19th Australian International Aerospace Congress (AIAC) (Incorporating HUMS and Space)
and 10th Australasian Congress on Applied Mechanics (ACAM)
(AEDT) Time in Sydney, Australia

Monday, 29 November 2021

8:45	Congress Opening Day 1 (5 mins) Amanda Caples (10 mins) (Department of Jobs, Precincts and Regions) Chair: Chair: Adam Groszek, AIAC Chair and A/Prof Alex Ching-Tai Ng ACAM Chair		
	AIAC	**ACAM**	**ACAM**
	AIAC PLENARY 1	***Biomechanics, bio/sustainable composites 1***	***Micro/nano-mechanics***
	Chair: Ed Kruzins, CSIRO	***Chair: Alex Ching-Tai Ng, The University of Adelaide***	***Chair: Youhong Tang, Flinders University***
09:00	**AIAC PLENARY** Boeing's Australian autonomous new product development **Ms Emily HUGHES (Phantom Works, Boeing Defense Space & Security)**	Experimental analysis and prediction of mechanical properties of soft palate using machine learning **Dr Liujie CHEN** **(Guangzhou University)**	Size-dependent elastic wave propagation of a piezo-electro-magneto-thermal PC micro/nanobeam **Dr Mir Abbas ROUDBARI** **(RMIT University)**
9:20		Experimental investigation and mathematical modelling of temperature and force in surgical bone drilling **Mr Chandana SAMARASINGHE** **(University of South Australia)**	Modeling of 3D fracture propagation in reservoirs rocks at a microscale **Mr Victor NACHEV** **(Sadovsky Institute of Geospheres Dynamics of Russian Academy of Sciences; Moscow Institute of Physics and Technology)**
9:40	**AIAC PLENARY** The Australian Space Agency: objectives and priorities for the future **Mr Anthony MURFETT (Australian Space Agency)**	Design of head protective equipment for blast-induced traumatic brain Injuries **Dr Kwong MING TSE** **(Swinburne University of Technology)**	Size effect on the free vibration behaviour of organic solar cell **Miss Qingya LI** **(UNSW)**
10:00			Analysis of the constitutive behaviour of a porous material based on micro-indentation **Assoc/Prof Kostas SENETAKIS** **(City University of Hong Kong)**
10:20	Morning Tea (20 mins)		

	AIAC	**AIAC**	**AIAC**	**ACAM**	**ACAM**
10:40	***Space Technologies 1***	***Diagnostics & Prognostics 1***	***Structures and Materials 1***	***Mechanics of geomaterials and concrete 1***	***Fatigue, fracture and failure analysis of structures 1***
	Chair: Crystal Forrester, DSTG	***Chair: James Walduck, DASA***	***Chair: Alex Harman, DSTG***	***Chair: Andrew Chan, NCAM Committee***	***Chair: Chris Wallbrink, DSTG***
10:40	**AIAC KEYNOTE** Rocket Lab, Democratizing Access to Space **Mr Sandy TIRTEY** **(Rocket lab)**	**HUMS KEYNOTE** CASG NX - Integrating Industry 4.0 for Defence **SQNLDR Mike MORONEY** **(Department of Defence) and Luke DE JAGER (KPMG)**	**AIAC KEYNOTE** Automated Manufacturing Technologies with Machine-Learning & Artificial Intelligence **Dr Waruna SENEVIRATNE** **(Wichita State University)**	**ACAM KEYNOTE** Numerical simulation of concrete column confined with basalt textile reinforced ECC **Prof Yan ZHUGE** **(University of South Australia)**	**ACAM KEYNOTE** Notch fatigue analysis and lifetime prediction in additively manufactured steels subjected to multiaxial loading **Prof Ricardo BRANCO** **(University of Coimbra)**
11:10	Construction of spacecraft deployment mechanisms from shape memory alloys **Mr Will HOUTSMA** **(RMIT University)**	An approach to merging machine learning models in an ensemble for load estimation **Ms Catherine CHEUNG and Zouhair Adam HAMAIMOU** **(National Research Council Canada)**	Additively Manufactured Pinning Technology for Titanium-to-Composite Joints **Prof Adrian ORIFICI** **(RMIT University)**	Localisation analysis of porous reservoir rocks under triaxial conditions using a breakage mechanics model **Mr Nhan NGUYEN** **(The University of Adelaide)**	Multi-physics numerical study on fire-structural response in a naval post-flashover fire test **Mr James O'NEILL** **(Royal Melbourne University Of Technology)**
11:30	Electromagnetic shielding for the protection of crew in the space radiation environment **Dr Gail ILES** **(RMIT University)**	Alternative Approaches for Health Assessment of Vehicle Subsystems **Mr Rohan Kapoor** **(RMIT University)**	High fidelity residual strength assessment for composite aircraft sustainment **Mr Kade JACOBS** **(RMIT University)**	Control concrete disc cracking under diametric compression using AUSBIT - Adelaide University snap-back indirect tensile test **Dr Rupesh VERMA** **(The University of Adelaide)**	Evaluation of crack closure with a piezoelectric strain gauge **Mr James HUGHES** **(University of Adelaide)**
11:50	Increasing resiliency: Understanding the effect of Low Earth Orbit environmental conditions on space structures **Miss Zoe JANES** **(RMIT University)**	Is Deep Learning Superior in Machine Health Monitoring Applications **Dr Wenyi WANG** **(DST Group)**	Transverse Tensile Testing of Environmentally Aged Composites **Mr Lachlan BURGESS-ORTON** **(Defence Science and Technology Group)**	Cyclic behaviour of stabilized tailing sand with polymer-based additives: Grain-scale study **Assoc/Prof Kostas SENETAKIS** **(City University of Hong Kong)**	Fatigue properties enhancement of steel weldments by laser peening with microchip lasers **Prof Yuji SANO and Mr Yoshio Mizuta** **(Institute for Molecular Science)**
12:10	Spacesuit modifications and devices for the electrostatic repulsion of lunar dust **Ms Stephanie BATTEN** **(RMIT University)**	Categorical outlier detection for Health Usage and Monitoring Systems **Mr Leonard WHITEHEAD** **(Defence Science Technology Group(DSTG))**	Efficient Damage Prediction in Fibre Reinforced Composites **Dr Johannes REINER** **(Deakin University)**	Numerical Investigation on the Fracture Mechanism of Rock-like Brazilian Discs with Interbedded Hard-Soft Layers **Mr Lei YANG** **(The University of Sydney)**	The presence and future of residual stress measurements in Australia **Prof Anna PARADOWSKA** **(Institute for Molecular Science)**
12:30		An Overview of ADF Wear Debris Analysis **Dr Andrew BECKER** **(Department of Defence), Mr Paul NOCEJA (Department of Defence)**	Hawk Lead-In-Fighter Full Scale Fatigue Test – An Overview **Mr John TURNER** **(Defence Science and Technology Group)**		Rolling contact fatigue prediction using locomotive digital twin and a wheel-rail experimental program **Mr Esteban BERNAL** **(CQUniversity)**

12:50	Lunch Break (40 mins)				
	AIAC	**AIAC**	**AIAC**	**ACAM**	
13:30	***Operations, Airworthiness & Sustainment 1***	***HUMS Data Analytics***	***Structures and Materials 2***	***ACAM Plenary 1***	
	Chair: Sonja Jenkinson, DASA	***Chair: Wenyi Wang, DSTG***	***Chair: Alex Shekhter, DSTG***	***Chair: Andrei Kotousov, The University of Adelaide Co Chair: Jun Ma, University of South Australia***	
13:30	**13:30 - 14:00** **AIAC KEYNOTE** The Air Force Journey to Initial Operating Capability for F-35A – Innovation in Operations and Sustainment **GPCAPT Matthew MCCORMACK (81 WG)**	Prognostic Health Ontology **Dr Richard DE ROZARIO** **(The University of Melbourne)**	The Load variant stress concentrating effect of Interference Fit Fasteners, and its effects on durability. **Mr Jordan CARROLL (RMIT University)**	**ACAM PLENARY** Applied mechanics of topological interlocking structures **Professor Elena PASTERNAK (University of Western Australia)**	
13:50	**14:00 - 14:20** Air-to-air refuelling from an mrtt's perspective – the effect of fuel offload on the payload range performance **Dr Nicholas BARDELL** **(RMIT University)**	Operation Mode determination and Regime-based anomaly detection using Unsupervised methods **Mr Navid ZAMAN (PHM Technology)**	Achieving Test Loading Fidelity Requirements in the Hawk Lead-In-Fighter Full Scale Fatigue Test **Mr Michael JONES** **(RMIT University)**		
14:10	**14:20 - 14:40** Improving Remaining Useful Life Prediction of Complex Systems through CNN-LSTM Network Adaptations Professor Chun Wang **Dr Wim VERHAGEN** **(RMIT University)**	A hybrid method for degradation assessment and fault detection in rolling element bearings **Mr Yonatan NISSIM** **(PHM Laboratory, Ben-Gurion University)**	Effect of Corrosion Inhibiting Compounds on the fatigue life and initiation location in 1.5 single-shear lap joints **Mrs Rachelle FERBER** **(The University of Adelaide)**	**ACAM PLENARY** Mechanics of toughening carbon fibre composites for super cold applications **Professor Chun WANG (University of New South Wales)**	
14:30		Helicopter vibration-based operating regimes identification through the use of mixture models on health indicator **Mr Maxime MEUTERLOS** **(Univ Lyon)**	Forensic examination of damage growth indications observed in-service within critical titanium to composite bonded joints of the F/A-18 A-D – Part 1: Repaired region **Alex HARMAN** **(DST Group)**		
14:50	Afternoon Tea (20 mins)				
	AIAC	**AIAC**	**ACAM**	**ACAM**	**ACAM**
15:10	***Structures and Materials 3***	***Diagnostics & Prognostics 2***	***Mechanics of geomaterials and concrete 2***	***Structural health monitoring and structural optimization 1***	***Composites 1***
	Chair: Raj Das, RMIT	***Chair: David Blunt, DSTG***	***Chair: Andrew Chan, NCAM Committee***	***Chair: Arcady Dyskin, University Of Western Australia***	***Chair: Wenyi Yan, Moash University***
15:10	Seminal developments in the durability and damage tolerance (dadt) assessment of adhesively bonded air frames **Prof Rhys JONES (Monash University)**	Using FBG Sensors for Tooth Fault Diagnosis in Spur Gears – an Experimental Comparative Study **Mr Lior BACHAR** **(Ben-Gurion University)**	Investigating the Kaiser effect in concrete with no stress history using deformation rate analysis (DRA) and acoustic emission (AE) **Zulfiqar ALI** **(The University of Adelaide)**	A Machine learning approach for modelling CFRP-Strengthened members without explicit bond-slip models **Mr Zihao LIU** **(The University of Sydney)**	Vibrations of a CNT reinforced beam resting on a distributed spring bed **MR Oscar Zi Shao ONG** **(The University of Adelaide)**
15:30	Advanced Spectrum Editing Techniques for Compressing Loads Spectra in Support of a Future Full-Scale Helicopter Fatigue Test **Mr Beau KRIEG** **(Defence Science & Technology Group)**	Novel approach for the estimation of transfer functions using a realistic dynamic model of gear and in-out zeros technique **Mr Omri MATANIA** **(PHM Laboratory, Department of Mechanical Engineering, Ben-Gurion University of the Negev)**	Study of hydraulic fracturing dynamics based on ultrasonic transmission data **Dr Sergey TURUNTAEV** **(Idg Ras)**	Source characterisation of acoustic emission in Al 2024-T3 specimens during fatigue crack growth **Miss Xinyue YAO** **(Monash University)**	Composite helical springs with cladding structures - design, manufacturing, and mechanism studies **Dr Ling CHEN** **(Flinders University)**
15:50	Rapid Development of a Novel Method of Damage Introduction in Full-Scale Damage Tolerance Testing in Support of F/A-18 Hornet Sustainment **Mr David RUSSELL** **(RMIT/DSTG)**	Deep One-Class Method for Helicopter Anomaly Detection based on Cyclic Spectral Analysis **Chenyu LIU** **(KU Leuven)**		Automated calibration of TSA imaging through parallel DIC **Mr Elliot WHEATLAND** **(The University Of Adelaide)**	Free and forced vibration analysis of graphene nanoplatelets (GPLs) and carbon fibre reinforced three-phase laminate plates **Prof Muni Rami Reddy RASAPPAGARI** **(University Of Southern Queensland)**
16:10	Break (5 Mins)				
	AIAC	**AIAC**		**ACAM**	**ACAM**
16:15	***Structures and Materials 3 Cont.***	***Operations, Airworthiness & Sustainment 2***		***Structural health monitoring and structural optimization 1. Cont.***	***Composites 1 Cont.***
	Chair: Raj Das, RMIT	***Chair: Cameron Clanchy, DASA***		***Chair: Arcady Dyskin, University Of Western Australia***	***Chair: Wenyi Yan, Moash University***
16:15	Design and build of a large-scale aerospace multi-axial structural testing capability for emerging aerospace technologies **Mr Ben MAIN** **(Defence Science and Technology Group)**	Mobile Beacon Path Planning for Optimal Unmanned Aerial Vehicle Self-Localization **Mr John MCGUIRE** **(University of South Australia)**		Analytical study on the effects of geometrical parameters on the bimorph sensor performance to detect surface defects in gas pipelines **Mr Taha SHEIKH** **(Department of Mechanical Engineering, Indian Institute of Technology Kanpur)**	Use of nanoparticles to produce multiscale carbon-epoxy composite laminates for cryogenic liquid hydrogen fuel tank **Dr Mohammad ISLAM** **(The University of New South Wales)**
16:35	Improved cyclic damage model for fatigue crack growth in high strength aerospace alloy structures **Dr Kevin WALKER** **(QinetiQ Pty Ltd)**	An initial review of hypersonic vehicle accidents **Mr Luke POLLOCK** **(UNSW Canberra)**		Structural topology optimization and application to sustainability **Mr Vahid SHOBEIRI** **(The University of Adelaide)**	Toughening epoxy polymers at cryogenic temperature using cupric oxide nanorods and modelling of matrix microcracking for multiscale composite laminates **Mr Wenkai CHANG** **(University of New South Wales)**
16:55	**17:00 - 17:30 TRIVIA AND NETWORKING**			Long short-term memory auto-encoder based damage quantification using impulse response functions **Mr Chencho CHENCHO** **(Curtin University)**	Nonlinear dynamic behaviour of the functionally graded plate resting on winkler-pasternak elastic foundation **Mr Luo BO** **(University of New South Wales)**
17:15					On-demand debonding and rebonding of adhesives reinforced by magnetic and conductive nanofillers **Dr Xinying CHENG** **(University of New South Wales)**
17:35	**Aeronautics (AIAC19)**	END			
	Themes	**HUMS Conference**			
		Space Technology			
		ACAM			

AIAC19 AUSTRALIAN INTERNATIONAL AEROSPACE CONGRESS | ROYAL AERONAUTICAL SOCIETY | ENGINEERS AUSTRALIA | ACAM10 10TH AUSTRALASIAN CONGRESS ON APPLIED MECHANICS

19th Australian International Aerospace Congress (AIAC) (Incorporating HUMS and Space) and 10th Australasian Congress on Applied Mechanics (ACAM)

(AEDT) Time in Sydney, Australia

Tuesday, 30 November 2021

8:50	Congress Welcome Day 2 (10 mins) Chair: Adam Groszek, AIAC Chair and A/Prof Alex Ching-Tai Ng ACAM Chair			
	AIAC	**ACAM**	**ACAM**	**ACAM**
	AIAC PLENARY 2	***Kinematics, dynamics and vibrations 1***	***Computational mechanics 1***	***Advanced materials and structures 1***
	Chair: Cees Bill, RMIT	***Chair: Paul Meehan, NCAM Committee***	***Chair: Kostas Senetakis, City University Hong Kong***	***Chair: Raj Das, RMIT University***
09:00	**AIAC PLENARY** Artemis Program Update **Mr Greg CHAVERS (NASA)**	Applied mechanics of sliding with asymmetric friction **Mr Rui Xiang WONG** **(University of Western Australia)**	A solution to eliminate mesh sensitivities observed in ductility predictions in crystal plasticity finite element models **Dr Fatemeh AZHARI** **(The University of Melbourne)**	Analysis of AFP manufactured fibre metal laminate structures under impact loading **Mr Arcade SERUBIBI** **(University of New South Wales)**
9:20		Effects of non-uniform cross-section and stiffness on the nonlinear vibration behaviour of soft robotic arms **Mr Hossein KHANIKI** **(The University of Adelaide)**	Temperature prediction of railway overhead contact wire **Mohammad ANWAR** **(CQUniversity)**	Longitudinal three-point bending of corrugatedsandwich panels with cores of various shapes **Mr Fukun XIA** **(Swinburn University of Technology)**
9:40	**AIAC PLENARY** Evolution of Military Aviation Regulations and Aviation Safety. A recent chronology of where DASA has come from and why, current work and future challenges **AIRCDRE Joe MEDVED (DASA)**	A review of trajectory planning for autonomous excavator in construction and mining sites **Mr Ngoc Tam LAM** **(Curtin University)**	A recursive high-order implicit time integration method including controllable numerical damping **Miss Xiaoran ZHANG** **(University of New South Wales)**	
10:00		Vibratory evaluation of material damping performance of cross-laminated timber panels **Mr Adam FAIRCLOTH** **(Department of Agriculture and Fisheries)**	Direct structural analysis of point cloud models based on octree meshing techniques and the scaled boundary finite element method **Miss Yifan ZHAN** **(University of New South Wales)**	
10:20	Morning Tea (20 mins)			
	AIAC	**AIAC**	**AIAC**	**ACAM**	**ACAM**	**ACAM**
10:40	***Structures and Materials 5***	***Space Technologies 2***	***Structural Health Monitoring / Sensors & Algorithms***	***Kinematics, dynamics and vibrations 2***	***Non-destructive evaluation and materials identification 1***	***Advanced materials and structures 2***
	Chair: Kevin Walker, QinetiQ	***Chair: Gail Iles, RMIT***	***Chair: Joanna Kappas, DSTG***	***Chair: Abdul Mazid, Central Queensland University***	***Chair: Scott Moss, DSTG***	***Chair: Youhong Tang, Flinders University***
10:40	**AIAC KEYNOTE** Materials Science to Implementation – Strategies for Closing the Gap **Mr Neil MATTHEWS (RUAG)**	**AIAC KEYNOTE** The Responsive Space Operation Centre **Jason HELD** **(Saberasto)**	**HUMS KEYNOTE** Enterprise PHM Digital Thread Concepts & Opportunities **Tom DABNEY** **(PHM Engineering)**	**10:50 - 11:10** Two-to-one internal resonance in bending-torsion modes of an L-shaped cantilever structure **Mr Yimin FAN** **(The University of Adelaide)**	**10:40 - 11:10** **ACAM KEYNOTE** Exploring “breathing” crack-induced contact acoustic nonlinearity: analytical modeling, experimental validation, and quantitative evaluation of fatigue cracks **Prof Zhongqing SU** **(Hong Kong Polytechnic University)**	**10:50 - 11:10** Wave attenuation of a novel three-dimensional elastic metamaterial with low frequency bandgaps **Mr Youchuan ZHOU** **(The University of Sydney)**
11:10	Effect of oxygen shielding on the tensile and fatigue performance of 300M repaired through laser directed energy deposition **Dr Cameron BARR** **(RMIT University)**	**11:10 - 11:40** **AIAC KEYNOTE** Collaborative R&D to enable Australia’s space efforts **Carl SEUBERT** **(SmartSat CRC)**	Frictional heating as an estimator of modal damping and structural degradation – a vibrothermographic approach **Prof Nick LIEVEN** **(University of Bristol)**	A robust numerical model to investigate the response of aluminum cladding systems subjected to impact loading **Mr Iqrar HUSSAIN** **(School of Engineering And Built Environment, Griffith University)**	Utilisation of neutron diffraction for assessment of high-cyclefatigue damage **Mr James HUGHES** **(University of Adelaide)**	Structural stability of carbon/glass/chopped strand ceramic fibre reinforced bisphenol a epoxy hybrid composites at elevated temperatures **Mrs Jayani ANURANGI** **(University of Southern Queensland)**
11:30	Mechanical and Fatigue Properties of Laser Metal Deposited Ti-6Al-4V for Aerospace Applications **Dr Edward LUI** **(Centre for Additive Manufacturing, RMIT University)**	**11:40 - 12:00** Development of software tools for Mission Control Operations training at RMIT **Mr Pieter ROMBAUTS** **(RMIT University)**	Multi-Impact Force Identification on Aircraft Composite Structures using Operational Modal Analysis **Mr Morteza PAYAB** **(RMIT university)**	Auto-tuning bayesian filtering for model identification and updating using reinforcement learning **Dr Yuguang FU** **(Nanyang Technological University)**	Scaling subtraction method for local defect resonance determination in orthotropic CFRP laminates: Experimental and numerical studies **Mr Lunan WEI** **(Beihang University)**	Retrofitting of telecommunication tower legs **Assoc/Prof Jake FITZALAN** **(Western Sydney University)**
11:50	Acetate Replica Inspection for Aircraft Structural Integrity Management **Mr David RUSSELL** **(RMIT/DSTG)**	**12:00 - 12:20** Characterisation of hydrated Martian minerals for development of a water extraction device **Mr Nicholas FLORENT** **(RMIT University)**	Passive phased array acoustic emission localisation via recursive signal-averaged Lamb waves with an applied Warped Frequency Transformation **Mr Luke POLLOCK** **(UNSW Canberra)**	Vibrations of axially functionally graded graphene-nanoplatelets-reinforced Euler-Bernoulli beams **Miss Kelly YEE** **(The University of Adelaide)**	Thermal damage detection and monitoring of pristine graphene mortar materials using a cross-modulation vibro-acoustic technique **Ms Tingyuan YIN** **(The University of Adelaide)**	
12:10	Undeniable proof of a first-order error in the classical expressions for shear strains in curvilinear co-ordinates **Dr John HART-SMITH (Retired from The Boeing Company)**	**12:20 - 12:40** Ionizing radiation dose distributions on board habitable modules of the International Space Station **Mr Liam MOSHOVELIS** **(RMIT University)**	Validation of optimised vibration energy harvesters under near operational conditions **Mr Jess FLICKER** **(Defence Science and Technology Group)**	Applied mechanics of bilinear oscillators **Prof Arcady DYSKIN** **(University of Western Australia)**		
12:30	On the Previously Unknown Other Buckling Mode for Thin Cylindrical Shells under Longitudinal Compression **Dr John HART-SMITH** **(Retired from The Boeing Company)**		A wireless accelerometer for in situ gearbox condition monitoring of rotating components **Dr George JUNG (DSTG)**	Vibration analysis of robotic end effector components for industrial scale microlithography **Steven CUCITI** **(University Of Technology Sydney)**		

12:50	Lunch Break (40 Mins)				
	AIAC	**AIAC**	**AIAC**	**ACAM Plenary 2 and Fatigue, fracture and failure analysis of structures 2**	
13:30	***Structures and Materials 6***	***Autonomous Systems/UAS 1***	***Platform Asset Management***		
	Chair: Xiaobo Yu, DSTG	***Chair: Alexander Sivachtchenko, DASA***	***Chair: Paul Marsden***	***Chair: Alex Ching-Tai Ng, The University of Adelaide Co Chair: Anna Paradowska, ANSTO/USYD***	
13:30	Observations from interpretation of a full-scale wing fatigue test **Sebastian STOBART and Matthew RICHMOND (Qinetiq)**	Validation of sky simulation model against data from an automated sky photography station. **Miss Yiting TAO (University of South Australia)**	Optimal plans and policies for the management of military aircraft fleets **Dr David MARLOW (Joint and Operations Analysis Division, Defence Science and Technology Group)**	**ACAM PLENARY** Real-time non destructive testing during metal additive manufacturing **Professor Hoon SOHN (Korean Advanced Institute of Science and Technology)**	
13:50	A Building-Block Approach to Study Aeroelastic Instabilities for Unconventional Aircraft Configurations **Mr Nils BöHNISCH (FH Aachen University of Applied Sciences, Aachen, Germany)**	A Methodology of aerodynamic parameter characterization for a small agile fixed-wing UAV **Mr Yuchen HUANG (University of Sydney)**	A Study on Fleet Agnostic Health Usage and Monitoring System for Bridging Assets **Mr Steven KOULOUMENDAS (Anywise Consulting Pty Ltd)**		
14:10	An improved algorithm for crack tip location finding with thermoelastic stress analysis **Mr Lloyd BUTTON (Structural Integrity Research Group (SIRG) - School of Mechanical Engineering - The University of Adelaide)**	Electromagnetic actuators for flapping wing flight **Mr Blake MCIVOR (University of South Australia)**	Deep Learning Airframe Load Prediction: A Data-Driven System for Aircraft Structural Health Management **Dr Haytham FAYEK (RMIT University)**	**ACAM PLENARY** Insect-scale robots on stimuli-responsive hydroxides/oxides: multi-material design, synthesis and chemo-mechanics **Prof Alfonso H.W. NGAN (The University of Hong Kong)**	
14:30	Durability/economic life analysis of cold spray repairs to simulated corrosion damage **Mr Neil MATTHEWS (RUAG)**	Large-scale In-plane Movement estimation of floating covers using UAV photogrammetry **Mr Chiu WINGKONG (Monash University)**			
14:50	***Structures and Materials 6***	***Autonomous Systems/UAS 1***		**ACAM** ***Fatigue, fracture and failure analysis of structures 2 Chair: Andrei Kotousov, The University of Adelaide***	
14:50	In Situ Thermoelastic Stress Analysis for Enhanced Structural Performance Assessment **Dr Nik RAJIC (Department of Defence)**	Sensitivity of Chord, Span and Pitch to a Single Propeller's Performance in both Water and Air **Mr Zhe YANG (Aerospace engineering and Aviation, RMIT University)**		Predicting crack growth in fibre reinforced composites under fatigue loading conditions **Dr Mathew JOOSTEN (Deakin University)**	
15:10	Dynamic characteristics of bioinspired micro-corrugated aerofoils **Ms Nasim CHITSAZ (UNISA STEM, Australian Research Centre for Interactive and Virtual Environments, University of South Australia)**			Numerical modelling on cyclic behaviour of retrofitted steel transmission towers **Assoc/Prof Xing MA (University of South Australia)**	
15:30	Afternoon Tea (20 mins)				
	AIAC	**AIAC**		**ACAM**	**ACAM**
15:50	***Structures and Materials 7***	***New Technologies***		***Computational mechanics 3***	***Structural health monitoring and structural optimization 3***
	Chair: Ben Main DSTG	***Chair: Don Love, Enable Aerospace***		***Chair: Kaiming Bi, Curtin University Co-Chait: Liujie Chen, Guangzhou University***	***Chair: Jing Rao, University of New South Wales Co-Chair: James Hughes, The University of Adelaide***
15:50	Deriving Optimal Control from Data using Machine Learning for Force Load Control Systems **Miss Juliette SMITH (Defence Science and Technology Group, Melbourne)**	On the applicability of traditional stabilizer sizing methods to novel joined wing configurations **Mr Julius QUITTER (RMIT University / FH Aachen)**		The application of interface damage plasticity model in the simulation of masonry walls in mesoscale level **Mr Yu NIE (The University of Adelaide)**	Image deformation and fractal dimension analysis for automated monitoring of crack propagation **Mr Wei ZHANG (The University of Sydney)**
16:10	Design Development and Manufacture of a Full-Scale Helicopter Airframe Test RigDesign Development, Manufacture and Commissioning of a Full-Scale Helicopter Airframe Test Rig **Mr Geoff SWANTON (Defence Science and Technology Group)**	A Physical Load Metric Development for Assessment of Mixed Reality in Aircraft Maintenance Tasks **Dr Vlado KEKOC (Defence Science and Technology Group)**		Race conformity effect on the contact characteristics and wear of spherical roller bearings **Mr Abdul MANNAN (The University of Queensland)**	Study of shear connector damage influence on interface slippage in steel-concrete composite beams with a novel slippage measurement method **Mr Bing ZHANG (University of Technology Sydney)**
16:30	Strain Characterisation of Laser Repaired Titanium Using Fibre Optic Sensing **Mr Matthew STEVENS (DSTG)**	Digital technology in passenger door-to-door air travel **Miss Jiezhuoma LA (RMIT University)**		Computational simulation of mechanical stability and mechano-biology of distal radius fracture healing under volar locking plate **Mr Xuanchi LIU (The University Of Melbourne)**	Guided wave mixing and bispectrum analysis for monitoring of bolted joints Monitoring of Bolted Joints **Mr Juan PINEDA (The University of Adelaide)**
16:50	The state of the art in the durability and damage tolerance analysis of am parts and attritable aircraft **Prof Rhys JONES (Monash University)**	Launching Swinburne University's Aerostructures Innovation Research Hub, the AIR Hub **Adriano DI PIETRO (Swinburne)**		Integrity operating window review of a steam reformer inlet tee by level 3 Fitness-For-Service Assessment **Mr David OSUNA (Incitec Pivot Limited)**	Robust sensor networks for applications in structural health monitoring **Dr Samir MUSTAPHA (American University of Beirut)**
17:10				An application of framed space curve to higher-order geometrically-exact beam with a deforming cross-section **Dr Mayank CHADHA (University of California San Diego)**	Mathematical instability within curvature based damage detectionalgorithms **Mr Aaron BAKER (Flinders University)**
17:30				Numerical simulation of soil desiccation cracking process **Minh Khoa Tran (Monash University)**	Debonding damage detection and monitoring using nonlinear guided wave for reinforced concrete beam subjected to bending **Mr Ahmed ASEEM (The University of Adelaide)**
17:50	END				

Themes	
	Aeronautics (AIAC19)
	HUMS Conference
	Space Technology
	ACAM

AIAC19
AUSTRALIAN INTERNATIONAL AEROSPACE CONGRESS

ROYAL AERONAUTICAL SOCIETY

ENGINEERS AUSTRALIA

ACAM10
10TH AUSTRALASIAN CONGRESS ON APPLIED MECHANICS

19th Australian International Aerospace Congress (AIAC) (Incorporating HUMS and Space)
and 10th Australasian Congress on Applied Mechanics (ACAM)
(AEDT) Time in Sydney, Australia

Wednesday, 1 December 2021

8:50	Congress Welcome Day 3 (10 mins) Chair: Adam Groszek, AIAC Chair and A/Prof Alex Ching-Tai Ng ACAM Chair			
9:00	**ACAM PLENARY** Recent Developments in fracture mechanics and fatigue design **Professor Filippo BERTO** **(Norwegian University of Science and Technology)**			
	Chair: Andrei Kotousov, The University of Adelaide			
	AIAC	**ACAM**	**ACAM**	**ACAM**
	AIAC PLENARY 3	***Additive manufacturing and advanced manufacturing 1***	***Advanced materials and structures 3***	***Composites 2***
	Chair: Ben Main, DSTG	***Chair: Ling Yin, The University Of Adelaide***	***Chair: Youhong Tang, Flinders University***	***Chair: Xiaobo Yu, DSTG, NCAM Committee***
09:40	**AIAC PLENARY** Focusing Our National Science and Technology Enterprise: Creating Impact Through Defence Science **Dr Katerina AGOSTINO (DST Group)**	**ACAM KEYNOTE** Damage tolerance of high-performance alloys manufactured by laser powder bed fusion **Prof Jamie KRUZIC** **(UNSW Sydney)**	**ACAM KEYNOTE** Development of novel protective materials and systems for resilient buildings and infrastructure **Prof Tuan NGO** **(University of Melbourne)**	**ACAM KEYNOTE** Graphene origami enabled metamaterials **Prof Jie YANG** **(RMIT University)**
10:20	Morning Tea (20 mins)			
	AIAC	**AIAC**	**ACAM**	**ACAM**	**ACAM**
10:40	***Autonomous Systems/UAS 2***	***Operations, Airworthiness & Sustainment 3***	***Additive manufacturing and advanced manufacturing 2***	***Advanced materials and structures 4***	***Composites 3***
	Chair: Noel Schmidt, Defence	***Chair: Sonja Jenkinson, DASA***	***Chair: Ling Yin, The University Of Adelaide***	***Chair: Youhong Tang, Flinders University***	***Chair: Xiaobo Yu, DSTG, NCAM Committee***
10:40	Rapid non-destructive inspection of composite laminates using robotic line-scan thermography **Mr Jace DENNY** **(Department of Defence)**	A Proposed Framework and Review of Probabilistic Methodologies to Characterise UAS Operational Risks **Dr Reuben STRYDOM** **(Department of Defence)**	Real Time acoustic based burn through detection in gas metal arc welding **Mr Mitchell CULLEN** **(University of Technology Sydney)**	Effects of nanoparticles in DGEBA based shape memory polymers for biomedical applications **Mr Janitha JEEWANTHA** **(University of Southern Queensland - CFM)**	Digital image correlation with X-ray micro-Computed Tomography characterisation of woven fibre-reinforced composites **Mr John HOLMES** **(Australian National University)**
11:00	An Approach for Autonomous Landing of UAVs using a Deep Neural Network (DNN) and Visual Features **Dr Aakash DAWADEE** **(Defence Science and Technology Group (DSTG)**	Investigating the performance dependency on the weight of different cost functions for the 3DVFH+ **Mr Andreas THOMA** **(FH Aachen University of Applied Sciences)**	Topology optimisation design for additive manufacturing with a passageway for powder removal **A/Prof Wenyi YAN** **(Monash University)**	Dynamic response of TPMS-Primitive reinforced cement beam under impact loading **Mr Vuong NGUYEN** **(RMIT)**	Meso-scale damage modelling of hybrid braided composites using a homogenisation method **Professor Raj DAS FIEAust** **(Professor of Aerospace Structures RMIT & NCAM Chair)**
11:20	On Dependability in Human-Swarm Teaming-Toward Qualification of Smart Autonomous Systems **Mr Andrew BUCKLEY** **(School of Engineering and Information Technology, The University of New South Wales, Canberra)**	Holistic Risk Analysis of an Ageing Aircraft Wing **Mr Rafal RUTKOWSKI** **(QinetiQ)**	Conventional and ultrasonic diamond milling of pre-sintered zirconia **Co-presenters Assoc/Prof Ling YIN** **(The University of Adelaide)** **&** **Miss Afifah JURI** **(The University Of Adelaide)**	Wearable temperature sensors with enhanced sensitivity by engineering microcrack morphology **Ms Yuyan YU** **(UNSW)**	Promoting interfacial interactions between montmorillonite and cement **Ms Jeong-a OH** **(University of South Australia)**
11:40	Vision based traverse of a pipe by UAV **Dr Kent ROSSER** **(DST)**	Rapid production of aircraft interior replacement parts with additive manufacturing **Mr Akesh SENANAYAKE** **(RMIT University)**	Additive manufacturing of Diamond-Titanium composite as a multifunctional material for medical application using laser metal deposition **Ms Nour MANI** **(RMIT)**	Fatigue life of welded high strength steel t-joints **Dr Han FANG** **(The University of Adelaide)**	Characterisation of Pseudo-Ductile Hybrid 3D printed continuous fibre-reinforced composites **Miss Cheng HUANG** **(Deakin University)**
12:00	Aerial deployment of a small quadrotor **Mr Jonathan DANSIE** **(Defence Science and Technology Group)**		Effect of heat treatment on the residual stress in laser clad hypereutectoid rail components using neutron diffraction **Ms Olivia KENDALL** **(Monash University)**		
12:20	Lunch Break (40 mins)				
	AIAC	**AIAC**	**ACAM**	**ACAM**	**ACAM**
13:00	***Autonomous Systems/UAS & Industry***	***Additive Manufacturing Panel Session***	***Structural health monitoring and structural optimization 4***	***Structure-fluid interactions***	***Non-destructive evaluation and materials identification 2***
	Chair: Ken Anderson, DSTG	***Chair: Adam Groszek, QinetiQ***	***Chair: Anna Paradowska, ANSTO/USYD***	***Chair: Jonathan Tran, RMIT***	***Chair: Han Fang, The University of Adelaide***
13:00	Feasibility of Ultra-Long Endurance Aerial Vehicles **Mr Michael YOUNG** **(Defence Science and Technology Group)**		Vibration-based debonding assessment on tile panels using finite element numerical simulation **Miss Daiheng SHEN** **(Monash University)**	Computational fluid dynamic validation of a two-dimensional marine propeller blade **Mr Long Hin POON** **(Flinders University)**	Use of SLDV and FBG for the detection delamination in composite laminate beams: a Comparative Study **Dr Stuart WILDY** **(Flinders University)**
13:20	Monitoring patterns for UAS Bistatic LIDAR-based CO2 Concentration Monitoring in Precision Agriculture **Mr Maidul ISLAM (RMIT University)**	**Additive Manufacturing Panel Session** **13:00 - 14:40**	Novel osseointegration implant optimization **Mr Shouxun LU** **(Monash University)**	The mechanical contributions and effects of underwater explosion loading on structural responses **Dr Steven DE CANDIA** **(Defence Science And Technology Group)**	Ultrasonic imaging with point cloud-based elastic reverse time migration **Dr Jing RAO** **(University of New South Wales)**
13:40	Aviation Transport Infrastructure Discussion Paper **A/Prof Chrystal ZHANG** **(RMIT University)**	Neil MATTHEWS **(RUAG)** Xiaobo YU **(DSTG)** Samuel NOONE **(DASA)** Doug SLATER **(DASA)** Kevin WALKER **(QinetiQ)** Milan BRANDT **(RMIT)** Suresh PALANISAMY **(Swinburne)** Ravinder SINGH **(DASA)**	Application of MobilenetV3-Large model improved by transfer learning and CBAM in crack recognition and classification **Dr Liujiu CHEN** **(Guangzhou University)**	Analytical Investigation on the performance of a morphing forward-folding blades wind turbine by using qblade **Mr Yung Jeh CHU** **(City University Of Hong Kong)**	The use of phase-reversal approach for extraction of second order harmonics of mixing waves **Mr Hankai ZHU** **(The University of Adelaide)**
14:00	Digital transformation in air travel at pre-flight stage **Dr Iryna HEIETS** **(RMIT University)**		Analysis and design approaches for a frequency-agile piezoelectric energy harvester **Mr Jess FLICKER** **(Defence Science and Technology Group)**	Aerodynamic damping estimation for a horizontal axiswind turbine (HAWT) with the consideration of blade flexibility and mountain slope **Mr Yisu CHEN** **(UNSW)**	Experimental investigations on second harmonics generated by leaky guided waves in immersed plates **Mr Xianwen HU** **(The University of Adelaide)**
14:20	Towards Australia's First Certified Remotely Piloted Aircraft System **Mr Austin KONG** **(Capability Acquisition and Sustainment Group - Department of Defence)**		Experimental study of the reflection characteristic of the fundamental anti-symmetric lamb wave from internal defects in structural timber members **Jinhang WU** **(The University of Adelaide)**	Vortex-Induced vibration of a textured rigid pipe at subcritical reynolds numbers **A/Prof Kaiming BI** **(Curtin University)**	
14:40	Afternoon Tea (20 mins)				

15:00	Day 3 continued				
	AIAC	**AIAC**	**ACAM**	**ACAM**	**ACAM**
15:00	***Aerodynamics***	***Autonomous Systems/UAS 3***	***Fatigue, fracture and failure analysis of structures 3***	***Mechanics of geomaterials and concrete 3 and Biomechanics, bio/sustainable composites 2***	***Additive manufacturing and advanced manufacturing 3 / Structural health monitoring and structural optimization 4***
	Chair: Murray Scott, ACS-A	***Chair: Daniel Myers, DASA***	***Chair: Chris Wallbrink, DSTG***	***Chair: Andrew Chan, NCAM Committee***	***Chair: Ling Yin, The University Of Adelaide***
15:00	The Role of Posture in Dragonfly-like Air Vehicles in Turning Flight **Ms Titilayo OGUNWA** **(University of South Australia)**	Buffet Load Prediction via Frequency Response Functions **Mr Stephan KOSCHEL** **(RMIT)**	Numerical analysis of rolling contact fatigue crack growth on curved railway tracks **Mr Yiping WU** **(Monash University)**	Fluid-Elastic versus computational fluid dynamics techniques in the biomechanical analysis of coronary arteries **Miss Sophie HEATH** **(The University of Adelaide)**	Influence of shot peening and ball burnishing on surface integrity and corrosion resistance of AZ31B Mg alloys **Mr Vincent SANTOS** **(Unisa - Stem)**
15:20	Modal Investigation of Transonic Shock Buffet using Proper Orthogonal Decomposition with Galerkin Projection **Mr Arpan DAS** **(RMIT University)**	Ice Crystal Icing Wind Tunnel: Characterisation and Experimental Results **Dr Khalid SALEH** **(School of Mechanical and Electrical Engineering, University of Southern Queensland)**	Warping/Flexural torsion: A consistent explanation **Prof Douglas CLYDE** **(Retired UWA)**	Effect of different proximal neck and iliac bifurcation angles on the biomechanics of saccular AAA **Miss Xiaochen WANG** **(The University of Adelaide)**	Bioinspired 3D printing – unravel the secret behind porcupine quill structure **Miss Yun LU TEE** **(RMIT University)**
15:40	Investigating on flow characteristics of different fabrication methods of mimicking 3D corrugated dragonfly wing through PIV method **Ms Nasim CHITSAZ** **(UNISA STEM, University of South Australia)**	Development of autonomous systems for drone racing **Mr Muddasir TAHIR** **(The University of Sydney)**	Fatigue analysis of metallic-plastic-metallic pipeline systems: a numerical case study **Mr Ji-sung LEE** **(Deakin University)**	Development of soft sensor pad for pressure measurement within regions of limb socket interface of a lower limb prosthesis **Co-presenters Mr Swapno ADITYA** **(University of Wollongong)** **& Mr Matthew SCHNEBLI**	Triply periodic minimal surfaces (TPMS) based lattice structure to reduce stress shielding effect **Mr Chenxi PENG** **(RMIT University)**
16:00	Modal Analysis of Corrupt Transonic Shock Buffet Data using Robust Dynamic Mode Decomposition **Mr Arpan DAS** **(RMIT University)**		Fatigue properties and design of structures fabricated with WAAM process **Mr Andrew SALES** **(University of Adelaide)**	A laboratory model to evaluate the prospective of multi-material bone plate for transverse fracture fixation of long bones **MR K M Anamul HOSSAIN** **(University of Technology Sydney)**	The correlation between frequency changes and residual strength after low-velocity impact for composite beams **Miss Zhifang CHANG** **(Guangzhou University)**
16:20	**AIAC Closing and Awards Ceremony 16:20 - 17:00** **Chair: Adam GROSZEK, QinetiQ** **Harnessing Australian ingenuity for global capability** **Major Congress Sponsor** **Greg BARSBY** **Managing Director (QinetiQ Australia)**		Development of laser peening device to prolong fatigue life of metallic infrastructure **Prof Yuji SANO** **(Institute For Molecular Science)**		
16:40			**ACAM Closing and Awards Ceremony 16:40 - 16:50** **Chairs: A/Prof Alex Ching-Tai NG, Prof Raj DAS, Prof Anna PARADOWSKA**		
	END				

Themes
Aeronautics (AIAC19)
HUMS Conference
Space Technology
ACAM