

BSSM 14th International Conference on Advances in Experimental Mechanics

Riddell Hall, Queens University Belfast

Draft Programme

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| 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 |

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| 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 | |

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| | Conference Room 2 | |
| 13:45 | Plenary Session – Conference Room 2 Chair: Adrian Murphy 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> | |
| | 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. Davì, 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 |
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| | 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 | |

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| 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 | |

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| 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, W.J.R. Christian University of Liverpool, UK | | Digital volume correlation of freeze cast aerogel during in situ compression using phase contrast synchrotron X-ray micro-CT S.D. Rawson, 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 E. Hack 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) P.Dorrington, M.Davies Swansea University, UK |
| 12:40 | Probabilistic metric for validation based on strain field data K. Dvurecenska, E. Patelli, E.A. Patterson University of Liverpool, UK | | TBC (Fotheringham) |

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| 15:50 | Refreshments and Exhibition – Isdell Courtyard | |
| 16:20 | Plenary Session – Conference Room 2 BSSM Measurement Lecture 2019 Challenges and opportunities in high rate characterisation of soft materials <i>Clive Siviour, University of Oxford</i> | Chair: Salih Gungor |
| 17:20 | BSSM AGM – Conference Room 1 | |
| 19:00 | Chairman’s Gala Reception and Awards Ceremony – Great Hall, Queens University Belfast | |

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| | 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 |

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| 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 | |