

BSSM 14th International Conference on Advances in Experimental Mechanics

Riddell Hall, Queens University Belfast

Draft Programme

08:30	Tuesday 10 th September 2019 Registration – Tea & Coffee – Lower Glass Corridor	
09:30	Introduction & Welcome Conference Room 2 Conference Chair: Adrian Murphy, Queens University Belfast	
	Conference Room 2	Conference Room 1
	Session 1.1a Chair: Leslie Lamberson	Session 1.1b Chair : Mahmoud Mostafavi
	High Strain Rate	Fatigue and fracture mechanics (Part 1)
09:40	Advancing the image-based inertial impact test for high strain rate interlaminar properties using synchronised ultra-high-speed cameras <u>J. Van Blitterswyk</u> , L. Fletcher, F. Pierron University of Southampton, UK	Crack Growth Mechanisms and Identification of Traction-Separation Relations in Antisymmetric CFRP Laminates <u>C. Blondeau</u> , G. Pappas, J. Botsis Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland
10:00	A new tensile test sample geometry for oscillation-free determination of material properties at high strain rate <u>X. Fang</u> , R. Grams University of Siegen, Germany	Residual stress, fatigue, and preferential orientation in shot peened aluminium <u>D. Asquith</u> Sheffield Hallam University
10:20	The off-axis IBII test for simultaneous characterisation of the transverse and shear moduli of composites at high strain rates <u>S. Parry</u> , L. Fletcher, F. Pierron University of Southampton, UK	Evaluation of lock-in signal data processing procedures for Thermoelastic Stress Analysis <u>G. Pitarresi</u> University of Palermo, Italy
10:40	Simultaneous identification of the transverse and shear moduli of a UD composite at high strain rates with the IBUS test <u>X. Régál</u> , F. Pierron University of Southampton, UK	An Experimental and Theoretical Study of Longitudinal Bulk Strain Waves Generated by Fracture <u>C.G. Hooper</u> , P.D. Ruiz, K.R. Khusnutdinova, J.M. Huntley Loughborough University, UK

11:00	Refreshments – Lower Glass Corridor	
	Conference Room 2	Conference Room 1
	Session 1.2a Chair: Johan Hoefnagels	Session 1.2b Chair: David Jesson
	In-situ and micro-mechanical testing	Fatigue and fracture mechanics (Part 2)
11:25	Martensite crystallography and chemistry in dual phase and fully martensitic steels <u>J.P.M. Hoefnagels</u> ¹ , C. Du ² , M.G.D. Geers ¹ , and T.Vermeij ¹ ¹ Eindhoven University of Technology, the Netherlands ² Max-Planck-Institut für Eisenforschung (MPIE), Germany	Transverse cracking in thin-ply composites: experimental observation techniques <u>S. Kohler</u> , J. Cugnoni, J. Botsis Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland
11:45	Micromechanical Tester for Micro-scale characterization <u>W. Fern</u> Newcastle University, UK	Finite Element Study of Effect of Constraint on Fracture in a Ductile Material <u>S. Tonge</u> ¹ , C. Simpson ¹ , J. Marrow ² ¹ University of Bristol, UK ² University of Oxford, UK
12:05	Microstructure of Ni-P and its mechanical characterization by micro-compression testing <u>C. Du</u> ¹ , K. Matoy ² , J. Zechner ³ , M. Reisinger ³ , W.Robl ⁴ , R. Hartl ⁴ , C. Kirchlechner ¹ , G.Dehm ¹ ¹ Max-Planck-Institut für Eisenforschung GmbH, Germany ² Infineon Technologies Austria AG, Austria ³ Kompetenzzentrum Automobil- und Industrieelektronik GmbH, Austria ⁴ Infineon Technologies AG, Germany	Fatigue Assessment of Tubular Specimens with Dents G.L.G. Gonzáles, V.E.L. Paiva, <u>J.L.F. Freire</u> Pontifical Catholic, University of Rio de Janeiro, Brazil
12:25	In-situ micro-mechanical investigation of cut-edge failure: microstructure-driven crack toughening in laser-cut affected zones <u>J.P.M. Hoefnagels</u> ¹ , C. Du ² , C.C. Tasan ³ ¹ Eindhoven University of Technology (TU/e), the Netherlands ² Max-Planck-Institut für Eisenforschung (MPIE), Germany ³ Massachusetts Institute of Technology (MIT), U.S.A	Experimental Characterisation of Fatigue in Next-Generation Welded Steel Catenary Risers <u>R.J. Devaney</u> , P.E. O'Donoghue, S.B. Leen NUI Galway, Ireland
12:45	Lunch – Isdell Courtyard	

	Conference Room 2	
13:45	Plenary Session – Conference Room 2 Ground Vibration Testing at NASA Armstrong, Emphasising on Passive Aeroelastic Tailored Wing Ground Vibration Test using Fixed Base Correction Method <i>Natalie Spivey, NASA-Armstrong Flight Research Center</i>	Chair: Adrian Murphy
	Conference Room 2	Conference Room 1
	Session 1.3a Chair: TBC	Session 1.3b Chair: Gary Menary
	Residual stress	Large deformations in polymers and composites
14:45	Residual Stress Prediction of an Electron Beam Welded P91 Ferritic–Martensitic Steel Plate using the Contour Method <u>N. Naveed</u> ^{1,2} ¹ University of Sunderland, UK ² The Open University, UK	Assessment of stretch ability of polymers above Tg: a comparison between poly(ethylene furandicarboxylate) (PEF) and poly(ethylene terephthalate) (PET) <u>E.Forestier</u> ^{1,2} , C.Combeaud ¹ , N.Guigo ² , G. Corvec ¹ , C. Pradille ³ , N. Sbirrazzuoli ² , N.Billon ¹ ¹ Mines Paristech, PSL -Research University France ² Université Nice Sophia Antipolis, France ³ Mat Xper, France
15:05	Stress and quality control of anisotropic crystals by means of optical methods <u>D. Rinaldi</u> , F. Davi, L. Montalto Università Politecnica delle Marche, Italy	On the Usefulness of Time Temperature Superposition Principle for Characterising Non-Linear Mechanical Behaviour of Polymers and Composites <u>N. Billon</u> , J-L. Bouvard, C. Combeaud Mines Paristech, PSL -Research University, France
15:25	Influence of physical constraint combined with uphill quenching on residual stresses in 7000 series aluminium alloys <u>L. Sutherland</u> ¹ , J.S. Robinson ¹ , D.A Tanner ¹ , A. O’Donovan ² ¹ University of Limerick, Ireland ² Limerick Institute of Technology, Ireland	Complete In-Process Stress Strain Measurement of the Free-Stretch-Blow Process for Polymer Containers <u>J. Nixon</u> , S. Yan, G.H. Menary Queen’s University Belfast, UK
15:45	Refreshments - Lower Glass Corridor	

	Session 1.4a Chair: Shelley Rawson	Session 1.4b Chair: Adrian Murphy & Su Taylor
	Thermographic techniques & Synchrotron X-ray techniques	Structural Health Monitoring
16:10	High-Speed Infrared investigations of local heating in a Graphite-Fiber-PDMS Composite material Under dynamic loading <u>S. Boubanga-Tombet</u> ¹ , S. Ravindran ² , A. Kidane ² , P. Lagueux ¹ , F. Marcotte ¹ ¹ Telops, Canada ² University of South Carolina, USA	The Development of a Practical Wireless Sensor Based Aircraft Structural Health Monitoring System <u>R. Pullin</u> , S. Grigg, C. A. Featherston Cardiff University, UK
16:30	Revisiting the behaviour of elastomers with energy balances: energy stored, intrinsic dissipation, the physical meaning of the hysteresis loop... <u>J.-B. Le Cam</u> ^{1,2} ¹ Université de Rennes 1, France ² LC-DRIME, France	Real-time location and quantification of damage in composite materials <u>W.J.R. Christian</u> ¹ , K. Dvurecenska ¹ , K. Amjad ¹ , C. Przybyla ² , E.A. Patterson ¹ ¹ University of Liverpool, UK ² Air Force Research Laboratory, Dayton OH, USA
16:50	Time-Resolved Synchrotron X-ray Techniques for Experimental Mechanics <u>T. Connolley</u> , R. C. Atwood, B. Humphreys, O. V. Magdysyuk, S. Michalik, C. Reinhard Diamond Light Source Ltd., UK	Non-destructive evaluation of isotropic plate structures by means of mode filtering in the frequency-wavenumber domain <u>F. Purcell</u> , M. Pearson, M. Eaton, R. Pullin Cardiff University, UK
17:10	In-situ 3D tomography of wood compression J. Koivisto, <u>T. Mäkinen</u> , M.J. Alava Aalto University, Finland	Investigation of Surface Strain Fields of Thermoplastic Composites Using Fibre Optic Sensors <u>N. Perogamvros</u> ¹ , P. Motwani ² , A. Murphy ¹ , S. Taylor ¹ ¹ Queens University Belfast, UK, ² Indian Institute of Technology Bombay, India
17:40	Coaches to Belfast City Hall	
18:00	Welcome Reception – Belfast City Hall	
19:30	Finish	

08:30	Wednesday 11th September 2019 Arrival Tea & Coffee	
	Conference Room 2	Conference Room 1
	Session 2.1a Chair: <u>Damian Quinn</u> & Adrian Murphy	Session 2.1b Chair: Salih Gungor
	Novel techniques for characterisation and testing (Part 1)	Digital Image Correlation
09:00	Single-shot hyperspectral interferometry: From astronomy instrumentation to surface profilometry and depth-resolved deformation measurements <u>P. D. Ruiz</u> , J. M. Huntley, T. Reichold Loughborough University, UK	An Integrated Methodology Evaluating the Integrity of Composite to Steel Joints for Maritime Applications <u>G. Ólafsson</u> ¹ , R. C. Tighe ² , J.M. Dulieu-Barton ¹ ¹ University of Southampton, UK ² University of Waikato, New Zealand
09:20	Inverse identification of through-thickness shear anisotropic behaviour of sheet metals at large strains <u>A. Lattanzi</u> ¹ , M. Rossi ¹ , A. Baldi ² , M. Sasso ¹ ¹ Università Politecnica delle Marche, Italy ² Università di Cagliari, Italy	Assessment of the effect of hole/specimen ratio when using DIC K. Ghods, S.J.C. Matthews, N.J. Saiger, C. Foreman, <u>D.A. Jesson</u> University of Surrey, UK
09:40	Evaluating the fidelity of force measurement for characterising acoustoplasticity <u>C.F. Souza</u> , M. Lucas University of Glasgow, UK	Creep Deformation Mechanisms of AZ31 Magnesium Alloys at Room Temperature by High Resolution Digital Image Correlation <u>B. Yavuzyeğit</u> ¹ , E. Avcu ^{1,2} , J. Donoghue ¹ , A. D. Smith ^{1,3} , D. Lunt ¹ , J. D. Robson ¹ , T. L. Burnett ¹ , P. J. Withers ¹ ¹ The University of Manchester, UK ² Kocaeli University, Turkey ³ Tescan UK Ltd., UK
10:00	Characterisation of elastic-plastic tensile properties for grey cast irons <u>W. Khor</u> , D. Jesson University of Surrey, UK	In-situ DIC analysis in crush tests of lithium-ion battery cells <u>M. Sasso</u> ¹ , G. Newaz ² , A. Lattanzi ¹ , L. Arava ² ¹ Università Politecnica delle Marche, Italy ² Wayne State University, USA
10:20	Plenary Session – Conference Room 2 BSSM Best Paper in ‘Strain’ Fylde Prize for 2018 “Impact of motion blur on stereo-digital image correlation with the focus on a drone-carried stereo rig R. Balcaen, A. Lavatelli, C. Jiménez-Peña, H. Pfeiffer, E. Zappa, D. Debruyne (https://doi.org/10.1111/str.12300)” <i>Presented by <u>Daan Peleman</u>, KU Leuven</i>	
	Chair: Johan Hoefnagels	

10:50	Exhibitor Introductions – Conference Room 2	Chair: TBC
11:10	Refreshments and Exhibition – Isdell Courtyard	
	Conference Room 2	Conference Room 1
	Session 2.2a Chair: Eann Patterson & Erwin Hack	Session 2.2b Chair: Hari Arora
	Supporting Simulations with Strain Measurement (CEN WS71) Part 1	Volumetric imaging techniques for structural characterisation Part 1
11:40	Round robin results for CWA16799:2014 – Validation of computational solid mechanics models G. Lampeas ¹ , E.A. Patterson ² , E. Hack ³ , ¹ Industrial Systems Institute, Athena Research and Innovation Centre, Greece ² University of Liverpool, UK ³ Swiss Federal Laboratories for Materials Science and Technology, Switzerland	X-ray Tomography Evaluations of Failure in Additive Manufactured Biomimetic Structures M. Curto ¹ , A. P. Kao ¹ , M. Pani ¹ , A. Bucchi ¹ , G. Tozzi ¹ , A.H. Barber ² ¹ University of Portsmouth, UK ² London South Bank University, UK
12:00	Generalised decomposition of strain fields in complex components A. Dean, <u>W.J.R. Christian</u> University of Liverpool, UK	Digital volume correlation of freeze cast aerogel during in situ compression using phase contrast synchrotron X-ray micro-CT <u>S.D. Rawson</u> , V. Bayram, P. Yang, S. A. McDonald, Y. Guo, J. Xu, T. L. Burnett, S. Barg, P.J. Withers University of Manchester, UK
12:20	Incorporating historical data in a validation process <u>E. Hack</u> ¹ , K. Dvurecenska ² , G. Lampeas ³ , E.A. Patterson ² , T. Siebert ⁴ , E.Szigeti ⁵ ¹ Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland ² University of Liverpool, UK ³ Industrial Systems Institute, Athena Research and Innovation Center, Greece ⁴ Dantec Dynamics GmbH, Germany ⁵ Airbus Operations Ltd., UK	Fit achieved through contoured engineering to improve tolerance (FACE-IT) <u>P.Dorrington</u> , M.Davies Swansea University, UK
12:40	Probabilistic metric for validation based on strain field data <u>K. Dvurecenska</u> , E. Patelli, E.A. Patterson University of Liverpool, UK	TBC (Fotheringham)

13:00	Lunch and Exhibition – Isdell Courtyard	
	Conference Room 2	Conference Room 1
	Session 2.3a Chair: Eann Patterson & Erwin Hack	Session 2.3b Chair: Daniel Mulvihill
	Supporting Simulations with Strain Measurement (CEN WS71) Part 2	Advanced material characterisation
14:00	Evaluating measurement uncertainty in industrial environments <u>Th. Siebert</u> , K. Splitthof Dantec Dynamics GmbH, Germany	Understanding Kink Formation of Layered Crystalline Solids with a Focus on Titanium-based MAX Phases <u>L. Lamberson</u> , X. Zhao, H. Badr, M. Barsoum Drexel University, USA
14:20	Supporting simulations with strain measurement – Panel Discussion <u>E.A. Patterson</u> ¹ , <u>E. Hack</u> ² , <u>Thorsten Siebert</u> ³ , <u>Eszter Szigeti</u> ⁴ ¹ University of Liverpool, UK ² Empa, Swiss Federal Laboratories for Materials Science and Technology, Switzerland ³ Dantec Dynamics GmbH, Germany ⁴ Airbus Operations Ltd., UK	Adiabatic Shear Localization in Ultrafine-grained Metals <u>Y Guo</u> , Q. Ruan, Y. Li Northwestern Polytechnical University, China
14:40	BSSM Young Stress Analyst Competition – Conference Room 2	Chair: Hari Arora
	<ol style="list-style-type: none"> <u>Timothy Harrell</u>, University of Southampton Structural Response of CFRP Materials Subjected to Simulated Lightning Strikes <u>T.M. Harrell</u>, O.T. Thomsen, J.M. Dulieu-Barton. University of Southampton, UK <u>Saman Tavana</u>, Imperial Collage London Digital Volume Correlation based on MRI: A novel methodology enabling measurements of the internal deformation and strain in human intervertebral discs during loading S. Tavana, J.N.Clark, N. Baxan, N. Newell, U. Hansen. Imperial College London, UK <u>Scott Matthews</u>, University of Surrey Using printable speckle patterns for DIC: addressing potential and challenges <u>S. J. C. Matthews</u>, D. A. Jesson, M. J. Oldfield, P. A. Smith. University of Surrey, UK <u>Akash Trivedi</u>, University of Oxford 	

	<p>A novel modelling framework to predict the high rate response of soft materials: Application to (plasticised) poly(vinyl chloride) A.R. Trivedi, C.R. Siviour. University of Oxford, UK</p>
15:50	Refreshments and Exhibition – Isdell Courtyard
16:20	<p>Plenary Session – Conference Room 2 Chair: Salih Gungor BSSM Measurement Lecture 2019 Challenges and opportunities in high rate characterisation of soft materials <i>Clive Siviour, University of Oxford</i></p>
17:20	BSSM AGM – Conference Room 1
19:00	Chairman’s Gala Reception and Awards Ceremony – Great Hall, Queens University Belfast

	Thursday 12th September 2019	
08:30	Arrival Tea & Coffee	
	Conference Room 2	Conference Room 1
	Session 3.1a Chair: Krishna Manda, Nicholas Dunne, Fraser Buchanan, Alex Lennon	Session 3.1b Chair: Damian Quinn
	Experimental Biomechanics	Component and joints testing (Part 1)
09:00	Mechanical Behaviour of Additively Manufactured Gradient Scaffold Materials M. Stagno Navarra, C. Faurat-Narkisian, M. Browne, <u>A.R. Hamilton</u> University of Southampton, UK	Mode Jumping in Post buckling Analysis of Curved Stiffened Panels <u>M.S. Al-Saymaree</u> ^{1,2} , C.A. Featherston ¹ , D. Kennedy ¹ ¹ Cardiff University, UK ² Basrah University, Iraq
09:20	Development of displacement-controlled multiaxial stretching device for characterising mechanical properties of female pelvic floor tissue <u>K. Harte</u> , G. Menary, A.B. Lennon Queen's University Belfast, UK	Fracture behaviour of welded joints <u>M. Mostafavi</u> , M. Mokhtari, C Simpson, Z Davey, M Gleeson University of Bristol, UK
09:40	Measurement of cortical bone stiffness using an image-based ultrasonic test <u>A. Marek</u> , X. Régal, L. Fletcher, F. Pierron University of Southampton, UK	Experimental analysis of Linear Friction Welded components under complex loading <u>D. Quinn</u> ¹ , A. Murphy ¹ , G. Moore ² ¹ Queen's University Belfast, UK ² Bombardier Aerostructures & Engineering Services, UK
10:00	Comparison of Different Implant Placement Schemes for Personalized Restoration of an Edentulous Jaw <u>I.N. Dashevskiya</u> , D.A. Gribov Ishlinsky Institute for Problems in Mechanics RAS, Russia	
10:20	Refreshments – Lower Glass Corridor	
10:50	Plenary Session – Conference Room 2 Strain rate dependency of materials: characterisation and identification of models parameters. From standard procedure to advanced inverse methods based on full field measurements <i>Bertrand Langrand, (Thomas Fourest and Julien Berthe) ONERA The French Aerospace Lab</i>	Chair: Adrian Murphy

	Conference Room 2	Conference Room 1
	Session 3.2a Chair : James Nixon	Session 3.2b Chair: Daniel Mulvihill
	Component and joints testing (Part 2)	Friction and wear
11:50	Feasibility of Resonances Avoidance by a Shape Memory Actuated Morphing Thin-shell Cylinder <u>Z. Yang</u> The University of Sheffield, UK	Measurement and Analysis of Tool Wear When Drilling CFRP <u>J. McClelland</u> , A. Murphy, Y. Jin Queen's University Belfast, UK
12:10	Measurement of helicopter rotor blade vibration modes using fibre optic sensing techniques T. Kissinger ¹ , S. Weber ^{1,2} , E. Chehura ¹ , J. Barrington ¹ , S. Staines ¹ , <u>S. James</u> ¹ , M. Lone ¹ , R. Tatam ¹ ¹ Cranfield University, UK ² Airbus Helicopters UK	Interdependence of friction, wear and noise: A review <u>K. Lontin</u> , M. Khan Cranfield University
12:30	Lunch – Isdell Courtyard	
	Conference Room 2	Conference Room 1
	Session 3.3a Chair: Nikos Perogamvros	Session 3.3b Chair : <u>Damian Quinn</u> & Adrian Murphy
	Dynamic testing	Novel techniques for characterisation and testing (Part 2)
13:30	Experiment and measurement methods for dynamic structural change process of rocket in a blast simulator <u>Y. Wu</u> , B. Gao, Yanrui Zhang, Ning Li Beijing Institute of Astronautical Systems Engineering, China	Small punch creep testing of power generation materials C.Ó Murchú, S.B. Leen, P.E. O'Donoghue, R.A Barrett NUI Galway, Ireland
13:50	RNN Based Online Automobile Deformation Measurement for Active Safety <u>C. Chen</u> ¹ , M. Song ¹ , T. Furukawa ¹ , A. Nakata ² , S. Shibata ² ¹ Virginia Polytechnic Institute and State University, USA ² Honda R&D Co., Ltd	Method to account for edge and surface roughness effects in nanoindentation measurements of viscoelastic solids with a sharp tip <u>N. Fujisawa</u> , M. Łukomski The Getty Conservation Institute, USA

14:10	A dynamic three-point bending test method at high temperatures <u>S. Tao</u> Northwestern Polytechnical University, China	Visualization the Change of Face after the Facial Massage by Using Ultraviolet Stereo Image Correlation <u>Y.L. Zhang</u> ¹ , F. Sunamura ² , S. Bamba ² , S. Arikawa ² , S. Yoneyama ² , K. Motonami ³ , T. Matsushima ³ , T. Mumata ³ ¹ Sophia University, Japan ² Aoyama Gakuin University, Japan ³ C'BON Cosmetics Co.,Ltd., Japan
14:30		Study on the Mechanism of Fluid Percussion Injuries on Immune Cells D. Xu, N. Zhang, <u>H. Yang</u> Northwestern Polytechnical University, China
14:50	Closing Plenary Session – Conference Room 2 Conference Chair: Adrian Murphy 2020 Conference Chair: TBC	
15:00	Refreshments – Conference Close, Lower Glass Corridor	