficients of a range of unidirectional glass and carbon epoxy composites, as well as a quadraxial glass reinforced composites. It was found that while for unidirectional composites the thermal expansion was similar transverse and through thickness, the moisture expansion was markedly different in the two directions which is not what has been traditionally assumed. The presentation will discuss these results; the background of measurement methods and issues; the effect of fibre type, tow size and resin content on the thermal and moisture expansion. **About the presenter** Nigel St John graduated with a B. Appl. Sci. from the Queensland University of Technology in 1989, B.Sc. (Hons) in 1990 and PhD in 1994 from the University of Queensland. He has over 20 years research and development experience working for the Defence Science and Technology Group (DST Group) in the field of polymer materials and composite structures for Defence applications including projects for the all composite Huon Class Minehunter Coastal ships, applications related to the Collins Class Submarines and new applications for the future fleet.
1145-1215	Prof. Gangadhara Prusty, Professor, UNSW Mechanical and Manufacturing Engineering, UNSW Australia **Robotic Manufacture of Advanced Composites - Current Trends and Opportunities** UNSW Australia is the home for a new Automated Composites Laboratory, equipped with an Automated Fibre Placement (AFP) machine for digitally manufacturing structures enabling from concepts to reality. The integrated composites facility is fully functional with equipment to make, bake and break composites in one stop. The state-of-the-art facility within UNSW's Mechanical and Manufacturing Engineering is the first of its kind in Australia, and it is facilitating automated production of lighter, stronger materials already being used in a range of engineering applications. Our recent work at UNSW Australia on the use of fibre optic sensing methods for in-situ processing defect identification demonstrates the feasibility of adapting such technology at a larger scale that can	**Professor Cheng Yan, School of Chemistry, Physics and Mechanical Engineering, Queensland University of Technology, Australia** **TOPIC: Fabrication and characterization of nano carbon composites** Carbon nanotube (CNT) and graphene have attracted major interest due to their exceptional electrical, mechanical, and thermal properties. The potential applications include structural and functional composites, energy harvesting and storage systems, bio devices and filtration membranes. CNT/graphene based nanocomposites can be applied to flexible displays, photovoltaic cells, and electromagnetic-wave interference materials. Based on the relationship between conductivity and mechanical strain, resistance-type strain sensors can be also built. In spite of these promising results, fundamental understanding of mechanical and electrical properties of CNT, graphene and their polymer nanocomposite is still lacking. In this presentation, our recent work	Prof. Hubert Debski, Researcher, Lublin University of Technology **Nonlinear Stability Analysis of Composite Profiles Under Uniaxial Compression** The object of the research is short, thin-walled columns with open channel cross section made of multilayer laminate. The walls of the investigated profiles are made of plate elements. The entire columns are subjected to uniform compression. The study range covered experiments on the structures made with the autoclaving technique. The numerical calculations performed before the stand tests exploited the finite element method. During the experiments the test parameters were registered (axial load, deflections of a profile's walls and its strains) in order to plot the post-critical equilibrium paths for any real structure. The basic aim of the research was determination of the load eccentricity effect on the value of critical load, as well as the post-critical equilibrium paths. In addition and influence of the laminate sequence both on the value of critical load and the post-critical characteristics were analyzed. The experimental outcomes

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	ensure a high level of quality assurance for the composite components fabricated using automated fabrication methods. **About the presenter** Gangadhara Prusty is a Professor of Mechanical and Manufacturing Engineering and is the Director of Australian Research Council (ARC) funded Industrial Transformation Training Centre for Automated Manufacture of Advanced Composites (AMAC). Professor Prusty pioneered the establishment of Automated Composites laboratory in UNSW Mechanical and Manufacturing Engineering. The facility is world class with $3.5m + equipment value that include Australasia's first robotic cell for the automated fabrication of bespoke composite with tape laying and directed fibre placement of Thermoset and Thermoplastic materials. His research strengths are on the nano, micro and macro-mechanics of fibre reinforced composites, embodied with experimental and finite element modelling techniques. His current research focus on the online monitoring and processing of advanced composites using Automated Tape/Fibre Placement (ATP/AFP) procedure.	on fabrication, modeling and characterization of CNT/graphene polymer composites will be introduced. **About the presenter** Cheng Yan attained his PhD from the University of Sydney in 1998. He is a professor in the School of Chemistry, Physics and Mechanical Engineering, Queensland University of Technology, Australia. His main research interests include composites, advanced material interfaces and numerical modeling. He has generated more than 300 publications and received more than A$6 million research fund. He was awarded several competitive fellowships from the Australian Research Council (ARC APD and ARC ARF) and has been committee member of Australia Fracture Group and Australian ATN Nanotechnology Network. He is the editorial member of Composite Communications, Materials Technology, Graphene, etc.	enabled elaboration of adequate numerical models for the tested structures. The study involves solving the problem of eigenvalue and the non-linear problem of stability of the structure. The numerical analysis is performed by the commercial simulation software ABAQUS®. The study was conducted under the project UMO-2015/19/B/ST8/02800 financed by the National Science Centre Poland. Keywords: buckling, composite profile, failure analysis **About the presenter** Professor Hubert Debski is a specialist in mechanical modeling and experimental testing of composite and other engineering materials. He is the leading Finite Element researcher in his university, concerning buckling and damage processes in composites. Lastly he has been elected for the Vice-Dean for Education in the Mechanical Engineering Faculty, Lublin University of Technology.
1215-1245	Simon Karpeles, General Manager - Engineering, RPC Technologies **TOPIC: Composites as Structural Cast-in- Place Formwork for Major Civil Sewer Applications** RPC Technologies has recently introduced engineering innovations into the Australian Civil/Construction market by utilising Glass Reinforced Plastics (GRP) as structural cast-in-place formwork on a range of infrastructure projects that have demonstrated significant advantages for the constructors, clients and end-users. GRP as an engineering material provides outstanding strength/stiffness properties, is lightweight and boasts unparalleled corrosion resistance. These properties have seen GRP used extensively in the Marine / Defence / Aerospace / Chemical Processing and Water/Waste Water sectors. However, until recently, GRP has struggled to gain acceptance in the Civil/Construction markets. With ever-increasing construction and labour costs, RPC's clients are looking for construction methods that provide alternative solutions to more traditional materials such as concrete and steel. Using GRP can generate overall project savings and reduce construction risks while delivering a superior quality outcome. GRP solutions are low maintenance and deliver long asset life of up to 100 years. GRP cast-in-place formwork is ideal for applications that involve working in corrosive environments, confined spaces or require	Peter Turner, PhD Student, University of Queensland **TOPIC: Towards the Design of an In Situ Braiding System for the Manufacture of Confined Concrete Columns** Authors: Mr Peter Turner, Dr Michael Heitzmann, Dr Dilum Fernando, Dr Surya Singh Affiliations: University of Queensland Automated composite manufacturing processes are rapidly gaining momentum and are increasingly replacing labour intensive manufacturing processes in the aeronautical and automotive industries. Civil construction is one of the most promising future markets for fibre-reinforced plastics (FRP), with an increasing number of projects incorporating FRP into the initial design rather than as a retrofit or rehabilitation solution. An example of this is the FRP confinement of concrete columns, which is a method that significantly increases the shear and compressive strengths of the column. The physical scale of typical civil infrastructure projects and the outdoor environment have so far prevented the development of automated manufacturing processes for the in situ manufacture of FRP civil structures. This paper will present the work that is being undertaken towards the development of an autonomous braiding system for the in situ manufacture of the FRP confinement for concrete columns. The allowable design envelope has been determined based on the manufacturing process limitations and the	Prof. Xiao-Ling Zhao, Chair of Civil Engineering, Monash University **TOPIC: Hybrid Construction Using Seawater Sea Sand Concrete and FRP** This presentation gives a summary of current research at Monash University on hybrid construction using seawater sea sand concrete (SWSSC) and FRP. It contains four major parts: (1) Properties of SWSSC: Alkali activated slag concrete with seawater and sea sand was used in this research. Material properties measured include modulus of elasticity, compressive strength, bending strength at ambient temperature as well as elevated temperature. (2) Long-term behavior of fiber reinforced polymer (FRP): Filament-wound FRP tubes were adopted with three types of fibres (glass, carbon and basalt). Exposure temperatures include 25, 40, 60˚C with exposure time varies from 1 month to 12 months. (3) SWSSC-filled FRP and SS stub columns: Stub columns, including hollow sections and SWSSC fully filled tubes or double-skin tubes, were tested under axial compression. The effects of some key parameters (e.g., tube diameter-to-thickness ratio, cross-section types, outer tube types, and inner tube types) on the confinement effects were discussed. (4) Durability of FRP bars in SWSSC environment: Accelerated corrosion tests were conducted on FRP bars using two types of

TIME	STREAM 1 ROOM 1	STREAM 2 ROOM 2	STREAM 3 ROOM 3
	complex shapes. GRP reduces construction time/costs by permitting off-site construction of components that can be delivered and assembled on-site and rapidly installed. **About the presenter** Simon Karpeles, B.Eng. (Civil) (Hons) is General Manager – Engineering for RPC Technologies and an Australasian GRP industry leader specialising in the management and coordination of all engineering and technical aspects involved with the supply of industrial fibreglass for major projects. He is involved specifically in the application of Glass Reinforced Plastics (GRP) in the corrosion control industry which includes cooling water pipelines, chemical scrubbers/tanks, ventilation and ducting systems, general GRP piping systems and odour control systems for the chemical, mining, power, wastewater and defence industries.	required material properties of the structure. These will be presented as part of an initial feasibility study. Relevant calculations will then be presented to demonstrate how this novel manufacturing method can be used for various geometries and project scales. Finally, work on a simple prototype design will be presented as a proof of concept. **About the presenter** Peter Turner is an early stage PhD student and member of the UQ Composites Group, studying at The University of Queensland under the supervision of Dr. Michael Heitzmann, Dr. Dilum Fernando and Dr. Surya Singh. His project is multi-disciplinary, combining areas of mechanical design, civil structural engineering, materials and processes, and mechatronics. Peter has graduated with a Master of Engineering Science (Mechanical), and a Bachelor of Engineering (Hons.) (Mechanical and Aerospace) from the University of Queensland	SWSSC solutions at different pH and temperatures, and for different durations. The long-term behaviour of BFRP and GFRP bars under the service construction condition was predicted. Key words: Fibre Reinforced Polymer, Seawater Sea Sand Concrete, Durability **About the presenter** Xiao-Ling has received several prestigious fellowships: Alexander von Humboldt Fellowship; Japan Society for Promotion of Science Invitation Fellow; National "1000-Talent" Chair Professorship, China; Distinguished Visiting Fellowship Award, The Royal Academy of Engineering, UK; Visiting Professorship Award, Swiss National Science Foundation. Xiao-Ling is a Fellow of the American Society of Civil Engineers, Engineers Australia, and International Institute for FRP in Construction. He served as a member on the ERA (Excellence in Research for Australia) Research Evaluation Committee for Engineering and Environmental Sciences Cluster in 2015. Xiao-Ling was the Head of Department of Civil Engineering at Monash University from 2008 to 2011.
1345-1415	Helen Creagh, Customer Experience Manager, WorkCover Queensland **TOPIC: Navigating Through Workplace Injuries-Best Practice and Practical Tips for Employers** Workers in the manufacturing sector are exposed to high risk activities every day. Even with the best training, safety policies and experience, injuries can happen which may require rehabilitation and/or alternative duties before a sustainable return to work. In the 2015-2016 financial year, over 11,300 claims were lodged with WorkCover Queensland by manufacturing workers. These claims cost the scheme over $82.2M in compensation payments and resulted in an average on 23 days off work for every claim. The most common injuries sustained by Queensland manufacturing workers originated from musculoskeletal injuries (43%) and lacerations/foreign bodies (31%) and whilst some of these injuries can appear to be "minor" in nature, they often come with hidden costs to your business which can include impact to production and delivery time frames, wage costs and impact on morale. This presentation will provide practical information to support employers through the workers compensation process and will focus on best practice return to work including contemporary research and practical tips following a work place injury. Keywords: Manufacturing; Injuries; Return to work **About the presenter** Helen Creagh is a customer experience	Dr Rikard Heslehurst, Director, Heslehurst and Associates P/L **TOPIC: Delamination Secondary Behaviour Under Axial Compressive Loading** Last year at the 2016 Advanced Composites Innovation Conference, a paper was presented on secondary bending stresses of delaminated composite structures under tensile loading. In this paper the application of axial compression loads to delaminated composite structures is examined. Under compression load around the delaminated region, induced secondary bending may improve or reduce the resistance to delamination buckling. Single and multiple delamination can be analysed and resulting delamination behavior determined to assist with damage criticality assessment. The laminate ply stacking sequence plays a very important role in determining the structural integrity of the delamination crack growth. The stacking sequence of plies may actually close delamination cracks, but it could also decrease the critical axial buckling load. This paper will show the mathematical model for developing the secondary bending stresses of delamination composite structures under axial compression loads. Effects of ply orientation will be shown through sub-laminate stiffness ratios. Keywords: Composites, Delaminations, Stress Analysis **About the presenter:** Rik Heslehurst has worked in the composites and adhesive bonding industry for more than 35 years. He started his career as an aeronautical engineering officer in the RAAF	Chengyuan Shang, Senior Engineer, Aerospace Research Institute of Materials & Processing Technology, Beijing, China **TOPIC: Study on Processability and Thermal Properties of a Novel Phthalontrile Resin System** Authors: Chengyuan Shang, Dongxia Zhang, Mengjin Fan Affiliations: Research and Application Center for Structural Composites, Aerospace Research Institute of Materials & Processing Technology, Beijing, China Phthalonitrile resins have potential to be used over 300oC and own excellent high-temperature properties and superior mechanical properties. However, the resins have some disadvantages due to the high-melting temperature of phthalontrile monomers. In order to improve the processability of phthalontrile resins without sacrificing their thermal properties, a novel resin system with good tack at room temperature was developed due to the blends of the reacted diluents 3-aminophenylacetylene and phthalontrile monomer. The thermal and mechanical properties of the obtained phthalontrile resin system and the corresponding fiber reinforced imprepreg andcomposites were studied. Results showed that the phthalontrile had high temperature (Tg=420oC) and comparable properties with commercial PMR-15 Polyimide. **About the presenter:** Chengyuan Shang is an associate professor and senior engineer with the Aerospace Research Institute of Materials & Processing Technology,

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	manager with WorkCover Queensland. Her portfolio specialises in manufacturing, specifically composites, cement, concrete and aggregates.	with postings as an F/A-18 airworthiness engineer, and Officer In-Charge of the RAAF Materials and Process Engineering. More recently Rik retired as an academic with the University of New South Wales (UNSW) at the Australian Defence Force Academy where he lectured and conducted research in aircraft and airframe design and composite and bonded structures design and analysis. Rik now runs his own consulting business and provides engineering and technical support for the fabricators association – Composites Australia. Rik is also the Senior Engineer for two US companies. Rik also consults for several organisations; including Raytheon, NASA, USAF, Boeing, Lockheed-Martin, Bombardier, Walt Disney Imagineering, and several other companies. Rik obtained his Bachelor and Master's degrees in aerospace engineering from the RMIT and his PhD from UNSW. Rik has been presenting courses and seminars around the world on the subject of composites and joint technologies.	Beijing, China, whose main study is concentrated on the matrix resin for advanced composites, including thermosetting resin toughening, bismaleimide resin and phthalontrile resin with high- temperature resistance. A lot of the obtained resins have been applied in the aerospace industry.
1415-1445	David Reid, Business Development Manager, Employsure **TOPIC: Why Does Understanding your Obligations Under the Fair Work Act Matter?** Running a business and managing staff can be challenging. This presentation focusses on the top compliance requirements for Australian businesses today. Topics to be discussed include: • How to set up the correct contracts and policies for your workplace • Steps to take when terminating staff • Avoiding unfair dismissal. **About the presenter** As Employsure's Queensland Business Development Team Leader, David Reid is committed to helping business owners and managers achieve a fair and safe workplace. David joined Employsure in 2012, bringing over 30 years of practical experience in management, operations, trade and business development roles. With management, counselling, marketing and trade qualifications, he has held management positions in the building, manufacturing, personnel, registered training, employee assistance program counselling and industrial relations fields. David's goal is to provide advice and operational solutions that are robust and sustain the long-term viability of businesses.	Dr Chuang Feng, Research Fellow (Australian Research Council DECRA Fellow) with the School of Engineering at RMIT University, Melbourne, Australia **TOPIC: Eigenvalue Buckling Analysis of Functionally Graded Graphene Platelets Reinforced Cylindrical Shells** Authors: Yu Wang, Chuang Feng, Lili Li, Jie Yang from the School of Engineering, RMIT University, Melbourne Australia Cylindrical shell structures have wide applications as structural elements in many engineering fields. This paper proposes a new novel class of multi-layered cylindrical shells reinforced by non-uniform distribution of graphene platelets (GPL) in the thickness direction. Finite element method (FEM) is used to analyse the elastic buckling behaviours of the cylindrical shells, for which the effective Young's modulus of the composites is determined by modified Halpin-Tsai micromechanics model. A comprehensive parametric study is conducted on the influences of the distribution pattern, weight fraction, geometry and size of GPLs together with the total number of layers on the critical buckling load of cylindrical shells with various geometries. It is found that a very small amount of GPLs added into polymer can dramatically increase the critical buckling load of the structure. Dispersing more GPLs with fewer graphene sheets near the inner and outer surfaces of the cylindrical shell is the most effective way to increase the critical buckling load. Moreover, it is indicated that the effects of distribution pattern on the buckling load become significant	Dr Luke Djukic, Chief Technical Officer, Omni Tanker Pty Ltd **TOPIC: Analysis and Testing of Thermoplastic Liners with Enhanced Chemical Resistance for Transport of Liquid Dangerous Goods** Authors: Luke P. Djukic1, Manudha T. Herath1, Roderick Sweeting2, Daniel C. Rodgers1 1Omni Tanker Pty Ltd, 2Advanced Composite Structures Australia Polymer matrix composite tanks offer major advantages to the transport industry in terms of increased payload capacity and corrosion resistance, in comparison to conventional steel tanks. The chemical resistance and versatility can be enhanced through the addition of a thermoplastic liner. This paper presents a test program and finite element analysis of carbon fibre reinforced polymer (CFRP) tank wall lined with linear low density polyethylene (LLDPE) for the purpose of achieving type approval in accordance with United Nations ADR (European Agreement Concerning the International Carriage of Dangerous Goods by Road). The LLDPE liner was tested, with and without CFRP backing, for use with 12-15% Sodium Hypochlorite and 98% Sulphuric Acid. Specimens were conditioned by contact with chemicals at 50°C for periods of 1000 and 2000 hours. Shore D hardness testing was performed periodically during the conditioning and three point bend tests were conducted following conditioning. When compared to unconditioned benchmarks, the specimens were found to pass ADR requirements; no significant strength reduction or damage was found to occur. Finite element

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		when the ratio of radius to thickness of the shell is approximately larger than 10. Keywords: Graphene platelets; Nanocomposites; Buckling **About the presenter:** Dr Chuang Feng attained his Bachelor and Master degree from China in 2004 and 2007, respectively. Then he worked as Assistant Professor in a university for three years. In 2014, Dr Feng obtained PhD degree from the University of Western Ontario in Canada. After that, he became a Research Fellow at RMIT University. Since his Master study, Dr Feng has published 13 papers in journals and 8 in conference proceedings. He has received several competitive scholarships and awards in Canada and Australia, including the Western Graduate Research Award and Academic Achievement Scholarship in Canada and an Endeavour Research Fellowship and ARC DECRA Fellowship in Australia.	analysis was performed on the tested specimens, and good correlation of results is demonstrated. Keywords: Chemical conditioning, polyethylene, finite element analysis **About the presenter:** Dr Luke Djukic is the Chief Technical Officer of Omni Tanker, where he manages a team of engineers working on design and certification of new and existing tankers for bulk liquid transport. Dr Djukic led the development of the first carbon fibre reinforced polymer tank to be type approved under the United Nations ADR, which is the European Agreement for Transport of Dangerous Goods by Road. Prior to working for Omni Tanker, Dr Djukic worked on Aerospace, Oil and Gas, Defence and Transport sector projects for both Advanced Composite Structures Australia and Cooperative Research Centre for Advanced Composite Structures.
1445-1515	Steve Brennan, Managing Director, BI Glass Fibre Pty Ltd **TOPIC: Let's Talk About the Wonderful World of Glass Fibre Reinforced Composites** Fibreglass reinforced composites have been in existence since first invented in 1938 and they have found many applications in our day to day lives. Fibreglass reinforced composites still have a significant place in the high tech world and the future for growth opportunities remain high. This presentation will review the past, present, and future of fibreglass reinforced composites in global, and Australian markets. **About the presenter:** Steve Brennan has been involved in the Australian and New Zealand composites industry for 39 years. His early roles were in composites manufacturing in the marine industry, and has spent the last 25 years in resins and glass fibre sales, marketing and business development, with responsibilities extending to the markets in South East Asia. During this time he has held positions with Dulux Resins, RF Services, and global leaders Saint-Gobain Vetrotex, Cray Valley, and most recently Owens Corning.	Wahid Ferdous, PhD Candidate, University of Southern Queensland **TOPIC: Performance of an Innovative Composite Railway Sleeper** Authors: Wahid Ferdous; Allan Manalo; Thiru Aravinthan from Centre for Future Materials (CFM), School of Civil Engineering and Surveying, University of Southern Queensland, Toowoomba, QLD 4350, Australia The high maintenance cost and scarcity of the hardwood timber promote alternative technologies for replacing the traditional timber railway sleepers. The advantages of composites in high strength-to-weight ratio, durability, reliability, longer life and less maintenance are of great interest for their application in railway sleepers. This study investigated the performance of an innovative composite railway sleeper manufactured from sandwich composites and bonded with the epoxy polymer matrix. The performance including rail-seat vertical load, centre bending moment, shear strength, screw holding capacity and electrical resistance have been investigated and compared with the traditional timber sleepers. Results showed that the new composite sleeper can maintain the minimum performance requirements and showed a very similar behaviour to the timber ones. This innovative composite technology could be a suitable replacement of the existing timber sleepers. Keywords: Composite railway sleepers, Performance, Alternative technology About the presenter: Wahid Ferdous recently submitted his PhD thesis from the Centre for Future Materials (CFM) at the University of Southern Queensland, Toowoomba. His main research area is to	Dr Xuesen Zeng, Senior Research Fellow & Centre Manager for the Centre for Future Materials, University of Southern Queensland **TOPIC: Modelling Enable Low Cost Composites Manufacturing** Out-of-autoclave manufacturing processes still face a number of challenges for aerospace applications. Computer modelling offers great opportunity to enable the smarter tooling for composite production. This presentation will cover the modelling developments, in collaborations with the leading aerospace companies. In liquid composites moulding process, for example, for manufacturing aircraft engine nose cone, the forming process starts with flat layers of dry fabric. To predict the accurate flow pattern and fill time for the nose cone, the precise permeability data are needed for various regions of the component. This case study is set out to numerically predict and validate the permeability tensors for two real fabric lay-up systems. The composite nacelle structures, using out-of-autoclave vacuum assisted resin infusion, aim to achieve high quality parts while at much lower energy consumption and cost, in comparison with the prepreg autoclave technology. The study investigates a sub-component of nacelle fan cowl with Xsensor pressure imaging system. The finite element modelling approach predicts the bending performance due to the quality variations. To improve fuel efficiency through weight reduction, the optimisation framework with genetic algorithms is established on designing novel 3D multiaxial composite reinforcements. The developed approach was applied to a case

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		investigate the behaviour of composite structures. During his PhD study, he published several articles in the high ranked journals and developed his skills in experimental investigation, analytical, numerical and statistical analysis. Recently, he achieved several competitive awards particularly, Australian postgraduate award, Young professional scholarship, Publication excellence award, 3-minutes pitch club challenge award and Endeavour postdoctoral fellowship.	study on composites landing gear brace. The optimised composites material has 80% weight saving potential. Key words: process modelling, resin infusion, optimisation **About the presenter:** Dr Xuesen Zeng is Senior Research Fellow and Centre Manager at USQ's Centre for Future Materials (CFM). Dr Zeng joined USQ in Feb 2017, after 10 years' composites research at the University of Nottingham, UK. His research focus is on low-cost and sustainable composite manufacturing processes, including advanced dry preforms, resin transfer moulding, vacuum assisted resin infusion and automated dry tape laying process. Dr Zeng has extensively applied finite element methods for the mechanical, fluid dynamics and thermal analyses in composite process modelling. The established modelling approaches have been successful in investigating the correlation of process-induced defects and structural performance, forming, permeability and its variability, void formation, composite material optimisation, and composite structural shape distortion. Dr Zeng pioneered 'organic textile design' optimization modelling leading to the radical advancement in structural optimization and process development technologies. Xuesen has run collaborative research with Airbus, Rolls Royce and SAFRAN Nacelles. Dr Zeng has been awarded $1.6M total in research grants, from a variety of UK government funding bodies as well as industry and has over 40 publications.
1545-1615	Dr Floreana Coman, Managing Director, Fabrics and Composites Science and Technologies **TOPIC: The Art and Science of Employing Carbon and Other Reinforcing Tows to Shape Composites in the Future** There is a growing interest in the carbon tows destined for fibre reinforced composite materials due to a widening demand beyond traditional aerospace applications. We started to understand more about carbon tow's science since the arrival of new manufacturers on the global market and the widening circle of specialised scientists in this field. There are still key factors limiting the expansion of carbon fibre composites within the broader community including the lack of composites materials knowledge and tendency to use more well established and understood fabrics and tows. This paper will review the latest manufacturing techniques to convert the carbon and other reinforcing tows into substrates suitable for a wider range of Fibre Reinforced Composite Materials, highlighting the advantages over traditional materials.	Ali A. Mohammed, PhD candidate at the Centre for Future Materials at the University of Southern Queensland, Toowoomba, Queensland, Australia **TOPIC: Composite Repair Systems for Damaged Concrete Columns** Authors: Ali A. Mohammed, Allan C. Manalo, Ginghis B. Maranan and Yan Zhuge from the Centre for Future Materials, Faculty of Health, Engineering and Sciences, University of Southern Queensland, Toowoomba, Queensland, Australia A new type of a pile repair system and concrete formwork jacket with an innovative mechanical joining system has been developed recently. This novel repair system is quick and safe to install due to the easy-fit and self-locking mechanical jointing system. This repair system works by wrapping the prefabricated and flexible FRP jacket around the damaged structure and placing an infill between the jacket and the repaired structure producing a cylindrical confinement. A recent study indicated that this new rehabilitation technique can be an effective repair and strengthening system for	Mahdireza Yarigarravesh, PhD Candidate, Department of Civil Engineering, Sharif University of Technology, Iran **Effect of Alkaline and Sea Water Solutions on the Bond at the Interface Between Bidirectional Aramid Fiber and Masonry** Authors: Vahab Toufigh*, Mahdireza Yarigarravesh** * Assistant Professor, Sharif University of Technology, Department of Civil Engineering **Ph.D. Candidate, Sharif University of Technology, Department of Civil Engineering Nowadays, the application of fiber reinforced polymers (FRPs) became prevalent in structural engineering due to its properties such as light weight, formability, resistance against corrosion and high tensile strength. Most of researchers in last decades focused on the effect of moisture and temperature on the bond at interface between FRPs and concrete, however, a few investigations have been reported about the effect of chemical solutions on the other construction materials such as

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	Key words: Reinforced Composite Materials, 3D textiles, 2D Smart Textiles, Interlaminar shear strength **About the Presenter** Based in Australia, Dr Floreana Coman has an international background and extensive experience in high-tech industries – most notably in the textile and composite industries. From early in her career she has gained considerable experience in, and maintains a strong connection to, the aerospace sector. Her materials and processes expertise include leading design and manufacturing of structural preforms and prepregs for composite materials; complex structures for a range of defence applications; and high performance sporting equipment. Her research and development capabilities led to inventions related to materials and process technologies, including UV curing resins and preforms for composite materials. Dr Coman is an Adjunct Professor in RMIT's School of Engineering.	columns, and also it can be used as a permanent concrete formwork as it can provide structural continuity and confinement to the repaired structure. This paper reviews the existing FRP composites techniques in terms of concrete, wood, steel structures' rehabilitation, and their categories based on their manufacturing process. Also it shows the advantages and the drawbacks of each method based on the previous applications and studies. Finally, it presents a detailed explanation and description about the proposed and the novel FRP composite jacket with showing its privilege aspects that distinguish it over the traditional rehabilitation and strengthening techniques. **About the presenter:** Ali A. Mohammed is undertaking his PhD at the Centre for Future Materials at the University of Southern Queensland. He completed his Bachelor of Science degree in structural engineering at the University of Technology, Baghdad, Iraq in 2010 and went on to successfully complete a Master of Technology in infrastructure engineering at JNTUH University in Hyderabad, India in 2013.	masonry. This research aims to investigate the effect of alkaline (pH of 10) and sea water solutions on the bond at interface between bidirectional aramid fiber and masonry after six months exposure. 50 brick specimens were prepared by wet lay-up technique and exposed to alkaline solutions for 1, 3 and 6 months. Universal testing machine was used to evaluate debonding force degradation between FRP and masonry substrate. Results indicate that alkaline pH of 10 caused 45 % reduction in bond between FRP and masonry, while sea water solution had the less effect by 23 % decrease. Keywords: Fiber reinforced polymer; chemical solutions; masonry. **About the presenter:** Mahdireza Yarigarravesh is a Ph.D. candidate in Civil Engineering at Sharif University of Technology. He completed his M.Sc. in Civil Engineering at Sharif University of Technology,2012 and his B.Sc. in Civil Engineering, The University of Tehran, Feb 2006 His research interests are in Rehabilitation and Strengthening Techniques for Existing Structures and Application of Fiber Reinforced Polymer (FRP) His interest is mainly focused on the environmental effects on the bond at the interface between fibre composites and construction materials such as concrete, masonry and wood.
1615-1645	Dr Michael Heitzmann, Group Leader Composite Materials and Processes, The University of Queensland **TOPIC: High Temperature Composites: A Parallel Universe** High temperature composite materials form somewhat of a parallel universe to traditional fibre reinforced plastics. On one hand, many aspects of high temperature composites feel immediately familiar to anyone dealing with fibre reinforced plastics but on the other hand, equally many aspects are completely different and often exactly the opposite to what one is used to. This presentation attempts to provide an introduction to the exciting universe of high temperature composite materials. The first part of the presentation will focus on available material options and their process routes. Composite materials covered will range from high temperature polymer resins to ceramic matric composites. The second part of the presentation will focus on the challenges and opportunities of high temperature composite materials. This includes a discussion of emerging applications as well an analysis of challenges from an Australian	Dr Rikard Heslehurst, Director, Heslehurst & Associates Pty Ltd **Topic: Successful Application of Composite Materials – A Deeper Materials Understanding** Advanced composite materials and fabrication processes offer many advantages over traditional metals and plastics. These benefits include significant improvements in structural performance at reduced weights, and, if fabricated well, lower processing costs. However, we must recognise that the basic material costs are higher, but also appreciate that less material is used to achieve the same or better performance. What typically causes most problems with the application of advanced composite materials is an underdeveloped understanding of the material and structural behaviour fundamentals. This presentation will attempt to highlight many of the key aspects of composite materials at a fundamental level that need to be understood. There are numerous projects that have become very costly because of the lack of material fundamental understanding. Such projects have neglected the resin system physical property	Christopher Kourloufas, Aeronautical Engineer **Effect of Saltwater Absorption/ Desorption Cycling on Strength** Authors: Christopher Kourloufas[1], Evgeny Morozov[2], Rikard Heslehurst[3] Affiliations: [1]Unaffiliated, [2]UNSW, [3]Heslehurst and Associates The use of carbon/epoxy composites is ever increasing in the aerospace industry. The topic of saltwater absorption/desorption cycling effects is of interest as aircraft will experience significant moisture absorption/desorption and thermal cycles both during the short time-scale of a sortie, as well as during the long time-scale of service life. Coupled with this is exposure to elements, such as salt, from the environment. Carbon/epoxy materials are known to absorb moisture throughout their service life, and the extent of this absorption and its effects on the material may be estimated. It is generally assumed that the effects of fresh water absorption are reversible upon drying with respect to some basic characteristics such as glass transition temperature and associated

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	research organisation's view point. Key words: Ceramic matrix composites, High temperature composites, Composite materials & processes **About the presenter** Dr Michael Heitzmann is the group leader of the Composite Materials & Processes Group at The University of Queensland. Under Michael's leadership the group has rapidly expanded and now covers a diverse portfolio of composite materials research. The primary research focus is devoted to the four areas: short cycle time processes, high temperature composites, bio-composites and product innovation. The strong emphasis on industry relevant research is reflected through high profile collaborations with industry and government agencies such as SABIC, Crimsafe, Airbus Group Australia Pacific, Department of Agriculture and Fisheries or the Defence Science and Technology Group.	limitations, or the importance of getting the process correct, so the design performance is matched by the actual performance. Also, not considering all load cases that result in damaging conditions is often a product failing. So what do you need to do to successfully implement composite materials in your products? 1. Do the homework technical reading. 2. Know the right questions to ask. 3. Train technical and engineering staff 4. Engage industry experts 5. Keep up-to-date with current initiatives and trends. Keywords: Applications, Marketing, Education **About the Presenter** Rik Heslehurst has worked in the composites and adhesive bonding industry for more than 35 years. He started his career as an aeronautical engineering officer in the RAAF with postings as an F/A-18 airworthiness engineer, and Officer In-Charge of the RAAF Materials and Process Engineering. More recently Rik retired as an academic with the University of New South Wales (UNSW) at the Australian Defence Force Academy where he lectured and conducted research in aircraft and airframe design and composite and bonded structures design and analysis. Rik now runs his own consulting business and provides engineering and technical support for Composites Australia. Rik is also the Senior Engineer for two US companies. Rik also consults for several organisations including Raytheon, NASA, USAF, Boeing, Lockheed-Martin, Bombardier, Walt Disney Imagineering, and several other companies. Rik obtained his Bachelor and Master's degrees in aerospace engineering from the RMIT and his PhD from UNSW. Rik has been presenting courses and seminars around the world on the subject of composites and joint technologies.	mechanical properties. It is also acknowledged that repeated fresh water cycling does not have significant negative effects. However, the effect of a very common component of the environment, salt (NaCl), has had little attention in the research to-date. It has been seen in the few experiments conducted on carbon/epoxy, that saltwater/seawater conditioning degrades matrix-dominated properties to a greater degree than fresh water conditioning. The effects of repeated cycles of saltwater absorption/desorption on short-beam strength of carbon/epoxy composite materials are explored in this thesis. Experiments were conducted on Toray T700S/Cytec MTM57 plain weave carbon/epoxy composite material. The material was exposed to four cycles of immersion to saturation and drying and the gravimetric results obtained. The diffusion constants for absorption of fresh water and of salt water were obtained. Finally, the short-beam strength was tested for saltwater-cycled versus as-manufactured Toray T700S/Cytec MTM57 material. A relative reduction in strength of approximately 10% was observed. These results indicate that cycles of saltwater have irreversible effects. And further studies into the effects of the cyclic saltwater environment may be useful for the development of design allowables of composite materials employed in aircraft. **About the presenter:** Mr Chris Kourloufas, ME(Aerospace), MS(Aeronautics and Astronautics), BE(Aero) Hons, has served with the RAAF as an Aeronautical Engineering Officer since 2009 and holds the current position of Flight Lieutenant, F/A-18A/B Structural Integrity, Defence Aviation Safety Authority.
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0900	**PLENARY: Mr Greg Williams, Senior Consultant – CSIRO Futures** **TOPIC: Advanced manufacturing – unlocking future growth** Australian manufacturing is not dying, it's evolving. This transformation is being driven by supply chain disruptions, the continued explosion of data and analytics, and an increasing demand for customised and sustainable solutions and services. Over the coming decades, Australia's manufacturing sector must become integrated, collaborative and export-focused, producing bespoke and high-value solutions for global value chains. Advanced manufacturing technologies, systems and processes will be at the heart of this transformation. However, in order to realise the full potential of these emerging technologies, industry and research need to jointly tackle issues around technology adoption, skills, collaboration and culture. **About the presenter:** Greg Williams is a senior consultant with CSIRO Futures. Prior to taking on this role just over 18 months ago, he was a senior consultant with KPMG, Management Consulting for four years. He has a Masters of Biotechnology and a Double Bachelor of Science and Commerce from the University of Melbourne.		
0950-1020	Michael Kemp, General Manager - Engineering, Wagners CFT Manufacturing Pty Ltd **TOPIC: Utilising Composites to Extend Performance Capability of Aging Infrastructure - a Case Study on the Chesterhope Bridge Cycleway Project, Hastings NZ** The Hawkes Bay region in New Zealand is becoming renowned for its cycleways and these are a big tourism drawcard for the region. This paper discusses a case study on applying light weight composite materials to upgrade the functional capacity of a 50 year old reinforced concrete bridge to include a "clip-on" cycleway, and safely connect cycleways on each side of the Ngaruroro River. Keywords: Composites, Structural engineering, Performance upgrade **About the presenter:** As the General Manager of Wagners CFT, Michael has led the development of the business over the last 15 years from R&D start-up to a profitable business unit in the Wagner Group with over 100 employees. Michael's drive for innovation and experience in risk management and commercialisation of opportunities has led to projects around Australia and Wagners becoming known as a world leader in the implementation of composite materials in infrastructure**.**	Hongfei Zheng, Engineer, China Aerospace Research Institute of Materials & Processing Technology **TOPIC: Study on Cryogenic Carbon Fiber Reinforced Composite Pressure Vessel** **Authors:** Hongfei Zheng, Jianbao Zhang, Chengyuan Shang, Wenbin Li, Junfeng Wang, Hongjie Sun from the China Aerospace Research Institute of Materials & Processing Technology To meet the design goals for light weight of the next generation launch vehicles, carbon fiber reinforced polymeric based composites are being explored for cryogenic pressure vessel applications. One potential application is cryogenic fuel storage tank. To realize the potential weight savings from the use of polymeric composites, it is important to know the performance of the candidate material at cryogenic temperatures to ensure safety and reliability. A T800 carbon fiber reinforced epoxy based composite (CFRC) pressure vessel for cryogenic fuel storage tank was fabricated by prepreg tape winding. A washout mandrel which was wrapped with EPDM rubber was used. Mechanical properties of resin cast, NOL ring and pressure vessel were measured at ambient and cryogenic temperatures respectively. The relationship between temperature and mechanical properties were discussed. The results indicated that cryogenic mechanical properties of NOL ring was better than at ambient. The burst pressure of pressure vessel can satisfy the design demands at ambient and cryogenic temperatures respectively. Keywords: CFRC, pressure vessel, cryognic **About the presenter:** Mrs Hongfei Zheng is an engineer from China Aerospace Research Institute of Materials & Processing Technology. Her major is filament winding, including wet winding and tape winding. She studied at CSIRO from 2011	Hossein Mohammad Khanlou, PhD Student, School of Engineering, Griffith University, QLD **TOPIC: Process Boundaries of the Degradation of Mechanical Properties for Natural- Fibre Bio-Polymer Composites** **Authors:** Hossein Mohammad Khanlou, Peter Woodfield, John Summerscales, Wayne Hall from the Griffith School of Engineering, Gold Coast Campus, Griffith University, Queensland 4222, Australia; and Advanced Composites Manufacturing Centre, School of Marine Science and Engineering, Reynolds Building, University of Plymouth, Plymouth, Devon PL4 8AA, United Kingdom Simulation and modelling of the thermal degradation of polymeric materials is essential for when predicting or describing the material's behaviour and durability after an exposure to high temperature. Chain-scission of polymers highly corresponds to thermos-chemical degradations of natural fibre reinforced bio-composites. In addition, compression moulding is a complex balance between processes in which consolidation and the onset of thermal degradation of the natural fibre and/or matrix materials must successfully occur for the bio-composites. Therefore, we bring together models of thermal penetration, melt infusion, thermal degradation and chemical degradation of natural polymers to construct an ideal processing window for a bio-composite. Finally, critical processes and process boundaries are identified by mathematical models and validation of the concept is achieved by measuring changes in the mechanical properties of flax/PLA bio-composites. Key words: Bio-polymer composites; Chemical degradation; Natural fibres; Mechanical properties; and Thermal processing degradation **About the presenter:** After gaining his undergraduate degree in Manufacturing Engineering, Hossein Mohammad Khanlou has been involved with various engineering projects. He has also worked in the University of Malaya as a research assistant in the area of nano-composite production. Hossein is currently a PhD. student at Griffith University and has been awarded

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		to 2012 as a visiting scholar supported by Chinese government.	Vice Chancellor Postgraduate Research Scholarship (GUPRS)and Griffith University Postgraduate International Research Scholarship (GUIPRS) on a project entitled "The sensitivity of natural fibre reinforced composites to environmental conditions".
1020-1050	Charles MacDonald, Strategic and Technical Advisor, Sydney Motorway Corporation **TOPIC: An In Depth Analysis of WestConnex Project** This presentation will provide an in-depth analysis of the WestConnex project, which is part of an integrated transport plan to keep Sydney moving and is currently the largest infrastructure project in Australia. The new motorway will provide crucial support for Sydney's long-term economic and population growth. The presentation will cover: • What is WestConnex and its benefits? • Project timeline of planning and construction • Update on the progress of the project to date • Industry partnerships • Community support for the project • Future procurement opportunities Key words: Major infrastructure, tunnelling, motorway **About the presenter:** Charles is a Chartered Professional Engineer with over 40 years of experience in the design and construction of civil infrastructure works worldwide and is a Fellow of both the Institution of Engineers, Australia and the Institution of Civil Engineers, UK. He has held various senior positions with contractors, consultants, the public sector and academia. He has extensive experience in the design, construction and operation of tunnels for a wide variety of purposes including road and rail transport. Charles holds a doctorate in project management from RMIT, Melbourne, an MBA from the University of Queensland plus engineering and science degrees from the University of Birmingham, UK. He is also a qualified mediator and a graduate of the Australian Institute of Company Directors.	Flight Lieutenant Chris Kourloufas, F/A- 18A/B Structural Integritywith the Australian Defence Aviation Safety Authority **TOPIC: Managing Composite Structural Integrity Hazards – A RAAF F/A-18A/B Case Study** The Royal Australian Air Force (RAAF) F/A-18A/B 'Classic Hornet' is a twin engine fighter aircraft introduced into service in 1983 to replace the Mirage III in the tactical fighter role. A multi-mission aircraft with extensive air-to-air and air-to-ground capabilities designed by Boeing (formerly McDonnell Douglas) to United States Navy (USN) design specifications. The airframe was designed to achieve 6,000 hours under a safe-life philosophy. Contemporary high-strength aluminium alloys are the primary structural materials. High-performance Carbon Epoxy composites are used in the vertical and horizontal tails, wing skins, trailing edge flaps and access doors and dorsal covers. Numerous full-scale fatigue tests were conducted during the design and production phases to validate the fatigue life of the structure. A hazard to the airworthiness of Classic Hornet Inner Wing – potential disbonding of the 'Step Lap Joint' area, is being identified and analysed. This and the work to establish the condition of the fleet via NDT (Phased Array Ultrasonic Inspection) will be discussed. The Phased Array NDT technology will also be presented and briefly compared to conventional Ultrasonic Testing (UT). The practical application of the technology to the Inner Wing Step Lap Joint will also be described, along with reporting capabilities and defects detected. Further, the analysis and interpretation of inspection results will be discussed as well as the management strategies applied to findings. Finally, opportunities for collaboration and research will be outlined to meet RAAF certification/management requirements. Keywords: Contamination; Disbonding; Damage growth. **About the presenter:** Chris Kourloufas, ME(Aerospace), MS(Aeronautics and Astronautics), BE(Aero)	Dr Ying Li, Senior Lecturer, Nanyang Polytechnics **TOPIC: Reinforcing Capability of Hierarchical Structures in Starch-Based Biocomposites** Authors: Yah Wen Ko, Ying Li, Chi Mun Cheah, Chuem Kum Lee, Mohd Pauzi Hussen, Leonard Loh from Nanyang Polytechnic, Singapore Presented by: Dr Li Ying, Senior Lecturer, Biomedical Engineering and Materials Group, School of Engineering, Nanyang Polytechnic, Singapore The development of green composites to replace non-degradable oil-derived synthetic materials is gathering widespread interests due to deepening concerns of environmental issues and fossil fuel depletion. Starch-based materials are one of the most viable alternatives due to their low cost, high abundancy and biodegradability into non-toxic by-products. However, drawbacks such as weak mechanical properties and high water sensitivity hinder their extensive use in commercial applications. Various efforts are focused on incorporating natural fibers into starch-based materials to produce biocomposites with improved performance. Reinforcement in the biocomposites is highly dependent on the nature of the fibers and loadings. In this study, the reinforcing effect of hybrid, hierarchical structured fibers on the mechanical performance of starch-based composite was elucidated. By creating hierarchical structures comprising of micro- and nano-sized fibers in starch composite, it was possible to strengthen the material through mechanical interlocking at the matrix-fiber interface. The current work will provide better insights into tailoring mechanical properties by generating hierarchical assembly within the biocomposite. Keywords: biocomposite, natural fillers, starch **About the presenter:** Dr Li Ying is a senior lecturer at the Biomedical Engineering and Materials Group, School of Engineering, Nanyang Polytechnic, Singapore. Dr Ying has over 20 years of research and engineering experience in composite materials synthesis and application. She has published more than 60 technical papers on nanomaterials and composite materials. She has also completed many reports on research and industrial projects. Her current research focuses on development of composite materials for environmental friendly and biodegradable applications.

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		Hons joined the RAAF as an Aeronautical Engineering Officer in 2009 and is now Flight Lieutenant, F/A-18A/B Structural Integrity, Defence Aviation Safety Authority. Previous positions include: PC- 9A Structural Integrity; F/A-18A/B Component Maintenance.	
1120-1150	Frank Cristiano, General Manager, Tricomposite & Hugh O'Donnell, Managing Director, High Performance Consortium **Tricomposite - Looking Outside our Industry for a Breakthrough in our Thinking and Performance** A few years ago, Tricomposite was struggling to meet the expectations of its customers in the light of overseas competition and was a business under significant financial stress. Three years later following a change of ownership and leadership the business has transformed into a business that is reliable, innovative and customer focussed. How has this been achieved in such a short time? Pivotal to this change has been changing the existing team's mindset from a production focus to a customer value oriented mindset. In this highly interactive session Frank Cristiano, General Manager Tricomposite, and Hugh O'Donnell (HPC) will share how Tricomposite effected this change in culture by focussing on improving the work to be done using a tailored business improvement approach and collaborating with their peers in other industries to challenge paradigms and access new thinking, resources and ideas. The significant improvements in productivity, quality, delivery and output have been achieved with the existing team, manufacturing footprint and with minimal capital investment. In light of this case study participants will also have an opportunity to explore and discuss the opportunity for improvement and collaboration in their own organisation. Keywords: Innovation, Collaboration, Culture **About the speakers:** ***Hugh O'Donnell*** is an accomplished business leader with an impressive track record as an Executive, Facilitator and Management Consultant. Prior to consulting he held senior leadership roles in Europe, USA and Australia with AMCOR, UpRight, Searle and Yves Rocher. With full P&L responsibility he led business transformations across multiple sites delivering sustainable top and bottom line growth. Hugh works with both corporate and medium size businesses in manufacturing, construction and services. He supports teams to develop and	Prof. Thiru Aravinthan, Professor of Structural Engineering, Centre for Future Materials, University of Southern Queensland **TOPIC: Civil Composites in Australia - Past, Present and Future** The application of composites in civil infrastructure has been an emerging trend globally in the last decade. In Australia, the pioneering work was initiated at the University of Southern Queensland (USQ) within the Centre for Future Materials (CFM) in late 1990s resulting in the installation of the first Australian fibre composite bridge. Since then, several infrastructure projects with innovative concepts and design using engineered composites as suitable solution and cost effective alternative to existing construction materials were implemented. This paper will discuss the past and recent applications of composite materials in civil infrastructure taking place around Australia including sustainable fibre composite bridge girders, pile rehabilitation and composite pile systems, railway sleepers, strengthening of existing structures, and other innovative composite applications. Challenges and future opportunities will be also presented for the broad and safe use of composites in civil infrastructure. **About the presenter:** Thiru Aravinthan is a Professor of Structural Engineering within the Centre for Future Materials at the University of Southern Queensland (USQ). He is a Charted Professional Engineer and Fellow of Engineers Australia and a registered Professional Engineer at Oregon State, USA. His expertise includes fibre composites structures, prestressed concrete technology, structural rehabilitation and engineering education. He is actively involved in national and international organisations including being the Member of Board of Directors, Composite Australia (Dec 2009 – 2013) and Council Member of International Institute for FRP in Construction (since 2010) and has over 25 years of engineering experience in the industry, research and academia and involved in several industry funded projects.	Yueyou Wang, Graduate Student, Aerospace Research Institute of Materials and Processing Technology, Beijing, Cina **TOPIC: High Performance Quartz/Cyanate Ester Composites Fabricated by RTM Process at Ambient Temperature** **Authors:** WANG Yueyou, SHI Peiluo*, LEI Qin, SUN Hongjie, ZHAO Yunfeng from the Aerospace Research Institute of Materials and Processing Technology, Beijing 100076, China A high performance cyanate ester system suitable for RTM process was developed, which is made of low viscosity bisphenol E cyanate ester. The viscosity of the resin system is 200mPa·s at ambient temperature with suitable pot life (>10h) and thus meet the needs of RTM techniques at ambient injection temperature. Quartz/cyanate ester composites were fabricated by RTM technique. The processing characteristics, mechanical, thermal and dielectric properties were studied. The glass transition temperature is 230oC. The dielectric constant is 3.4 and dielectric loss factor is 0.006, suggesting that this quartz/cyanate ester system fabricated by RTM process has great potential to be used for advanced structural/functional composites. Keywords: Cyanate ester, RTM, High performance **About the presenter:** Born in China in 1991, Yueyou WANG is currently a graduate student at Aerospace Research Institute of Materials and Processing Technology, Beijing, China. He received a BA degree in Material Science from the Shan Dong Université in China in June 2015.

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1150-1220	implement their strategic plans using a practical customised approach, blending facilitation, coaching and action learning to maximise ownership, build internal capability to transform the business. He has worked with clients such as AMCOR, BP, AME Systems, Volgren, PPG Industries, AMCOL Inc., Gekko Systems and Life Saving Victoria. Hugh is a founding director and lead-facilitator of the High Performance Consortium (HPC), a community of non-competing businesses collaborating to accelerate the transformation of their people and businesses to be globally competitive. He is a past board member of the Association of Manufacturing Excellence, Innovation Insights (i2e) and is an advisory board member. He has facilitated Leadership Development Programs at Melbourne Mount Eliza Business School and is an international speaker on business improvement and strategy deployment presenting at conferences in Australia and North America. ***Frank Cristiano*** joined Tricomposite as manager in 2013, taking on the general manager role a year later. Coming from a background in hydraulic engineering and OEM manufacturing in Australia and Asia for the automotive sector, he brought to Tricomposite expertise in advanced manufacturing processes for mass production. Since joining Tricomposite, Frank has increased monthly component output by 73 per cent to its current rate of 1700 parts per month for primary customer, RV manufacturer Jayco and is expanding the customer base. Frank is a board member of Composites Australia.	Dr Sylwester Samborski, Researcher, Lublin University of Technology, Poland **TOPIC: Strain Energy Release Rate Distribution Along Delamination Front in CFRP Laminates with Mechanical Couplings** The contemporary Finite Element (FE) codes provide efficient computational methods for pre-experimental verification of test configurations applied to composite laminates. A special group of laminates are those exhibiting mechanical couplings. The critical parameter for the CFRP laminates, prone to delamination is the Strain Energy Release Rate (SERR). The available ASTM procedures were thought for the unidirectional composites. However, they allow for testing of angle-ply laminates. The author analyzed possibilities of direct applicability of the standard DCB and ENF procedures to multidirectional coupled laminates using the Virtual Crack Closure Technique (VCCT) available in the Abaqus FE code. The results revealed asymmetries in the SERR plots along delamination front. The modifications of the data reduction schemes were proposed. The work paper was financially supported by the Ministerial Research Project No. DEC-2016/21/B/ST8/03160 financed by the Polish National Science Centre. Keywords: Delamination, Fiber reinforced polymer, Coupled laminate **About the presenter:** Dr Sylwester Samborski is a specialist in the field of damage mechanics of composite laminates and other materials, like ceramics. He has worked in several teams dealing with both static and dynamic problems of delamination. He is experienced in Finite Element Method and experiments on strength of deteriorated materials, including Acoustic Emission (AE) testing.	Dr Peiluo Shi, Senior Engineer, Aerospace Research Institute of Materials and Processing Technology Beijing 100076, China **TOPIC: M55J Carbon Fiber-Cyanate Ester Composites' Properties and Application** **Authors:** SHI Peiluo, BAI Xuelian, FU Pingjun, LING Hui, JIANG Wenge from 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. Laminates' moisture absorption, out-gassing, mechanical and thermal properties are measured and compared with T700/epoxy laminates. Telescope's coefficient of thermal expansion is measured. Results show that M55J/cyanate ester laminates' total mass loss (TML) is as low as 0.07% by out-gassing measurement. Cyanate ester systems absorb significantly less moisture (one third) than epoxy systems. Coefficients of thermal expansion are near zero (＜1×10-6/K) in both X and Y directions for M55J/cyanate ester laminates, as well as for the longitudinal direction of the telescope. All these data support the conclusion that M55J/cyanate ester system is an excellent candidate for dimensionally stable aerospace structures. Keywords: M55J, Cyanate ester, Aerospace structure **About the presenter:** Born in China in 1986, Peiluo SHI is currently a senior engineer at Aerospace Research Institute of Materials and Processing Technology, Beijing, China. He received a Ph.D. degree in Material Science from the Université Pierre et Marie Curie (France) in December 2013.
1220-1250	Dr Lucy Cranitch, Materials Scientist, PATH **TOPIC: Selling Composites, Answers to Common Customer Questions** Those of us in the industry know what great products are made from composite materials. However, new customers have common concerns. If we address these with answers that give technical details presented in clear, eye catching ways, we are well on our way to selling our products. This is a presentation that you can take away from the conference and send to your customers. Why do I want composites? What are composites? Are there standards and codes? How do I know I'll get a good quality product?	Dr Allan Manalo, Senior Lecturer in Civil Engineering, Centre for Future Materials, ,University of Southern Queensland **TOPIC: Developments and Applications on FRP Reinforcing Bars in Concrete Structures** Authors: Allan Manalo[1], Ginghis Maranan[1], Brahim Benmokrane[3], Darren Lutze[4] [1] University of Southern Queensland; [3] University of Sherbrooke; [4] Inconmat V-Rod Australia Fiber reinforced polymer (FRP) reinforcing bars have been extensively investigated and a number of FRP bars are now commercially available. However, the use of FRP bars as	Dr Chuang Feng, Research Fellow (ARC DECRA Fellow), School of Engineering, RMIT University **TOPIC: Vibration of Functionally Graded Trapezoidal Nanocomposite Plates Reinforced with Graphene Nanoplatelets** **Authors:** Zhan Zhao, Chuang Feng, Jie Yang from the School of Engineering, RMIT University, Melbourne Australia This paper investigates the free vibration characteristics of a novel class of functionally graded multilayer trapezoidal nanocomposite plates reinforced with non-uniformly distributed graphene nanoplatelets (GPL) by employing the finite element method (FEM). The effective Young's modulus of the

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	How long will it last? This presentation addresses these common questions and more on health hazards, durability in sunlight, corrosion, inspection, repair, fire and environmental impact. **About the presenter:** Dr Lucy Cranitch is a polymer chemist with 18 years of experience in industry specialising in composites in the water, waste, desalination, mining, minerals processing, chemical, oil and gas industries. With an understanding of degradation mechanisms, Lucy's aim is to assist people building or running industrial plants to achieve the design life and limit the maintenance of assets. Her main activities are selecting materials for new builds and assessing the condition of existing assets. Lucy is the director of the materials consulting company, PATH and has previously worked for the materials supplier Huntsman and engineering consulting companies MPT and GHD.	internal reinforcement in concrete structures is still unfamiliar to many practising Australian engineers. This paper provides an overview on the current research and developments on FRP bars to ensure that Australia is properly informed in the engineering research for this advanced material allowing its responsible introduction and wide use in civil infrastructure. Research and developments around the world on the application of FRP bars as internal reinforcement in concrete beams, columns and slabs are presented. Secondly, the results of the on-going efforts in Australia on the evaluation of the potential use of FRP bars in concrete structures are discussed along with some field applications of the GFRP bars to a number of Australian civil infrastructures. Keywords: FRP bars; composites; concrete **About the presenter:** Dr Allan Manalo is a Senior Lecturer at the School of Civil Engineering and Surveying at the University of Southern Queensland (USQ). He completed his master's studies at Saitama University, Japan in 2008, and his doctoral studies at USQ in 2011, both in the field of Structural Engineering. He is a key researcher at the Centre for Future Materials (CFM), USQ. Since 2012, Dr Manalo has been leading research projects at USQ relating to the use of FRP bars as internal reinforcement to concrete structures. He is an associate member of the CAN/CSA S807-10 standards on "Specification for fibre-reinforced polymers."	nanocomposites is calculated by Halpin-Tsai micromechanics model including the effects of GPL geometry and size while Poisson's ratio and mass density are determined by the rule of mixture. A comprehensive parametric study is conducted to study the influences of the distribution pattern, weight fraction, shape and size of GPL nanofillers as well as the total number of layers on the free vibration characteristics of the plates. It is found that the natural frequencies of the trapezoidal plate are significantly enhanced by adding a very small amount of GPLs into the matrix, and that placing more square shaped GPLs with fewer graphene layers near the top and bottom surfaces of the plate is the most effective way to increase the plate stiffness consequently its natural frequencies. Keywords: Graphene nanoplatelets; Functionally graded nanocomposites; Trapezoidal plate; Natural frequency **About the presenter:** Dr Chuang Feng got Bachelor and Master degree from China in 2004 and 2007, respectively. Then he worked as Assistant Professor in a university for three years. In 2014, Dr Feng obtained PhD degree from the University of Western Ontario in Canada. After that, he became a Research Fellow at RMIT University. Since his Master study, Dr Feng has published 13 papers in journals and 8 in conference proceedings. He has received several competitive scholarships and awards in Canada and Australia, including the Western Graduate Research Award and Academic Achievement Scholarship in Canada and an Endeavour Research Fellowship and ARC DECRA Fellowship in Australia.
1345-1415	Andreas Horbach, Technical Services Manager, Alliancys **TOPIC: Let's Talk Innovation** Andreas will present on the latest resin developments for odour-free processing and pultrusion, as well as several new resin application developments. **About the presenter:** Andreas Horbach graduated as a plastics engineer in Darmstadt, Germany, joining BASF in 1989 where he held positions in Composites Business including Leader of the Technical Lab and Project Manager for Technical Service and R&D Projects. In 1997, Andreas joined DSM Composite Resins where he provided Technical Service in Europe and Export countries including Asia and the Middle East with a focus on SMC/BMC, pultrusion, RTM, HLU FW, Putty and others. He joined Aliancys as Technical Service Manager in January 2016.	Simeon Cheuk, PhD Candidate, Monash University **TOPIC: Effect of Carbon Black Powder Protective Layer on Reusable Carbon Fibre Epoxy Resin Composite Rocket Combustion Chamber** **Authors:** Simeon Cheuk, Bijan Shirinzadeh, Pan Zhao from Monash University This work investigated the influence of fiber orientation and carbon black powder protective layer (CBPPL) on thermal resistance of carbon-fiber/epoxy composites combustion chamber for a miniature rocket. Carbon fiber reinforced polymer (CFRP) is an ideal material for aerospace application, due to its high strength-to-weight ratio and stiffness-to-weight ratio. However, the thermal properties of CFRP may preclude it as an optimal choice of material for rocket combustion chamber. To explore the possibility of reusable CFRP combustion chamber, a thin layer of carbon	Dr Si-Woo Park, Division Manager of the Mechanical System Research Division at the Korea Textile Machinery Research Institute Korea Textile Machinery Research Institute **TOPIC: Compression Molding Analysis of LFT-D System for Vehicle Trailing Arm** **Authors:** Si-Woo Park, Bo-Gyu Park, Han-Kyu Jung, Dong Soo Ha, Hyen Yel Choi, Jin Woo Jung ftrom the Mechanical System Research Division at the Korea Textile Machinery Research Institute Recently, CFRP composites have become widely used as lightweight materials have excellent mechanical properties and can be used in various fields. In general, thermosetting resins are used for CFRP. However, in recent years, studies using thermoplastic resins have been actively carried out to overcome the disadvantages of thermosetting resins. LFT-D system is a molding method in which a fiber is directly cut to a desired length while being impregnated with a thermoplastic resin to produce a compound and press-molding the product. In this paper, before the production of the trailing arm, the

TIME	STREAM 1 ROOM 1	STREAM 2 ROOM 2	STREAM 3 ROOM 3
		black powder was applied on the inner wall as a protective layer. With the aid of Robotic Fiber Placement (RFP), compaction force and lay-up temperature is precisely controlled in fabricating three composite ring samples with different fiber orientation ([0]51, [90]51 and [0/90/0]17). Subsequently, the composite ring samples are inserted as part of a miniature rocket combustion chamber and tested under combustion operation and thus subject to intense heat (~477oC) for two minutes. The experimental results showed that the samples with CBPPL had significant resistance against high-temperature corrosion. Keywords: Carbon black powder protective layer; High-temperature corrosion; Reusable rocket combustion chamber **About the presenter:** Simeon Cheuk holds qualification in Bachelor of Aerospace Engineering (Hons.) from Monash University. He is current researching on Automated Fibre Placement on Complex Contoured Surfaces. He is also interested in research on miniature hybrid rockets including propulsion systems, fibre-reinforced composite oxidizer tanks and thrust vectoring control systems.	compression molding analysis was carried out in order to grasp the problems that may occur during production. Through compression molding analysis was calculate of minimum press pressure and to compare and analysise molding conditions characteristic for forming the trailing arm. Keywords: Compression Molding Analysis, LFT-D System **About the presenter:** 1996 – 2001: Acquired Ph.D degree 2004 – 2005: Research Professor, Department of Mechanical Engineering, Kyungil University 2005 – : Division Manager , Korea Textile Machinery Research Institute
1415-1445	Manny Tesfaye, Director of Technical Services, SCIGRIP Structural Adhesives **TOPIC: Innovative Adhesive Technologies for Composite Marine Structures** Selection of adhesive products for joining structural components in small “runabouts” or rugged fishing boats require rigorous testing to ensure the structural integrity as well as the safety and comfort of the riders. Therefore, it is imperative that the appropriate adhesive technology identified, followed by assessment of the adhesives ability to bond to current as well as new and advanced boat building materials. The adhesive bonds have to pass minimum performance requirements as established by international bodies of standards for marine products. This presentation will discuss performance of new and improved MMA adhesives for joining similar and dissimilar substrates typically used in boat building. In short, the paper will address practical considerations faced by boat and yacht manufacturers in selecting the correct adhesive products. Keywords: Composites, Marine, Bonding **About the presenter:** Manny Tesfaye is an expert in composites for marine and land transportation systems. Manny’s responsibilities at SCIGRIP Smarter	Dr Dae Kyu Park, Director of the Headquarter of R&D at the Korea Textile Machinery Research Institute. **TOPIC: A Study on the Tensile Properties of CFRP Composites Using Long Fiber Thermoplastic-Direct (LFT-D) Process** **Authors**: D. K. Park, Y. J. Shin, H. K. Jeung, S. W. Park, J. W. Jung, Y. Park from the Korea Textile Machinery Research Institute in Dongshin. Carbon fiber-reinforced plastic(CFRP) composite materials have been widely used in various industrial fields because have been able to adjust design variables according to the application of the required structure. Thermosetting and thermoplastic resin are used as base material of CFRP composites used for lightweight construction of automotive components. Thermoplastics have several advantage such as no curing and being recyclable compared to thermosetting resin. In this study, CFRP composites were made the Long Fiber Thermoplastic-Direct(LFT-D) process. The LFT-D process includes an in-line production system that directly impregnates a thermoplastic resin, extrudes the composite material, and then molds it. It has taken on increasing the strength and decreasing molding time. Tensile strength characteristics	Jianbao Zhang, Senior Engineer with the Aerospace Research Institute of Materials and Processing Technology, Beijing, China **TOPIC: Study on the Mechanical Properties of Intersection Ply Composite Laminate** Authors: Jianbao Zhang, Wenwen Sun, Junfeng Wang, Jianbo Sun, Kai Yi from the Aerospace Research Institute of Materials and Processing Technology, Beijing, China Intersection ply, is a new composite fiber placement laminate mode, have potential to special mechanical properties relative to conventional composite ply. However, it is important to obtain the mechanical properties of this new laminate mode. In this paper, the mechanical properties of T800/ EP was studied, and the crossing intersection ply composite laminate samples were done with automated fiber placement. The mechanical properties of T800/ EP crossing intersection laminate were tested and the microstructure of the sample was observed and analyzed. Results showed that the T800/ EP composite new laminate mode had high interlaminate shear properties compared with conventional laminate, and a downtrend was obvious in the aspects of the tensile property and compression performance. **About the preenter:** Mr Jianbao Zhang is a senior engineer from China Aerospace Research Institute of Materials and

TIME	STREAM 1 ROOM 1	STREAM 2 ROOM 2	STREAM 3 ROOM 3
	Adhesives Solutions include developing adhesives, testing, certification and introduction in diverse markets and industries. Manny has extensive knowledge of polymers, composites materials and processing. This is in part due to over 20 years of work in the industry, including 10 years with OCF, and a combined 10 years as M&P engineer at Boston Whaler and OMC Group, both fiberglass boat manufacturers. Manny has a B. S. and M. S. in Civil and Structural Engineering from Howard University, USA and has presented and published technical papers globally.	on the mechanical properties of CFRP were analyzed according to parameters of LFT-D based on thermoplastics. In order to analyze the properties of CFRP, the specimens were prepared based on the tensile test standard ASTM 3039 of composite materials after press forming of high pressure. A tensile test was conducted using the universal testing machine and the results were analyzed. Key words: CFRP, Thermoplastic, LFT-D **About the presenter:** Dae-Kyu Park received his Ph.D. degree in mechanical engineering from Yeungnam University, Korea, in 2009. Now he works as the Director of Headquarter of R&D at Korea Textile Machinery Research Institute, Korea.	Processing Technology. His main work is concentrated on composite automated processing, including fiber winding, automated tape placement and fiber placement et al.
1445-1515	Raymond Ten Broeke, Field & Customer Support Engineer, AkzoNobel Polymer Chemistry **TOPIC: Recent Developments in Polyester Curing Systems** In polyester curing, the curing system has a large influence on the quality of the cured product and the ease and speed of the process. In this presentation recent developments in accelerators and peroxides will be highlighted. The new cobalt-free accelerators were found to give not only a cobalt-free end product, but also unexpected advantages in the curing process. Research is done on the effect of the peroxide formulation on osmosis for polyester products in contact with water and the cure of styrene free resins is also investigated as the market is showing more and more interest. About the presenter: Mr Ten Broeke joined AkzoNobel in 2012 as researcher and field & customer service focal point. Next to performing lab work and customer support, Mr Ten Broeke gives technical training on polyester curing and proper selection of curing systems. Before joining AkzoNobel, Mr Ten Broeke worked as a researcher on development of solar cells.	Anita Hajetian, Senior Application Engineer, 3M Australia **TOPIC: Ultralight TPO Technology Enabled by Long Polymer Fibres, 3MTM Glass Bubbles and MuCell® Microcellular Foam Injection Molding** Hollow glass microspheres, or Glass Bubbles, have been added to plastics for several years to reduce weight to improve fuel economy and lower the carbon footprint of vehicles. The addition of stiff, hollow glass spheres makes the plastic composite stiffer and therefore tends to reduce impact strength, especially cold temperature impact strength. A novel combination of Glass Bubbles and polymer fiber has been developed in a polypropylene matrix composite to improve the impact strength and provide even more weight reduction compared to talc filled TPO materials. Keywords: Thermoplastics, Weight reduction, Improved impact strength **About the presenter:** Anita Hajetian is the Senior Application Engineer at 3M, Advanced Materials division. She has 10 years' experience with the performance additives industry. Anita started her career at DuPont, in the Performance Coatings manufacturing plant and later moved to the technical centre to focus on research & development projects and the physical and chemical testing of polymers & coatings. At 3M she engages closely with customers to develop innovative solutions for thermoplastics, rubbers & coatings. Anita is currently a member of the Society of Plastics Engineers and Society of Petroleum Engineers. Her formal qualifications are a Bachelor of	Dr Mazhar. H. Peerzada, Associate Professor at the Fibre Reinforced Composite Laboratory, Mehran University of Engineering, Jamshoro, Pakistan **TOPIC: Bi-Axial Bias Weave Method for Preform** **Authors:** Mazhar. H. Peerzada, Sadaf A. Abbasi, Prasad Potluri from the Fibre Reinforced Composite Laboratory Mehran, University of Engineering; Department of Aerospace, RMIT Australia; North West Composite Centre, University of Manchester, UK. The present invention involves Bi-axial Bias weaving method for two dimension woven preform having interlaced bias strands. The material includes plain, twill and satin structures made of two bias flat strands (tape) interlacing each other at particular angle (30- 60). The weaving machine includes bias holders assembly, chains, bias rapiers and take-up assembly. Each Bias holder is responsible to hold the flat bias strand and shedding in order to produce the desired structures such as plain, twill and satin. Chain holds the bias holders assembly and rotate in order to make production continuous. Rapier is mean to insert the bias strand into the shed produced by Bias holders assembly. Bias strand feeding set-up is connected with rapier assembly. Two dimension woven preform have been successfully manufactured in most common designs such as Plain, Twill and Satin using high performance fibres (carbon). The embodiment of this invention may be utilized to produce high performance preforms (Kevlar/Glass/Carbon) for aerospace composites. Keywords: Bias weave, Textile preform, Bias holder **About the presenter:** Dr. Mazhar Hussain Peerzada is an Associate Professor his research areas are composites material. He is in charge of the Fibre Reinforced Composite Laboratory and a member of the textile composites research group of the University of Manchester. He has 22 research publications and filed US patent as well. He

TIME	STREAM 1	ROOM 1	STREAM 2	ROOM 2	STREAM 3	ROOM 3
			Chemical Engineering and Master of Biomedical Engineering from the University of New South Wales.		has the industrial as well as academic experience. He has been a faculty member in Mehran University since September 2004. He has won various academic scholarships and awards throughout his studies and later. He gained his PhD in composite materials from North West Composite Centre at the University of Manchester, UK.	
1515-1600	**TOPIC: Future Opportunities** Often cited as frontier materials, advanced composites as we know them today have grown market share through a series of sector adoptions commencing with the aircraft and defence industries which needed strong lightweight materials. Leisure and pleasure including marine, recreational vehicles (caravans), and swimming pools are well known, so too is the transport sector including trucks, trailers, rail and buses. This closing session features well-known members of the Australian Composite Community to share their expert views on the next waves of innovation; and which markets are likely to take up or ramp up their use of composite technologies including, civil infrastructure and architectural markets.					