

# Annual 2018 Technical Program

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Monday, June 04, 2018

Dynamic Behavior of Materials

## 001. Synchrotron Applications/Advanced Dynamic Imaging

**Organizer(s)** C. Meredith, Army Research Lab; J. Jordan, Los Alamos National Laboratory

**Chair Person** C. Meredith, Army Research Lab

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10:30 A **#184 Keynote: Examining Material Response using X-ray Phase Contrast Imaging (40-min)**

*B Jensen, Los Alamos National Laboratory; A. Iverson, National Security Technologies; C. Carlson, National Security Technologies; D. Montgomery, Los Alamos National Laboratory; B. Clements, Los Alamos National Laboratory; A. Mandal, Los Alamos National Laboratory; M. Short, Los Alamos National Laboratory; D. Fredenburg, Los Alamos National Laboratory*

11:10 A **#504 Jetting Transition Behavior in Additively Manufactured Lattice Structures**

*J Lind, Lawrence Livermore National Laboratory; A. Robinson, Lawrence Livermore National Laboratory; B. Jensen, Los Alamos National Laboratory; M. Kumar, Lawrence Livermore National Laboratory*

11:30 A **#676 In Situ X-ray Phase Contrast Imaging of the Dynamic Failure of Boron Carbide**

*A Leong, Johns Hopkins University; E. Asare, Johns Hopkins University; R. Rex, Johns Hopkins University; N. Sinclair, Argonne National Laboratory; K. Fezzaa, Argonne National Laboratory; T. Sun, Argonne National Laboratory; X. Xiao, Argonne National Laboratory; B. Schuster, Army Research Laboratory; D. Casem, Johns Hopkins University; P. Lambert, Johns Hopkins University; V. Kannan, Johns Hopkins University; Y. Sun, Johns Hopkins University; H. Sheng, Johns Hopkins University; K. Ramesh, Johns Hopkins University; T. Hufnagel, Johns Hopkins University*

11:50 A **#556 Shock Compaction of Powders Examined by X-ray Phase Contrast Imaging**

*A Mandal, Los Alamos National Laboratory, Los Alamos, NM 87545, USA; M. Hudspeth, Sandia National Laboratories, Albuquerque, NM 87185, USA; B. Jensen, Los Alamos National Laboratory, Los Alamos, NM 87545, USA; D. Fredenburg, Los Alamos National Laboratory, Los Alamos, NM 87545, USA; T. Aslam, Los Alamos National Laboratory, Los Alamos, NM 87545, USA; S. Root, Sandia National Laboratories, Albuquerque, NM 87185, USA*

12:10 P **#612 Mechanical Behavior and Deformation Mechanisms of Mg in Shear Using In-Situ Synchrotron Radiation X-Ray Diffraction**

*C Meredith, Army Research Lab; J. Lloyd, Army Research Lab; Z. Herl, University of North Texas; M. Young, University of North Texas*

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Monday, June 04, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

## 003. Recycled Constituent Composites I

**Organizer(s)** I. Miskoiglu, Michigan technological University; E. Bayraktar, SUPMECA-Paris

**Chair Person** I. Miskoiglu, Michigan technological University; E. Bayraktar, SUPMECA-Paris

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10:30 A **#112 Devulcanized Recycled Rubber-Graphene-Epoxy Composite Design for "Aircraft Wing Spar" to Withstand Bending Moment**

*G Zambelis, 1Airbus-Helicopter/PARIS; B. Irez, Supmecca/PARIS; E. Bayraktar, Supmecca/PARIS; I. Miskoiglu, Michigan Technical University*

- 10:50 A **#171 Design of Recycled Rubber Modified Epoxy Composites Reinforced with Titanium Dioxide (TiO<sub>2</sub>) for Tribological Applications**  
*A Irez, Ecole CentraleSupélec, University Paris - Saclay, France; E. Bayraktar, Supmeca-Paris, School of Mechanical and Manufacturing Engineering, France; I. Miskioglu, Michigan Technological University ME-EM Department, Houghton, MI-USA*
- 11:10 A **#549 The Influence of Crumb Rubber Reinforcement on the Mechanical Properties of Medium Density Fiber-board**  
*L K. Babu, Oklahoma State University; K. Mishra, Oklahoma State University; R. Singh, Oklahoma State University*
- 11:30 A **#333 Damping Effect of the Reinforcements on the Epoxy Modified Recycled Rubber Based Composites**  
*G Zambelis, Airbus-Helicopter, Composite Design Department, Le Bourget - Paris, France; A. Irez, Supmeca / Paris, School of Mechanical and Manufacturing Engineering FRANCE; E. Bayraktar, Supmeca / Paris, School of Mechanical and Manufacturing Engineering FRANCE; I. Miskioglu, Michigan Technological University ME-EM Department, Houghton, MI-USA*
- 11:50 A **#587 Toughening Effect of Alumina Fibers on the Recycled Rubber Modified Epoxy Based Composites**  
*A Irez, Ecole CentraleSupélec, University Paris - Saclay, France; E. Bayraktar, Supmeca-Paris, School of Mechanical and Manufacturing Engineering, France; I. Miskioglu, Michigan Technological University ME-EM Department, Houghton, MI-USA*
- 12:10 P **#529 A New Composite Design with Recycled Duplex Stainless Steel/7075 Aluminum Reinforced With Vanadium Carbide and Copper**  
*F Gatamorta, University of Campinas, FEM/Campinas - São Paulo, Brazil.; E. Bayraktar, Supmeca-Paris, School of Mechanical and Manufacturing Engineering, France; C. Mendonça, Universidade Federal de Itajubá. Av. BPS, 1303, Bairro Pinheirinho. Itajubá- Minas Gerais, Brasil.; M. SILVA, Universidade Federal de Itajubá. Av. BPS, 1303, Bairro Pinheirinho. Itajubá- Minas Gerais, Brasil.; M. Melo, Universidade Federal de Itajubá. Av. BPS, 1303, Bairro Pinheirinho. Itajubá- Minas Gerais, Brasil.; G. Silva, Universidade Federal de Itajubá. Av. BPS, 1303, Bairro Pinheirinho. Itajubá- Minas Gerais, Brasil*

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Monday, June 04, 2018

Mechanics of Additive and Advanced Manufacturing

## 004. Fatigue & Fracture in AM Materials

### Organizer(s)

**Chair Person** J. Jordan, Los Alamos National Laboratory; O. Scott-Emuakpor, Air Force Research Laboratory

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- 10:30 A **#440 Quantitative Relationship Between Anisotropic Fracture in Additively Manufactured Ti-6Al-4V and Grain Morphology**  
*A Beese, Pennsylvania State University*
- 10:50 A **#667 Fatigue of Solid State**  
*D Avery, University of Alabama; O. Rivera, University of Alabama; C. Mason, University of Alabama; J. Jordon, University of Alabama; P. Allison, University of Alabama; N. Hardwick, Aeroprope Corporation*
- 11:10 A **#794 Forced-Response Verification of Unique Additive Manufactured Vibration Suppressed Specimens**  
*O Scott-Emuakpor, Air Force Research Laboratory; T. George, Air Force Research Laboratory; B. Runyon, Air Force Research Laboratory; B. Langley, Air Force Research Laboratory; L. Sheridan, Air Force Research Laboratory; C. Holycross, Air Force Research Laboratory; R. O'Hara, Air Force Institution of Technology; P. Johnson, Universal Technology Corporation*
- 11:30 A **#729 The Effect of Powder Reuse on the Fracture Toughness of Additive Manufactured Ti-6Al-4V**  
*E Huskins-Retzlaff, United States Naval Academy; 1. Tagliavolone, United States Naval Academy; S. Graham, United States Naval Academy*

- 11:50 A **#91 Fatigue Characterization of 3D-printed Maraging Steel by Infrared Thermography**  
*C Douellou, University Clermont-Auvergne Sigma-Clermont; X. Balandraud, University Clermont-Auvergne Sigma-Clermont; E. Duc, University Clermont-Auvergne Sigma-Clermont*
- 12:10 P **#761 The Influence of Process History on Crack Growth of AM Alloy 718**  
*L Sheridan, Wright State University; C. Holycross, Air Force Research Laboratory; J. Gockel, Wright State University; O. Scott-Emuakpor, Air Force Research Laboratory*

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Monday, June 04, 2018

Inverse Problems/Hybrid Techniques

## 005. Inverse Problems/Hybrid Techniques I

**Organizer(s)**

**Chair Person** E.M.C. Jones, Sandia National Laboratories

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- 10:30 A **#346 Experimentally Enhanced Computations: Calibration Methodology for an Anisotropic Metal, Part I – Traditional Approach**  
*E Corona, Sandia National Laboratories; S. Kramer, Sandia National Laboratories; A. Jones, Sandia National Laboratories*
- 10:50 A **#307 Identification of Local Stiffness of Lodgepole Pine: Simulation and Example**  
*J Considine, USDA, Forest Service, Forest Products Laboratory*
- 11:10 A **#170 Joint DIC-Elasticity Imaging of Damage in the Presence of Material Inhomogeneity**  
*D Smyl, Aalto University; S. Bossuyt, Aalto University*
- 11:30 A **#673 High Rate Fracture of Minipig Skull**  
*C Gunnarsson, Army Research Laboratory; S. Alexander, SURVICE; T. Weerasooriya, Army Research Laboratory*
- 11:50 A **#489 Extraction of Dynamic Transfer Function in Dual-output Systems and Application to Passive Structural Health Monitoring**  
*F Lanza di Scalea, University of California San Diego; A. Liang, University of California San Diego; S. Sternini, University of California San Diego; M. Capriotti, University of California San Diego*
- 12:10 P **#535 System Identification of Structures with Incomplete Modal Information**  
*C Lin, National Pingtung University of Science and Technology; M. Lin, National Pingtung University of Science and Technology*

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Monday, June 04, 2018

Challenges in Mechanics of Time-Dependent Materials

## 006. Environmental Effects & Extreme Environments

**Organizer(s)**

**Chair Person** T. Sakai, Saitama University; A. Amirkhizi, University of Massachusetts, Lowell

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- 10:30 A **#792 Keynote: Perspectives on Residual Stresses and Dimensional Stability in Polymeric Materials, Adhesives, and Coatings (40-min)**  
*D Dillard, Virginia Tech*
- 11:10 A **#126 Temperature Dependence of Statistical Static Strengths for Unidirectional CFRP with Various Carbon Fibers**  
*Y Miyano, Kanazawa Institute of Technology; M. Nakada, Kanazawa Institute of Technology*
- 11:30 A **#777 Experimentally Validated Closed Cell Foam Packaging Simulation**  
*A Arzoumanidis, Psylotech, Inc.*

- 11:50 A **#137 Effect of Degradation on Viscoelasticity of Bedsore Prevention Mattress**  
*T Sakai, Graduate School of Science and Engineering, Saitama University; T. Uchiyama, Graduate School of Science and Engineering, Saitama University; K. Kageyama, Graduate School of Science and Engineering, Saitama University*
- 12:10 P **#698 Strain Rate Dependent FEM of Laser Shock Induced Residual Stress**  
*C Engebretsen, Air Force Institute of Technology; A. Palazotto, Air Force Institute of Technology; K. Langer, Air Force Research Lab*
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Monday, June 04, 2018

8th International Symposium on the Mechanics of Biological Systems and Materials

## 007. Mechanics of Tissue & Bone

**Organizer(s)**

**Chair Person** M.E. Grady, University of Kentucky

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- 10:30 A **#763 Keynote: Full-Field Characterization and Modeling of the Anterior Cruciate Ligament (40-min)**  
*E Arruda, University of Michigan*
- 11:10 A **#123 Mechanical and Fracture Properties of Human Cortical Bone with Simulated Diabetes**  
*K Merlo, University of Massachusetts Dartmouth; J. Aaronson, University of Massachusetts Dartmouth; J. Riordan, University of Massachusetts Dartmouth; R. Ghrandiz, University of Massachusetts Dartmouth; L. Karim, University of Massachusetts Dartmouth; A. Louhghalam, University of Massachusetts Dartmouth; V. Chalivendra, University of Massachusetts Dartmouth*
- 11:30 A **#485 Surface Modification of Titanium for Bio-applications through Hydrothermal Treatment**  
*C Hsu, Washington State University; Q. Li, Washington State University*
- 11:50 A **#312 Controlling Where and When Forces are Generated During Tissue Morphogenesis**  
*K Kasza, Columbia University; R. Herrera-Perez, Columbia University*
- 12:10 P **#506 Tumor Growth Mechanics**  
*K Mills, Rensselaer Polytechnic Institute*
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Monday, June 04, 2018

19th International Symposium on Micro- and Nanomechanics

## 008. Micromechanical Testing

**Organizer(s)**

**Chair Person** F. DelRio, NIST; J. Hay, Nanomechanics, Inc.

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- 10:30 A **#155 Keynote: Nanomechanics of Threshold Effects in Ultra-high Strength Distributions (40-min)**  
*R Cook, NIST; F. DelRio, NIST*
- 11:10 A **#621 Real-time Observation of Ballistic Deformation of Single CNT and Kevlar Filaments**  
*J Lee, University of Massachusetts; W. Xie, University of Massachusetts at Amherst; R. Headrick, Rice University; R. Zhang, Northeastern University; L. Taylor, Rice University; M. Pasquali, Rice University; S. Müftü, Northeastern University*
- 11:30 A **#205 A MEMS Device for Displacement-controlled Tensile Testing of One-dimensional Nanomaterials**  
*C Li, NCSU; Y. Zhu, NCSU*
- 11:50 A **#194 Real-time Measurement of Phase Boundary Propagation in Electrode Materials using Picosecond Ultrasonics**  
*S Rezazadeh-Kalehbasti, Brown University; L. Liu, Brown University; H. Maris, Brown University; P. Guduru, Brown University*

12:10 P **#188 Measurement of Electrolyte Dependent Elastic Modulus of Solid Electrolyte Interphase (SEI) Formed on Li Thin Film Electrodes**

*I Yoon, Brown University; S. Jurng, University of Rhode Island; D. Abraham, Argonne National Laboratory; B. Lucht, University of Rhode Island; P. Guduru, Brown University*

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Monday, June 04, 2018

Dynamic Behavior of Materials

## 009. Quantitative Visualization of Dynamic Events I

**Organizer(s)** L. Lamberson, Drexel University; T. Weerasooriya, US Army Research Laboratory

**Chair Person** L. Lamberson, Drexel University

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01:50 P **#530 Particle Tracking, Digital Image Correlation, and Image Processing Techniques in Granular and Heterogeneous Shock Studies**

*R Crum, Lawrence Livermore National Laboratory; J. Lind, Lawrence Livermore National Laboratory; E. Herbold, Lawrence Livermore National Laboratory; R. Hurley, Lawrence Livermore National Laboratory; M. Homel, Lawrence Livermore National Laboratory; M. Akin, Lawrence Livermore National Laboratory*

02:10 P **#640 Quantitative Visualization of Sub-micron Deformations and Stresses at Sub-microsecond Intervals in Soda-lime Glass Plates**

*C Miao, Auburn University; H. Tippur, Auburn University*

02:30 P **#465 An Image-Based Approach for Measuring Dynamic Fracture Toughness**

*L Fletcher, University of Southampton; L. Lamberson, Drexel University; F. Pierron, University of Southampton*

02:50 P **#347 Higher Order Term Effects on Dynamic Fracture of MAX Phase Ti<sub>3</sub>SiC<sub>2</sub>**

*L Shannahan, Army Research Laboratory; S. Pagano, Drexel University; L. Lamberson, Drexel University*

03:10 P **#400 Inertial Microcavitation as a Neural Cell Damage Mechanism in an in vitro Model of Traumatic Brain Injury**

*J Estrada, Brown University; H. Cramer III, Brown University; M. Scimone, Brown University; C. Franck, Brown University*

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Monday, June 04, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

## 011. Nanocomposites

**Organizer(s)** F. Gardea, U.S. Army Research Laboratory; P. Thakre, frank.gardea4.civ@mail.mil

**Chair Person** F. Gardea, U.S. Army Research Laboratory; P. Thakre, frank.gardea4.civ@mail.mil

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01:50 P **#141 AlSi<sub>10</sub>Mg Nanocomposites Prepared by DMLS Using in-situ CVD Growth of CNTs: Process Effects and Mechanical Characterization**

*P Thompson, NAVAIR; P. Poveda, NAVAIR; I. Bezonov, NAVAIR; M. Rossini, NAVAIR; D. Orthner, NAVAIR; B. Leng, CarboMet; Z. Iqbal, CarboMet*

02:10 P **#79 Stimulus-responsive Interfacial Chemistry in CNT/Polymer Nanocomposites**

*F Gardea, U.S. Army Research Laboratory; Z. Huang, University of Maryland; B. Glaz, U.S. Army Research Laboratory; S. Karna, U.S. Army Research Laboratory; X. Cheng, University of Maryland; Z. Peng, University of Maryland; Y. Wang, University of Maryland*

- 02:30 P **#429 Electro-Mechanical Response of Polymer Bonded Energetic Materials with CNT Sensing Networks for Structural Health Monitoring.**  
*N Shirodkar, Virginia Polytechnic Institute and State University; S. Rocker, Virginia Polytechnic Institute and State University; T. McCoy, Virginia Polytechnic Institute and State University; G. Seidel, Virginia Polytechnic Institute and State University*
- 02:50 P **#476 Strength and Energy Absorption Capability of Porous Magnesium Composites Reinforced by Carbon Nanofibers**  
*h Xu, Washington State University; Q. Li, Washington State University*
- 03:10 P **#270 Thermo-mechanical Properties of Thermoset Polymers and Composites Fabricated by Frontal Polymerization**  
*M Yourdkhani, University of Illinois at Urbana-Champaign; D. Ivanoff, University of Illinois at Urbana-Champaign; B. Koohbor, University of Illinois at Urbana-Champaign; P. Centellas, University of Illinois at Urbana-Champaign; L. Dean, University of Illinois at Urbana-Champaign; I. Robertson, University of Illinois at Urbana-Champaign; S. White, University of Illinois at Urbana-Champaign; N. Sottos, University of Illinois at Urbana-Champaign*

Monday, June 04, 2018

Advancement of Optical Methods in Experimental Mechanics

## 012. New Developments in Optical Methods & Fringe Pattern Analysis I

**Organizer(s)**

**Chair Person** C. Furlong, WPI-ME/CHSLT; M.T. Lin, National Chung Hsing University

- 01:50 P **#532 Computing DSPI Fringe Pattern with Location from Recorded Video Streamlines**  
*C Hwang, Applied Optics Division, Instrument Technology Research Center, NARL; W. Wang, Department of Power Mechanical Engineering, National Tsing Hua University*
- 02:10 P **#383 Accurate Reconstruction of High-gradient Strain Field in Digital Image Correlation: A Point-wise Hermite Element Scheme**  
*X Li, Tsinghua University; J. ZHAO, Tsinghua University; J. Shuai, Tsinghua University; Z. ZHANG, Tsinghua University; X. WU, Tsinghua University*
- 02:30 P **#101 A New Method of Fringe Pattern Analysis**  
*C Sciammarella, Illinois Institute of Technology*
- 02:50 P **#168 A New Method to Optimally Minimize the Optical Residual**  
*M GREDIAC, Universite Clermont Auvergne; B. BLAYSAT, Universite Clermont Auvergne; F. SUR, Universite de Lorraine*
- 03:10 P **#167 Speckle Image Rendering for DIC Performance Assessment**  
*F SUR, Universite de Lorraine; B. BLAYSAT, Universite Clermont Auvergne; M. GREDIAC, Universite Clermont Auvergne*

Monday, June 04, 2018

Symposium on the Role of Digital Image Correlation in Experimental Mechanics in Honor of Prof. Michael Sutton

## 013. High Rate Loading I

**Organizer(s)**

**Chair Person** A. Shukla, University of Rhode Island; G. Ravichandran, Caltech

- 01:50 P **#176 The Use of Digital Image Correlation in Split Hopkinson (Kolsky) Bar Experiments**  
*A Gilat, The Ohio State University; J. Seidt, The Ohio State University*

- 02:10 P **#536 High-speed Visualization of Deformation Field inside Opaque Materials**  
*N Kerschen, Purdue University; J. Chu, Purdue University; N. Kedir, Purdue University; W. Chen, Purdue University; K. Fezzaa, Argonne National Lab; T. Sun, Argonne National Lab*
- 02:30 P **#373 Characterization of the Constitutive Behavior of Polymeric Gels Using DIC**  
*K Upadhyay, University of Florida; G. Subhash, University of Florida; D. Spearot, University of Florida*
- 02:50 P **#728 Meso-Macro Scale Digital Image Based Experiments to Understand the Response of Materials Subjected to Extreme Conditions**  
*A Kidane, University of South Carolina*
- 03:10 P **#166 X-Ray based Digital Image Correlation for Fluid-Structure Interactions**  
*E Quintana, Sandia National Laboratories; E. Jones, Sandia National Laboratories; P. Reu, Sandia National Laboratories; J. Wagner, Sandia National Laboratories*
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Monday, June 04, 2018

Challenges in Mechanics of Time-Dependent Materials

## 014. Soft Materials

**Organizer(s)**

**Chair Person** M. Silberstein, Cornell University; Y. Hu, University of Illinois

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- 01:50 P **#100 Modified Hyper-viscoelastic Constitutive Model for Elastomeric Materials**  
*K Harban, University of Washington; M. Tuttle, University of Washington*
- 02:10 P **#531 Dynamic Indentation to Characterize the Poroelasticity of Gels**  
*Y Hu, University of Illinois at Urbana Champaign; Y. Lai, University of Illinois at Urbana Champaign*
- 02:30 P **#419 Modeling Dynamics of Pattern Formation in Hydrogel Membranes in Temperature Gradients**  
*Y Xiong, Clemson University; O. Kuksenok, Clemson University*
- 02:50 P **#316 The Development of Time Dependent Constitutive Laws of Jujube Flesh**  
*Q Pham, Southern Taiwan University of Science and Technology; N. Liou, Southern Taiwan University of Science and Technology*
- 03:10 P **#567 Theory for 3D Magnetic Rotational Spectroscopy of Complex Fluids**  
*V Palkar, Clemson University; P. Aprelev, Clemson University; O. Kuksenok, Clemson University; K. Kornev, Clemson University*
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Monday, June 04, 2018

8th International Symposium on the Mechanics of Biological Systems and Materials

## 015. Biotribology & Collagen

**Organizer(s)**

**Chair Person** J. Notbohm, University of Wisconsin-Madison

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- 01:50 P **#639 Micromechanical Characterization of a 3D Collagen Matrix**  
*M Patel, Brown University; C. Franck, Brown University*
- 02:10 P **#358 Modeling of Atomic Force Microscope Contact Experiments on Escherichia Coli Bacteria Cellular Systems**  
*D Biggs, Caltech; H. Liu, Caltech; D. Tirrell, Caltech; G. Ravichandran, Caltech*
- 02:50 P **#418 Strain Rate Experiments on the Mechanical Behavior of Collagen Fibrils**  
*F YANG, University of Illinois at Urbana-Champaign; G. Genin, Washington University; S. Thomopoulos, Columbia University; I. Chasiotis, University of Illinois at Urbana-Champaign*

- 03:10 P **#319 Nonaffine Displacements in Fibrous Biological Materials from Digital Image Correlation**  
*B Burkel, University of Wisconsin-Madison; M. Proestaki, University of Wisconsin-Madison; J. Notbohm, University of Wisconsin-Madison*
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Monday, June 04, 2018

19th International Symposium on Micro- and Nanomechanics

## 016. Adhesion & Fracture

**Organizer(s)**

**Chair Person** R. Cook, NIST; G. Raiser, Medtronic

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- 01:50 P **#651 Experimental Quantification of Interfacial Adhesion on the Mechanical Response of Granular Composites**  
*S Bhavanam, Worcester Polytechnic Institute; N. Karanjgaokar, Worcester Polytechnic Institute*
- 02:10 P **#593 Direct Measurements of the Mechanical Strength of Carbon Nanotube-Metal Interfaces**  
*C Yi, State University of New York at Binghamton; C. Dmuchowski, State University of New York at Binghamton; F. Gou, State University of New York at Binghamton; X. Chen, Xi'an Jiaotong University; C. Ke, State University of New York at Binghamton*
- 02:30 P **#204 Development of Femtosecond Laser Based Microscale Fracture Methods**  
*D Magagnosc, US Army Research Laboratory; B. Schuster, US Army Research Laboratory*
- 02:50 P **#203 Tensile Response of Armor Ceramics at the Microscale**  
*D Magagnosc, US Army Research Laboratory; B. Schuster, US Army Research Laboratory*
- 03:10 P **#635 Measurements of Adhesion between Polymeric Nanofibers**  
*D Das, University of Illinois at Urbana-Champaign; I. Chasiotis, University of Illinois at Urbana-Champaign*
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Monday, June 04, 2018

Dynamic Behavior of Materials

## 017. Quantitative Visualization of Dynamic Events II

**Organizer(s)** L. Lamberson, Drexel University; T. Weerasooriya, US Army Research Laboratory

**Chair Person** T. Weerasooriya, US Army Research Laboratory

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- 04:30 P **#601 High Strain Rate Off-axis Testing of Fibre-reinforced Polymer Matrix Composites Using an Image-based Impact (IBI) Test**  
*J Van Blitterswyk, University of Southampton; L. Fletcher, University of Southampton; F. Pierron, University of Southampton*
- 04:50 P **#625 IBI Test for High Strain Rate Tensile Testing of Adhesives**  
*A Guigue, University of Southampton; L. Fletcher, University of Southampton; R. Seghir, University of Southampton; F. Pierron, University of Southampton*
- 05:10 P **#328 Optimization of an Image-based Experimental Setup for the Dynamic Behaviour Characterization of Materials**  
*P Bouda, Onera - The French Aerospace Lab (Lille) - ONERA, F-59014 Lille - France, DMAS; D. Notta-Cuvier, LAMIH - CNRS : UMR8201, Université de Valenciennes et du Hainaut-Cambrésis Le Mont Houy - 59313 Valenciennes Cedex 9 - France; B. Langrand, Onera - The French Aerospace Lab (Lille) - ONERA, F-59014 Lille - France, DMAS; E. Markiewicz, LAMIH - CNRS : UMR8201, Université de Valenciennes et du Hainaut-Cambrésis Le Mont Houy - 59313 Valenciennes Cedex 9 - France; F. Pierron, Faculty of Engineering and the Environment - University of Southampton - Highfield SO171BJ - UK*



- 05:30 P **#722 The Utility of 3D Digital Image Correlation for Characterizing High-Rate Deformation**  
*P Jannotti, U.S. Army Research Laboratory; B. Schuster, U.S. Army Research Laboratory*
- 05:50 P **#546 High-Speed Microscopic Imaging of Initiation and Propagation of Adiabatic Shear Bands**  
*P Malhotra, Brown University; Y. Liu, Brown University; P. Guduru, Brown University*

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Monday, June 04, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

## 019. Mechanics of Composites

**Organizer(s)** B. Werner, Sandia National Laboratories; R. Singh, Oklahoma State University  
**Chair Person** B. Werner, Sandia National Laboratories; R. Singh, Oklahoma State University

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- 04:30 P **#648 Determination of Stress Free Temperature in Composite Laminates**  
*B Werner, Sandia National Laboratories; H. Jin, Sandia National Laboratories; T. Briggs, Sandia National Laboratories*
- 04:50 P **#649 Failure Modeling of Multi-directional Composites Using Northwestern Failure Theory and Simplified Constitutive Model**  
*B Werner, Sandia National Laboratories; J. Schaefer, The Boeing Company*
- 05:10 P **#650 Calibration of a Simple Rate Dependent Elastic-Plastic Constitutive Model for a Toughened Carbon Epoxy Composite System**  
*B Werner, Sandia National Laboratories; J. Schaefer, The Boeing Company*
- 05:30 P **#210 Testing the 2-3 Shear Strength of Unidirectional Composite**  
*J Fenner, Northwestern University; I. Daniel, Northwestern University*
- 05:50 P **#495 Damage Detection and Visco-Elastic Property Characterization of Composite Aerospace Panels Using Ultrasonic Guided Waves**  
*F Lanza di Scalea, University of California San Diego; M. Capriotti, University of California San Diego; R. Cui, University of California San Diego*

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Monday, June 04, 2018

Advancement of Optical Methods in Experimental Mechanics

## 020. New Developments in Optical Methods & Fringe Pattern Analysis II

**Organizer(s)**  
**Chair Person** L. Lamberti, Politecnico di Bari; C. Furlong, WPI-ME/CHSLT

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- 04:30 P **#161 Fast Adaptive Global Digital Image Correlation**  
*J Yang, California Institute of Technology; K. Bhattacharya, California Institute of Technology*
- 04:50 P **#265 Fast, Sub-Pixel Accurate Digital Image Correlation Algorithm Powered by Heterogeneous (CPU-GPU) Framework**  
*M Thiagu, Indian Institute of Technology-Madras, India; S. Subramanian, Indian Institute of Technology-Madras, India; R. Nasre, Indian Institute of Technology-Madras, India*
- 05:10 P **#164 Digital Image Cross-correlation Techniques for Longitudinal and Transverse Strain**  
*N Taylor, University of Cambridge*
- 05:30 P **#365 Development of Optimal Multiscale Patterns for Digital Image Correlation via Local Grayscale Variation**  
*G Bomarito, National Aeronautics and Space Administration, Langley Research Center, Hampton, VA; J. Hochhalter, National Aeronautics and Space Administration, Langley Research Center, Hampton, VA; T. Ruggles, National Institute of Aerospace, Hampton, VA*

- 05:50 P **#382 Enhanced Path-dependent Digital Image Correlation Parallelization Strategy for Ultra-high Speed Deformation Measurement**  
*J Shuai, Tsinghua University; J. Zhao, Tsinghua University; X. Li, Tsinghua University; L. Lei, Tsinghua University; P. Zeng, Tsinghua University*
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Monday, June 04, 2018

Symposium on the Role of Digital Image Correlation in Experimental Mechanics in Honor of Prof. Michael Sutton

## 021. High Rate Loading II

**Organizer(s)**

**Chair Person** W. Fourney, University of Maryland; P. Reu, Sandia national Laboratories

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- 04:30 P **#219 DIC Under Extreme Loading Conditions**  
*A Shukla, University of Rhode Island*
- 04:50 P **#208 Using X-ray Tomography and DVC to Study Damage Evolution in Syntactic Foam**  
*H Jin, Sandia National Lab; B. Mills, Sandia National Lab; B. Croom, University of Virginia; X. Li, University of Virginia; J. Carroll, Sandia National Lab*
- 05:10 P **#534 Quantitative Visualization of Biological Material Responses: Review of Human Femur and Skull Mechanical Behavior**  
*T Weerasooriya, Army Research Laboratory; S. Alexander, SURVICE Engineering Company; A. Gunnarsson, Army Research Laboratory; K. Rafaels, Army Research Laboratory*
- 05:30 P **#324 Ultra-High Speed Imaging for DIC Measurements in Kolsky Bar Experiments**  
*P Moy, Army Research Lab; T. Walter, Army Research Lab*
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Monday, June 04, 2018

Challenges in Mechanics of Time-Dependent Materials

## 022. Characterization Across Scales

**Organizer(s)**

**Chair Person** Y. Zhu, NC State University; H. Lu, The University of Texas at Dallas

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- 04:30 P **#568 Multiscale Characterization of Time Dependent Properties of Carbon Nanotube Grafted Fiber-reinforced Polymer Composites**  
*A Krishnamurthy, National Institute of Standards and Technology; R. Tao, National Institute of Standards and Technology; E. Senses, National Institute of Standards and Technology; S. Doshi, University of Delaware; E. Thostenson, University of Delaware; A. Faraone, National Institute of Standards and Technology; A. Forster, National Institute of Standards and Technology*
- 04:50 P **#469 Visualizing Nanoscale Deformation of Polymers by Atomic Force Microscopy and Digital Image Correlation**  
*R Savage, ExxonMobil Chemical Company; J. Furmanski, ExxonMobil Research & Engineering Company*
- 05:10 P **#661 Dynamic Characterization of Vertically Aligned Carbon Nanotube Foams**  
*H Kalathur, University of Wisconsin-Madison; T. Ramathanan, University of Wisconsin-Madison*
- 05:30 P **#588 High-resolution Time-dependent Microrheology of Thin Films and Nanoliter Droplets Using Magnetic Rotational Spectroscopy**  
*P Aprelev, Clemson University; K. Kornev, Clemson University*

- 05:50 P **#293 Characterization and Modeling of the Ageing of Polymers in Contact with Fluids using Nanomechanical Probes**  
*C Vlémincq, Université catholique de Louvain; T. Pardoën, Université catholique de Louvain; B. Nysten, Université catholique de Louvain; E. Gandin, Solvay*
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Monday, June 04, 2018

8th International Symposium on the Mechanics of Biological Systems and Materials

## 023. Cell Mechanics & Traumatic Brain Injury

**Organizer(s)**

**Chair Person** K. Kasza, Columbia University

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- 04:30 P **#633 Experimental Study of the Mechanics of Blast-induced Traumatic Brain Injury**  
*J Kerwin, Michigan State University; F. Masoomi, Michigan State University; S. Vidhate, Michigan State University; A. Willis, San Antonio Military Medical Center; M. Tartis, New Mexico Institute of Mining and Technology; R. Mejia-Alvarez, Michigan State University*
- 04:50 P **#738 Parametric Analysis of a Physical TBI Model for the Identification of Injury Mechanisms Due to Stress Wave Propagation**  
*W Mellor, University of California, San Diego; S. Koumlis, Drexel University; V. Eliasson, University of California, San Diego*
- 05:10 P **#84 DVC Measurement of Invasive Deformation Field of ECM Generated by Tumor Cell Induced EMT**  
*Y Morita, Nagoya University; T. Yamauchi, Nagoya University; Y. Toku, Nagoya University; Y. Ju, Nagoya University*
- 05:30 P **#138 Valsartan Abates Epinephrine-induced ICAM-4 Activation on Normal, Sickle Cell Trait and Sickle Cell Disease Red Blood Cells**  
*J Zhang, University of Connecticut; S. Jones, University of Connecticut, UCONN Health; G. Lykotrafitis, University of Connecticut; B. Andemariam, University of Connecticut, UCONN Health*
- 05:50 P **#646 Development of Biofilm-Surface Adhesion Technique via Laser-induced Stress Waves**  
*J Boyd, The University of Kentucky; S. Ross, The University of Kentucky; M. Grady, The University of Kentucky*
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Monday, June 04, 2018

19th International Symposium on Micro- and Nanomechanics

## 024. MEMS Devices & Technology

**Organizer(s)**

**Chair Person** J. Walton, Wright-Patterson AFB; T. Berfield, University of Louisville

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- 04:30 P **#451 Post Processed Foundry MEMS Actuators for Large Deflection Optical Scanning**  
*L Starman, Air Force Research Laboratory; D. Torres, Air Force Research Laboratory; H. Hall, Air Force Research Laboratory; R. Lake, Air Force Institute of Technology*
- 04:50 P **#642 A MEMS-scale Nonlinear Vibration Energy Harvester Based on Coupled Component Structures and Bi-stable States**  
*M Derakhshani, University of Louisville; T. Berfield, University of Louisville*
- 05:10 P **#228 Modelling & Simulation of Post Processed Foundry Fabricated Large, Out-of-Plane MEMS Energy Harvester**  
*J Walton, Air Force Research Laboratory; L. Starman, Air Force Research Laboratory; D. Torres, Air Force Research Laboratory*

- 05:30 P **#227 Programming Vanadium Dioxide Based MEMS Mirror**  
*D Torres, Air Force Research Laboratory; S. Dooley, Air Force Research Laboratory; L. Starman, Air Force Research Laboratory; N. Sepúlveda, Michigan State University*
- 05:50 P **#452 Torsional Structures to Enable Large Angle Deflections**  
*L Starman, Air Force Research Laboratory; D. Torres, Air Force Research Laboratory; J. Walton, Air Force Research Laboratory*

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Tuesday, June 05, 2018

Dynamic Behavior of Materials

## 025. Novel Experimental Techniques

**Organizer(s)** T. Walter, US Army Research Lab; O. Kingstedt, University of Utah

**Chair Person** T. Walter, US Army Research Lab

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- 09:00 A **#153 Heterodyne Diffracted Beam Photonic Doppler Velocimeter (DPDV) for Pressure-Shear Shock Experiments**  
*M Mello, California Institute of Technology; C. Kettenbeil, California Institute of Technology; Z. Lovinger, California Institute of Technology; G. Ravichandran, California Institute of Technology*
- 09:20 A **#636 Modified Digital Gradient Sensors with Higher Measurement Sensitivity for Evaluating Stress Gradients in Transparent Solids**  
*C Miao, Auburn University; H. Tippur, Auburn University*
- 09:40 A **#753 Under-microscope Pulse Test System with Controlled Force Amplitude and Pulse Duration**  
*U Heller, Department of Mechanical Engineering, Technion, Israel; E. Faran, Department of Mechanical Engineering, Technion, Israel; D. Shilo, Department of Mechanical Engineering, Technion, Israel*
- 10:00 A **#690 In situ High-rate Tensile Testing Inside a TEM**  
*T Voisin, Lawrence Livermore National Laboratory; M. Grapes, Lawrence Livermore National Laboratory; T. Li, Lawrence Livermore National Laboratory; Y. Zhang, Johns Hopkins University; N. Lorenzo, Army Research Laboratory; J. Ligda, Army Research Laboratory; B. Schuster, Army Research Laboratory; M. Santala, Lawrence Livermore National Laboratory; G. Campbell, Lawrence Livermore National Laboratory; T. Weihs, Johns Hopkins University*
- 10:20 A **#237 Microstructure Characterization of Electrodeposited Nickel Tested at High Strain Rates**  
*J Ligda, ARL; D. Casem, ARL; H. Murdoch, ARL*

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Tuesday, June 05, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

## 027. Fracture & Fatigue of Composites

**Organizer(s)** V. Chalivendra, University of Massachusetts Dartmouth; B. Mukherjee, The Dow Chemical Company

**Chair Person** V. Chalivendra, University of Massachusetts Dartmouth; B. Mukherjee, The Dow Chemical Company

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- 09:00 A **#426 2D Microscale Observations of Transverse Fracture in Carbon/Epoxy Composites**  
*A Smith, University of Utah; C. Arndt, University of Utah; M. Czabaj, University of Utah; D. Benson, University of Utah*
- 09:20 A **#117 Characterization of Through Thickness Reinforced Curved Carbon Fiber/Epoxy Composites**  
*N Bach, University of Massachusetts Dartmouth; V. Chalivendra, University of Massachusetts Dartmouth; J. Li, University of Massachusetts Dartmouth; Y. Kim, University of Massachusetts Dartmouth*

- 09:40 A **#702 Effect of Process Induced Residual Stress on Interlaminar Fracture Toughness of Hybrid Composites**  
*B Werner, Sandia National Laboratories*
- 10:00 A **#113 Probabilistic Assessment of Interlaminar Toughness in Composites: Experimental Approach and Implementation for Mode I**  
*P Clavette, United Technologies Research Center; M. Gurvich, United Technologies Research Center*
- 10:20 A **#645 Investigating Intralaminar Crack Growth in Biaxially Stressed Composites for Extreme Aerospace Applications**  
*J French, University of Utah; J. Christensen, University of Utah; M. Czabaj, University of Utah*
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Tuesday, June 05, 2018

Advancement of Optical Methods in Experimental Mechanics

## 028. New Developments in Optical Methods & Fringe Pattern Analysis III

**Organizer(s)**

**Chair Person** C.A. Sciammarella, Illinois Institute of Technology; C. Furlong, WPI-ME/CHSLT

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- 09:00 A **#246 Eliminating Air Refraction Issues in DIC by Conducting Experiments in Vacuum**  
*P Reu, Sandia National Laboratories; E. Jones, Sandia National Laboratories*
- 09:20 A **#273 DIC Image on FIB Ring-Core Analysis of Depth Sensing Residual Stress Measurement of Thin Films**  
*W Pan, National Chung Hsing University; A. Tsai, National Chung Hsing University; T. Terry Yuan-Fang Chen, National Cheng Kung University; F. Cherng, National Cheng Kung University; M. Lin, National Chung Hsing University*
- 09:40 A **#385 Development of A New Normalization Technique for Twelve- Fringe Photoelasticity (TFP)**  
*A Pandey, Indian Institute of Technology Madras; K. Ramesh, Indian Institute of Technology Madras*
- 10:00 A **#626 Deflectometry on Curved Surfaces**  
*Y Surrel, University of Southampton; F. Pierron, University of Southampton*
- 10:20 A **#748 Simulation of 3D Reconstruction of Conical Calibration Targets**  
*W Wang, Department of Power Mechanical Engineering, National Tsing Hua University; C. Hwang, Applied Optics Division, Instrument Technology Research Center, NARLabs; Y. Chen, Instrument Technology Research Center, NARLabs*
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Tuesday, June 05, 2018

Symposium on the Role of Digital Image Correlation in Experimental Mechanics in Honor of Prof. Michael Sutton

## 029. Biomechanics

**Organizer(s)**

**Chair Person** J. Dally, University of Maryland; P.G. Ifju, University of Florida

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- 09:00 A **#72 Combined Digital Volume Correlation and Confocal Microscopy for studying Cell-Matrix Interactions**  
*J Notbohm, University of Wisconsin-Madison; C. Franck, Brown University; G. Ravichandran, Caltech*
- 09:20 A **#251 Identification of Deformation Mechanism in Biomaterials Through AFM and Digital Image Correlation**  
*H Espinosa, Northwestern University*
- 09:40 A **#96 Beyond the Airbrush: Applications of Digital Image Correlation in Vascular Biomechanics**  
*S Lessner, University of South Carolina; J. Eberth, University of South Carolina*

- 10:00 A **#278 Measurement of Local Strain Distribution and Its Variation Near Eyes During Blink Using Digital Image Correlation**  
*K Sakai, Aoyama Gakuin University; Y. Zhang, Aoyama Gakuin University; S. Yoneyama, Aoyama Gakuin University; Y. Miyazaki, Kao Corporation; Y. Nagai, Kao Corporation; T. Igarashi, Kao Corporation*

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Tuesday, June 05, 2018

Challenges in Mechanics of Time-Dependent Materials

## 030. Damage, Fatigue, Fracture

**Organizer(s)**

**Chair Person** J. Furmanski, Exxon Mobil; B. Antoun, Sandia National Laboratories

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- 09:00 A **#559 Experimental Investigation of Dynamic Strain Aging in 304L Stainless Steel**  
*B Antoun, Sandia National Laboratories; C. Alleman, Sandia National Laboratories; K. De La Trinidad, Sandia National Laboratories*
- 09:20 A **#527 Modeling of Cavitation Erosion Resistance in Polymeric Materials Based on Strain Accumulation**  
*V Alizadeh, University of Massachusetts, Lowell; A. Amirkhizi, University of Massachusetts, Lowell*
- 09:40 A **#762 Bond Strength in Non-woven Mechanics**  
*M Silberstein, Cornell University; N. Chen, Cornell University*
- 10:00 A **#516 Direct Extraction of Traction-Separation Relationship for Polymer-Modified Bitumen Under Mode I Loading**  
*S Rajan Kattil, University of South Carolina; M. Sutton, University of South Carolina; F. RYAN, University of South Carolina; A. Kidane, University of South Carolina; Y. FARZANA, University of South Carolina*
- 10:20 A **#274 Understanding Creep-Fatigue Interaction in Fe-25Ni-20Cr (wt.%) Austenitic Stainless Steel**  
*N Kumar, North Carolina State University; A. Alomari, North Carolina State University; K. Murty, North Carolina State University*

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Tuesday, June 05, 2018

Inverse Problems/Hybrid Techniques

## 031. Inverse Problems/Hybrid Techniques II

**Organizer(s)**

**Chair Person** S. Bossuyt, Aalto University

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- 09:00 A **#518 Micromechanical Parameter Identification from Microstructural Volume Elements using IDIC**  
*J Hoefnagels, Eindhoven University of Technology, the Netherlands; O. Rokos, Eindhoven University of Technology, the Netherlands; R. Peerlings, Eindhoven University of Technology, the Netherlands; M. Geers, Eindhoven University of Technology, the Netherlands*
- 09:20 A **#367 Experimentally Enhanced Computations: Calibration Methodology for an Anisotropic Metal, Part II – Novel Approach/ Validation**  
*S Kramer, Sandia National Laboratories; A. Jones, Sandia National Laboratories; B. Lester, Sandia National Laboratories; E. Corona, Sandia National Laboratories*
- 09:40 A **#742 Optimal Mechanical Testing for Constitutive Parameter Identification**  
*D Seidl, Sandia National Laboratories; D. Turner, Sandia National Laboratories; E. Jones, Sandia National Laboratories; K. Karlson, Sandia National Laboratories; P. Reu, Sandia National Laboratories*
- 10:00 A **#136 Inverse Identification of the Loading Applied by a Tire on a Landing Gear Wheel**  
*K Cosseron, LMT, ENS Paris-Saclay; R. Gras, EikoSim; D. Mellé, Safran Landing Systems; J. Diebold, Safran Landing Systems; F. Hild, LMT, ENS Paris-Saclay; S. Roux, LMT, ENS Paris-Saclay*

10:20 A **#585 Image-based Stress Field Reconstruction in Complex Media**

*R Seghir, University of Southampton; F. Pierron, University of Southampton; L. Fletcher, University of Southampton*

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Tuesday, June 05, 2018

19th International Symposium on Micro- and Nanomechanics

## 032. Nano-scale Deformation Mechanisms

**Organizer(s)**

**Chair Person** M. Linne, University of Michigan; N. Karanjgaokar, Worcester Polytechnic Institute

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09:00 A **#582 Keynote: Investigating Small-Scale Deformation Mechanisms and Microstructure-Mechanical Property Relationships using SEM-DIC**

*S Daly, UCSB*

09:40 A **#178 Investigation of Deformation Mechanisms in Columnar Aluminum**

*M Linne, University of Michigan; S. Daly, University of California, Santa Barbara*

10:00 A **#99 Superstrength through Icosahedral Bonding**

*C Kunka, University of Florida; G. Subhash, University of Florida*

10:20 A **#569 Temperature and Microstructural Dependence of Dwell Fatigue in Dual-Phase Titanium Alloys**

*M Harr, University of Michigan; A. Pilchak, Air Force Research Labs (AFRL); S. Daly, University of California, Santa Barbara*

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Tuesday, June 05, 2018

Dynamic Behavior of Materials

## 033. Dynamic Behavior of Geomaterials I

**Organizer(s)** B. Martin, Air Force Research Laboratory; X. Nie, Southern Methodist University

**Chair Person** X. Nie, Southern Methodist University

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01:50 P **#148 Dynamic Damage Evolution in High-Strength Concrete**

*C Loeffler, Southern Methodist University; Y. Qiu, Southern Methodist University; B. Martin, Air Force Research Laboratory; W. Heard, U.S. Army Engineer Research and Development Center; B. Williams, U.S. Army Engineer Research and Development Center; X. Nie, Southern Methodist University*

02:10 P **#446 Residual Structural Capacity of a High-Performance Concrete**

*G Vankirk, US Army ERDC; W. Heard, US Army ERDC; A. Frank, US Army ERDC; M. Hammons, US Army ERDC; J. Roth, US Army ERDC*

02:30 P **#301 Revisit of Dynamic Brazilian Tests of Geomaterials**

*B Sanborn, Sandia National Laboratories; E. Jones, Sandia National Laboratories; M. Hudspeth, Sandia National Laboratories; B. Song, Sandia National Laboratories; S. Broome, Sandia National Laboratories*

02:50 P **#671 The Scaling Phenomena of Massive Concrete Targets Perforated by Rigid Projectiles**

*Y Luxenburg, Rafael Advance Defense Systems; Z. Lovinger, Rafael Advance Defense Systems; A. Malka-Markovitz, Rafael Advance Defense Systems; K. Ben-David, Rafael Advance Defense Systems; O. Spector, Rafael Advance Defense Systems*

03:10 P **#76 Effect of the Ratio of Charge Mass to Target Mass on Measured Impulse**

*L Taylor, University of Maryland, College Park; H. Leiste, University of Maryland, College Park; W. Fourney, University of Maryland, College park; C. Pecora, Army Research Laboratory, Aberdeen PG*

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Tuesday, June 05, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

## 035. Multifunctional Materials

**Organizer(s)** P. Thakre, The Dow Chemical Company; L. Bodelot, Ecole Polytechnique - LMS

**Chair Person** P. Thakre, The Dow Chemical Company; L. Bodelot, Ecole Polytechnique - LMS

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01:50 P **#74 Multifunctional Structural Composites with Energy Storage Capabilities**

*B Wang, Case Western Reserve University; S. Crisanti, Case Western Reserve University; R. Paul, Case Western Reserve University; V. prakash, Case Western Reserve University*

02:10 P **#409 Layered Jamming Multifunctional Actuators**

*R Acevedo, University of Maryland; L. Johnson, University of Maryland; S. Gupta, University of Maryland; H. Bruck, University of Maryland*

02:30 P **#513 Mechanical Properties of Magnetic Microcapsules**

*A Vancuren, University of Tulsa; M. Keller, University of Tulsa*

02:50 P **#776 Multifunctional Properties of Graphene Reinforced Epoxy Based Two Phase Solid Polymer Electrolyte**

*k mishra, oklahoma state university; R. Singh, oklahoma state university*

03:10 P **#212 Experimental Characterization of Magneto-Rheological Elastomers for Constitutive Model Parameters Identification**

*L Bodelot, Ecole Polytechnique; J. Voropaieff, Ecole Polytechnique*

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Tuesday, June 05, 2018

Advancement of Optical Methods in Experimental Mechanics

## 036. DIC Applications for Challenging Environments I

**Organizer(s)** H. Jin, Sandia National Laboratories; E.M.C. Jones, Sandia National Laboratories

**Chair Person** H. Jin, Sandia National Laboratories; E.M.C. Jones, Sandia National Laboratories

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01:50 P **#483 DIC of Foam Materials at Cryogenic Temperatures**

*S Quinn, University of Southampton; W. Bailey, University of Southampton; D. Crump, University of Southampton; J. Dulieu-Barton, University of Southampton; T. Bostock, University of Southampton; A. Robinson, University of Southampton*

02:10 P **#109 Measuring Spallation Strength of Epoxy by Laser Spallation Technique**

*S Singh, IIT Kanpur; R. Kitey, IIT Kanpur*

02:30 P **#234 Strain Rate Effects on Stainless Steel Laser Welds**

*H Jin, Sandia National Lab; K. Nelson, Sandia National Lab*

02:50 P **#694 Measurement on a Sample of Fuel Cell at High Temperature**

*N LI, University of South Carolina; M. Sutton, University of South Carolina; K. Huang, University of South Carolina*

03:10 P **#331 Application of Digital Image Correlation to Structures in Fire**

*C Smith, Berkshire Hathaway Specialty Insurance; M. Hoehler, National Institute of Standards and Technology; M. Seif, National Institute of Standards and Technology*



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Tuesday, June 05, 2018

Symposium on the Role of Digital Image Correlation in Experimental Mechanics in Honor of Prof. Michael Sutton

## 037. Soft Materials/ Heterogeneous Materials

**Organizer(s)**

**Chair Person** D. Dawicke,

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- 01:50 P **#501 A Method to Study Volumes Changes in Elastomers Using DIC**  
*F Davis, University of Southampton; F. Pierron, University of Southampton*
- 02:10 P **#471 Full-field Deformation Measurements Within a Granular Micro-hydrogel Support Medium During 3D Printing of Soft Matter**  
*P Ifju, University of Florida; A. McGhee, University of Florida; D. Nguyen, University of Florida*
- 02:30 P **#94 qDIC-based Experimental Characterization of Hyperelastic, Highly Compressible Elastomeric Foams**  
*C Franck, Brown University; A. Landauer, Brown University; X. Li, Brown University; D. Henann, Brown University*
- 02:50 P **#581 Understanding Deformation Mechanisms through the Use of in-SEM DIC and Large Data Analysis: Advances and Challenges**  
*S Daly, University of California, Santa Barbara*
- 03:10 P **#310 Use of DIC for Elucidation of Local Constitutive Laws in Heterogeneous Materials**  
*A Reynolds, University of South Carolina, Department of Mechanical Engineering*
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Tuesday, June 05, 2018

Challenges in Mechanics of Time-Dependent Materials

## 038. Inhomogeneties & Interfaces

**Organizer(s)**

**Chair Person** A. Forster, NIST; R. Hall, Air Force Research Laboratory

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- 02:30 P **#563 Characterization of the Interfacial Shear Strength of Carbon Nanotube Sheet Wrapped Carbon fiber Composite by Fiber Push-In**  
*X Wang, University of Texas at Dallas; M. Andrade, University of Texas at Dallas; T. Xu, University of Texas at Dallas; H. Luo, University of Texas at Dallas; S. Roy, The University of Alabama; R. Baughman, University of Texas at Dallas; H. Lu, University of Texas at Dallas*
- 02:50 P **#201 A Mixture Theory with Interactive Body Forces and Body Couples for Composites with Interphases**  
*R Hall, Air Force Research Laboratory*
- 03:10 P **#564 Novel Experiments to Capture Local Viscoelastic Mechanical Property Distributions in Soft Heterogeneous Materials**  
*P Kolluru, Northwestern University; M. Eaton, Northwestern Univeristy; D. Collinson, Northwestern Univeristy; L. Brinson, Duke University*
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Tuesday, June 05, 2018

Fracture & Fatigue

## 039. Novel Experimental Methods

**Organizer(s)** A. Kontsos, Drexel University; O. Scott-Emuakpor, Air Force Research Laboratory

**Chair Person** A. Kontsos, Drexel University; O. Scott-Emuakpor, Air Force Research Laboratory

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- 01:50 P **#789 DIC at Long Working Distances: The Effects of Diffraction Limits**  
*K Burn, Utah State University; E. Nickerson, Utah State University; R. Berke, Utah State University*

- 02:10 P **#78 Demonstration of Hybrid Crack Kinking Criterion**  
*S Grutzik, Sandia National Laboratories; E. Reedy, Sandia National Laboratories*
- 02:30 P **#611 Experimental Control Volume Analysis of Strain Energy Density for Fatigue Crack Growth of Ti-6Al-4V**  
*C Holycross, Air Force Research Laboratory; L. Sheridan, Wright State University; O. Scott-Emuakpor, Air Force Research Laboratory*
- 02:50 P **#404 Modification of Benthem Solution for Mode I fracture of Cylinder with Spiral Crack Subjected to Torsion**  
*A Fahem, University of South Carolina; A. Kidane, University of South Carolina*
- 03:10 P **#726 Development of a New Sensor to Measure Concrete Pore Pressure Under High Confinement Pressure**  
*A Accary, Grenoble Alpes University; Y. Malecto, Grenoble Alpes University; L. Daudeville, Grenoble Alpes University*

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Tuesday, June 05, 2018

19th International Symposium on Micro- and Nanomechanics

## 040. 1D & 2D Materials

**Organizer(s)**

**Chair Person** C. DiMarco, Columbia University; C. Ke, State University of New York at Binghamton

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- 01:50 P **#420 An Investigation into the Effect of Surface Pores on Mechanical Behavior of Hollow Carbon Fibers and Nanofibers**  
*Y Chen, Texas A & M University; J. Cai, Texas A & M University; J. Boyd, Texas A & M University; M. Naraghi, Texas A & M University*
- 02:10 P **#662 A Probability Density Function for Polycrystalline Two-dimensional Materials**  
*C DiMarco, Mechanical Engineering, Columbia University, New York, New York, United States; J. Hone, Mechanical Engineering, Columbia University, New York, New York, United States; J. Kysar, Mechanical Engineering, Columbia University, New York, New York, United States*
- 02:30 P **#594 Structural and Mechanical Properties of Boron Nitride Nanotubes in High Temperature Environment**  
*X Chen, Xi'an Jiaotong University; C. Dmuchowski, State University of New York at Binghamton; C. Park, NASA Langley Research Center; C. Fay, NASA Langley Research Center; C. Ke, State University of New York at Binghamton*
- 02:50 P **#245 Effect of Thermo-mechanical Processing On Microstructural Evolution and Mechanics of Electrospun Carbon Nanofiber**  
*J Cai, Texas A & M University; M. Naraghi, Texas A & M University*
- 03:10 P **#394 Evaluation of the Strength and Toughness of Monolayer Graphene using Raman Mapping**  
*R Young, National Graphene Institute and School of Materials, University of Manchester; X. Zhao, National Graphene Institute and School of Materials, University of Manchester*

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Tuesday, June 05, 2018

Dynamic Behavior of Materials

## 041. Dynamic Behavior of Geomaterials II

**Organizer(s)** B. Martin, Air Force Research Laboratory; X. Nie, Southern Methodist University

**Chair Person** B. Martin, Air Force Research Laboratory

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- 04:10 P **#150 Mechanical Response and Damage Evolution of High-Strength Concrete under Triaxial Loading**  
*B Williams, U.S. Army Engineer Research and Development Center, Vicksburg, MS, USA / Southern Methodist University, Dallas, TX, USA; W. Heard, U.S. Army Engineer Research and Development Center, Vicksburg, MS, USA; B. Martin, Air Force Research Laboratory, Fort Walton Beach, FL, USA; C. Loeffler, Southern Methodist University, Dallas, TX, USA; X. Nie, Southern Methodist University, Dallas, TX, USA*
- 04:30 P **#366 Ballistic and Material Tests and Simulations on Ultra-High Performance Concrete**  
*S Chocron, Southwest Research Institute; A. Carpenter, Southwest Research Institute; N. Scott, Southwest Research Institute; O. Spector, Rafael; A. Malka-Markovitz, Rafael; Z. Lovinger, Rafael; D. Havazelet, Israel Ministry of Defence*
- 04:50 P **#670 In situ Visualization of the Dynamic Failure of Geomaterials Using Phase Contrast X-ray Imaging**  
*A Leong, Johns Hopkins University; E. Asare, Johns Hopkins University; R. Rex, Johns Hopkins University; N. Sinclair, Argonne National Laboratory; K. Fezzaa, Argonne National Laboratory; T. Sun, fezzaa@aps.anl.gov; X. Xiao, Argonne National Laboratory; B. Schuster, Army Research Laboratory; D. Casem, Army Research Laboratory; P. Lambert, Johns Hopkins University; V. Kannan, Johns Hopkins University; Y. Sun, Johns Hopkins University; H. Sheng, Johns Hopkins University; K. Ramesh, Johns Hopkins University; T. Hufnagel, Johns Hopkins University*
- 05:10 P **#680 Effects of Liquid Viscosity on Wave Propagation Through Submerged Granular Media**  
*H Kocharyan, Worcester Polytechnic Institute; N. Karanjaokar, Worcester Polytechnic Institute*

Tuesday, June 05, 2018

Mechanics of Additive and Advanced Manufacturing

## 042. Additive Manufacturing of Polymers and Composites

**Organizer(s)**

**Chair Person** E.N. Brown, Los Alamos National Laboratory

- 04:10 P **#410 Experimental Homogenized Elastic Properties of Computer-generated 3D-printed Random Porous Materials**  
*O ZERHOUNI, Laboratory of Solid Mechanics (Ecole Polytechnique); G. TARANTINO, Laboratory of Solid Mechanics (Ecole Polytechnique); K. DANAS, Laboratory of Solid Mechanics (Ecole Polytechnique)*
- 04:30 P **#202 Mechanical Structure-Property Relationships for 2D Polymers Comprised of Nodes and Bridge Units**  
*E Sandoz-Rosado, Army Research Laboratory; E. Wetzel, Army Research Laboratory*
- 04:50 P **#454 Shrinkage Analysis of Posterior Molar Filled with Microcapsules-Based Dental Composite**  
*D Krauss, Johns Hopkins University*
- 05:10 P **#482 Microstructure and Macrostructure of Porous Magnesium/Carbon Nanofiber Composites Experienced Different Ball Milling Times**  
*h Xu, Washington State University; Q. Li, Washington State University*
- 05:30 P **#804 Computational and Experimental characterization of thermal fields in fused deposition modeling**  
*K Pooladvand, Worcester Polytechnic Institute (WPI); C. Furlong, Worcester Polytechnic Institute (WPI)*

Tuesday, June 05, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

## 043. Damage Detection & Non-destructive Evaluation

**Organizer(s)** A.-D. Celestine, Harvard University; P. Thakre, The Dow Chemical Company

**Chair Person** A.-D. Celestine, Harvard University; P. Thakre, The Dow Chemical Company

- 04:10 P **#115 Damage Sensing in Multi-functional Natural Fiber Composites Under Shear Loading**  
*S Yang, University of Massachusetts Dartmouth; J. Zulu, University of Massachusetts Dartmouth; V. Chalivendra, University of Massachusetts Dartmouth; Y. Kim, University of Massachusetts Dartmouth*
- 04:30 P **#368 Impact and Post-impact Behaviour of Composite Laminates Reinforced by Z-pins**  
*L Francesconi, Santa Clara University; F. Aymerich, University of Cagliari*
- 04:50 P **#437 Multimodal Damage Detection in Fiber-reinforced Composite Materials Using Magnetic Nanoparticles**  
*M Crall, University of Tulsa; S. Laney, University of Tulsa; M. Keller, University of Tulsa*
- 05:10 P **#218 Nondestructive Damage Detection of a Magentostriptive Composite Structure**  
*M Coatney, Army Research Laboratory - VTD; A. Hall, Army Research Laboratory - VTD; M. Haile, Army Research Laboratory - VTD; J. Yoo, Naval Systems Warfare Center - Carderock*
- 05:30 P **#473 Characterization of Composite Damage Using Magnetic Nanoparticles**  
*S Laney, The University of Tulsa; M. Crall, The University of Tulsa; M. Keller, The University of Tulsa*
- 05:50 P **#619 Early Damage Accumulation in CMCs**  
*B Swaminathan, University of California, Santa Barbara; A. Almansour, NASA Glenn Research Center; K. Sevenser, University of Michigan; J. Kiser, NASA Glenn Research Center; S. Daly, University of California, Santa Barbara*

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Tuesday, June 05, 2018

**Advancement of Optical Methods in Experimental Mechanics**

**044. DIC Applications (Incl. Hybrid Methods) for Challenging Environments II**

**Organizer(s)** H. Jin, Sandia National Laboratories; E.M.C. Jones, Sandia National Laboratories

**Chair Person** E.M.C. Jones, Sandia National Laboratories; H. Jin, Sandia National Laboratories

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- 04:10 P **#386 On Performing Spatiotemporal Stereocorrelation at Very High Temperatures**  
*M Berny, Laboratoire de Mécanique et Technologie (LMT), ENS-Cachan, CNRS, Université Paris-Saclay, Cachan, France / SAFRAN, Safran Ceramics, Le Haillan, France; T. Archer, Laboratoire de Mécanique et Technologie (LMT), ENS-Cachan, CNRS, Université Paris-Saclay, Cachan, France / SAFRAN, Safran Ceramics, Le Haillan, France / Office National d'Etudes et de Recherches Aéropatiales (ONERA), Palaiseau, France; F. Hild, Laboratoire de Mécanique et Technologie (LMT), ENS-Cachan, CNRS, Université Paris-Saclay, Cachan, France*
- 04:30 P **#555 Elevated Temperature Optical Microscopy DIC**  
*K Connolly, Southern Research; W. Ralph, Southern Research*
- 05:10 P **#340 Full-Field Determination of the Taylor-Quinney Coefficient in Tension Tests of Ti-6Al-4V at Strain Rates up to 7000 s<sup>-1</sup>**  
*J Smith, The Ohio State University; J. Seidt, The Ohio State University; A. Gilat, The Ohio State University*
- 05:30 P **#165 Comparison of Material Model Calibration using Tensile Dog Bones Versus the Virtual Fields Method**  
*E Jones, Sandia National Laboratories; J. Carroll, Sandia National Laboratories; K. Karlson, Sandia National Laboratories; S. Kramer, Sandia National Laboratories; R. Lehoucq, Sandia National Laboratories; P. Reu, Sandia National Laboratories; D. Turner, Sandia National Laboratories*

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Tuesday, June 05, 2018

Symposium on the Role of Digital Image Correlation in Experimental Mechanics in Honor of Prof. Michael Sutton

## 045. Digital Image Correlation

### Organizer(s)

**Chair Person** H.A. Bruck, University of Maryland; H. Schreier, Correlated Solutions, Inc.

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04:10 P **#129 Uncertainty Quantifications for Multiviewcorrelation**

*F Hild, University Paris-Saclay; S. Roux, University Paris-Saclay*

04:30 P **#221 Update on the 2D-DIC Challenge: Results and Conclusions**

*P Reu, Sandia National Laboratories; E. Toussaint, University Clermont; H. Bruck, University of Maryland; M. Iadicola, National Institute of Standards; R. Balcaen, KU Leuven; D. Turner, Sandia National Laboratories; T. Siebert, Dantec Dynamics; P. Lava, MatchID; M. Simonesen, Correlated Solutions*

04:50 P **#185 Experimental Investigation of LEFM Limitations**

*D Dawicke, AS&M, Inc.; J. Hochhalter, NASA Langley Research Center; R. Russell, NASA Engineering and Safety Center*

05:10 P **#415 Digital Image Correlation Beyond Experimental Mechanics: What I've Learned from Michael Sutton**

*B Bay, Oregon State University*

05:30 P **#475 Fluid Mechanics Application of DIC in Sloshing**

*C Chien, National Sun Yat-Sen University, Taiwan; T. Su, National Sun Yat-Sen University, Taiwan; C. Huang, National Sun Yat-Sen University, Taiwan; W. Yeh, National Sun Yat-Sen University, Taiwan; Y. Chao, National Sun Yat-Sen University, Taiwan*

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Tuesday, June 05, 2018

Challenges in Mechanics of Time-Dependent Materials

## 046. Viscoelasticity

### Organizer(s)

**Chair Person** A. Amirkhizi, University of Massachusetts, Lowell; A. Arzoumanidis, Psylotech, Inc.

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04:10 P **#557 Characterization of Viscoelastic Properties of Biomaterials using Stereo DIC with Bulge Pressure Technique**

*M Merola, University of Texas at Dallas; Z. Xie, University of Texas at Dallas; Z. Hu, University of Texas at Dallas; H. Lu, University of Texas at Dallas*

04:30 P **#157 Time-Temperature Mechanical Response of a PVA Dual Cross-Link Self-Healing Hydrogel**

*M Liu, Cornell University; J. Guo, Cornell University; C. Hui, Cornell University; A. Zehnder, Cornell University*

04:50 P **#586 Image- and Energy-based Dynamic Mechanical Analysis**

*r seghir, University of Southampton; f. pierron, University of Southampton; J. Bouvard, MINES ParisTech, PSL Research University, CEMEF*

05:10 P **#314 Measurement of the Visco-Elastic Properties of the Chinchilla Tympanic Membrane**

*J Liang, University of Texas at Dallas; H. Lu, university of Texas at Dallas; R. Gan, University of Oklahoma; H. Lu, University of Texas at Dallas*

05:30 P **#356 Time-Temperature Dependent Creep and Recovery behavior of MWCNTs-Polypropylene Nanocomposites**

*V KHARE, DEPARTMENT OF AEROSPACE ENGINEERING IIT KANPUR; D. KUMAR, DEPARTMENT OF AEROSPACE ENGINEERING IIT KANPUR; S. KAMLE, DEPARTMENT OF AEROSPACE ENGINEERING IIT KANPUR; G. KAMATH, DEPARTMENT OF AEROSPACE ENGINEERING IIT KANPUR*

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Tuesday, June 05, 2018

Fracture & Fatigue

## 047. Extreme Environments

**Organizer(s)** R. Berke, Utah State University; K. Hazeli, University of Alabama in Huntsville

**Chair Person** R. Berke, Utah State University; K. Hazeli, University of Alabama in Huntsville

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04:10 P **#439 Keynote: Development and Testing of Nuclear Materials (40-min)**

*M Meyer, Idaho National Laboratory*

04:50 P **#538 High Resolution Digital Image Correlation Study of Damage Accumulation During Creep-Fatigue of 709 Stainless Steel Alloy**

*R Vieira, University of Illinois at Urbana-Champaign; S. Ravi, University of Illinois at Urbana-Champaign; H. Sehitoglu, University of Illinois at Urbana-Champaign; J. Lambros, University of Illinois at Urbana-Champaign*

05:10 P **#790 Speckle Pattern Inversion in DIC at Extreme Temperatures**

*T Thai, Utah State University; A. Smith, Utah State University; R. Berke, Utah State University*

05:30 P **#330 Crack Tip Stress Measurement at High Temperature in IN-617 Using Nano-indentation and Nano-mechanical Raman Spectroscopy**

*Y Zhang, Purdue University; C. Prakash, Purdue University; V. Tomar, Purdue University*

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Tuesday, June 05, 2018

19th International Symposium on Micro- and Nanomechanics

## 048. Tribology & Wear

**Organizer(s)**

**Chair Person** D. Magagnosc, US Army Research Laboratory; G.A. Shaw, III, NIST

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04:10 P **#643 Full Assessment of Micromachine Friction Within the Rate-state Framework**

*S Shroff, Carnegie Mellon University; M. de Boer, Carnegie Mellon University*

04:30 P **#701 Measuring and Modeling Capillary Bridge Dynamics and Crack Healing Between Surfaces of Nanoscale Roughness**

*E Soylemez, Marmara University, Istanbul, Turkey; M. de Boer, Carnegie Mellon University*

04:50 P **#500 Mechanical Properties of Thermal Barrier Coatings at Small Length Scale**

*S Patibanda, Department of Mechanical Engineering, IITB-Monash Research Academy, Indian Institute of Technology Bombay, Mumbai 400076, INDIA; V. Nagda, Department of Mechanical Engineering, Indian Institute of Technology Bombay, Mumbai 400076, INDIA; S. G, Center for Engineered Coatings, International Advanced Research Center for Powder Metallurgy and New Materials, Hyderabad 500005, INDIA; R. Abrahams, Department of Mechanical Engineering, Monash University, VIC3800, AUSTRALIA; K. Jonnalagadda, Department of Mechanical Engineering, Indian Institute of Technology Bombay, Mumbai 400076, INDIA*

05:10 P **#736 Contact Reliability of Pt- and TiN-coated Microswitches in Different Environments**

*C Oh, Carnegie Mellon University; M. de Boer, Carnegie Mellon University*

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Wednesday, June 06, 2018

Dynamic Behavior of Materials

## 049. Dynamic Response of Low-Impedance Materials I

**Organizer(s)** P. Moy, Army Research Lab; J. Jordan, Los Alamos National Laboratory

**Chair Person** P. Moy, Army Research Lab

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10:30 A #110 Experimental and Computational Analysis of Mode I Fracture of Hydrogels

*A Knapp, University of Florida; G. Subhash, University of Florida; D. Spearot, University of Florida*

10:50 A #175 Radial Inertia Effect on Dynamic Compressive Response of Polymeric Foam Materials

*B Song, Sandia National Laboratories; B. Sanborn, Sandia National Laboratories; W. Lu, Sandia National Laboratories*

11:10 A #299 Quasi-static and Dynamic Poisson's Ratio Evolution of Hyperelastic Foams

*B Sanborn, Sandia National Laboratories; B. Song, Sandia National Laboratories*

11:30 A #704 Dynamic Characterization and Damping Capacity of Polyurethane Foams

*S Koumlis, Drexel University; L. Lamberson, Drexel University*

11:50 A #195 Dynamics Tensile Properties of Soft Tissue Materials

*S LIN, NATIONAL KAOHSIUNG UNIVERSITY OF APPLIED SCIENCES*

12:10 P #197 Dynamic Shear Response of Soft Tissue Materials

*W Liang, National Kaohsiung University of Applied Sciences - Mechanical Engineering; L. Tsai, National Kaohsiung University of Applied Sciences - Mechanical Engineering*

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Wednesday, June 06, 2018

Dynamic Behavior of Materials

## 050. Dynamic Failure & Fragmentation I

**Organizer(s)** B. Aydelotte, U.S. Army Research Laboratory; P. Jannotti, US Army Research Laboratory

**Chair Person**

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10:30 A #288 Proton Radiography of Reverse Ballistic Impacts

*B Aydelotte, US Army Research Laboratory; B. Schuster, US Army Research Laboratory; J. Allison, Los Alamos National Laboratory; F. Cherne, Los Alamos National Laboratory; M. Freeman, Los Alamos National Laboratory; J. Goett, Los Alamos National Laboratory; B. Hollander, Los Alamos National Laboratory; B. Jensen, Los Alamos National Laboratory; C. Morris, Los Alamos National Laboratory; L. Neukirch, Los Alamos National Laboratory; A. Pacheco, Los Alamos National Laboratory; T. Schurman, Los Alamos National Laboratory; Z. Tang, Los Alamos National Laboratory; D. Tupa, Los Alamos National Laboratory; J. Tybo, Los Alamos National Laboratory; C. Wilde, Los Alamos National Laboratory; J. Wright, Los Alamos National Laboratory*

10:50 A #290 The Effect of ECAE on the Ballistic Response of AZ31

*T Sano, US. Army Research Laboratory; P. Jannotti, US Army Research Laboratory*

11:10 A #767 Dynamic Fragmentation of MAX Phase Ti<sub>3</sub>SiC<sub>2</sub> from Edge-On-Impact Experiments

*P Forquin, University of Grenoble; L. Lamberson, Drexel University; M. Barsoum, Drexel University; N. Savino, Drexel University; M. Morais, University of Grenoble*

11:30 A #663 Microstructural Effects in the High Strain Rate Ring Fragmentation of Copper

*S Ward, University of Cambridge; C. Braithwaite, University of Cambridge; A. Jardine, University of Cambridge*

- 11:50 A **#720 Failure and Fragmentation of Pressed W-Al Composites**  
*J Kimberley, New Mexico Institute of Mining and Technology; M. Hargather, New Mexico Institute of Mining and Technology; A. Monclova, New Mexico Institute of Mining and Technology; G. Anderson, New Mexico Institute of Mining and Technology; S. Thoma, Reactive Metals International Incorporated*
- 12:10 P **#463 An Image-Based Impact Test for the High Strain Rate Properties of Brittle Materials**  
*L Fletcher, University of Southampton; F. Pierron, University of Southampton*

Wednesday, June 06, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

## 051. Recycled Constituent Composites II

**Organizer(s)** I. Miskoiglu, Michigan technological University; E. Bayraktar, SUPMECA-Paris

**Chair Person** I. Miskoiglu, Michigan technological University; E. Bayraktar, SUPMECA-Paris

- 10:30 A **#631 Manufacturing of SiCp Reinforced Aluminum Composite Foams by Direct Semi-solid Foaming Method Using Recycled Aluminum**  
*N Ürkmez Taşkın, Trakya University; V. Taşkın, Trakya University; Ç. OVACI BEJİ, Trakya University; Ö. TÜRK, Trakya University; O. KARADUMAN, Trakya University*
- 10:50 A **#718 Analysis of Interfaces in AA7075/Recycled WC Particles Composites Produced via Liquid Route**  
*M Viana, FEM/UNICAMP; M. Robert, FEM/UNICAMP*
- 11:10 A **#721 Investigation on Microstructure and Interface Reactions in Graded FE50007/WC Composites Produced by Casting**  
*R Leibholz, FEMAQ; H. Leibholz, FEMAQ; E. Bayraktar, Suomeca-Paris; M. Robert, FEM/UNICAMP*
- 11:30 A **#743 INVESTIGATION OF ALUMINIUM POWDER PRODUCED FROM RECYCLED CANS BY HIGH ENERGY MILLING USING DIFFERENTS TYPES OF PCAs**  
*C Oliveira, University of São Paulo; F. Gatamorta, University of Campinas*
- 11:50 A **#294 Alternative Composite Design from Recycled Copper +Aluminium Chips for Tribological Applications**  
*F Gatamorta, University of Campinas, UNICAMP-FEM, SP/Campinas, BRAZIL; E. BAYRAKTAR, Supmeca / Paris, School of Mechanical and Manufacturing Engineering FRANCE; I. Miskioglu, Michigan Technology University, Engineering Mechanics Department, Houghton, MI-USA; D. Katundi, Supmeca/Paris, School of Mechanical and Manufacturing Engineering, France*
- 12:10 P **#304 Alternative Composite Design from Recycled Aluminum Chips for Mechanical Joint Applications**  
*D Katundi, Supmeca/Paris, School of Mechanical and Manufacturing Engineering Paris-FRANCE; E. BAYRAKTAR, Supmeca / Paris, School of Mechanical and Manufacturing Engineering FRANCE; I. Miskioglu, Michigan Technology University, Engineering Mechanics Department, Houghton, MI-USA; F. Gatamorta, University of Campinas, UNICAMP-FEM, SP/Campinas, BRAZIL*

Wednesday, June 06, 2018

Advancement of Optical Methods in Experimental Mechanics

## 052. Optical Methods in SEM: History & Perspective I

**Organizer(s)** L. Lamberti, Politecnico di Bari; M.T. Lin, National Chung Hsing University

**Chair Person** L. Lamberti, Politecnico di Bari; C. Furlong, WPI-ME/CHSLT

- 10:30 A **#102 A Review: Optical Methods that Evaluate Displacement Information (40-min)**  
*C Sciammarella, Illinois Institute of Technology; L. Lamberti, Bari Politechnic*
- 11:10 A **#775 Holographic Interferometry – Then and Now (40-min)**  
*K Stetson, Karl Stetson Assoc., LLC*



11:50 A **#377 Laser and White-light Speckle Techniques - A Brief Review (40-min)**

*G Cloud, Michigan State University*

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Wednesday, June 06, 2018

**Mechanics of Additive and Advanced Manufacturing**

## **053. Additively Manufactured Metals & Structures I**

**Organizer(s)**

**Chair Person** B. Branch, Los Alamos National Laboratory

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10:30 A **#67 Keynote: Structure/Property Behavior of Additively Manufactured (AM) Materials: Opportunities & Challenges (40-min)**

*G Gray III, Los Alamos National Laboratory; V. Livescu, Los Alamos National Laboratory; C. Knapp, Los Alamos National Laboratory; D. Jones, Los Alamos National Laboratory; S. Fensin, Los Alamos National Laboratory*

11:10 A **#598 Influence of Post-Processing Parameters on the Tensile Behavior of Selective Laser Melting Additive Manufactured Inconel 718**

*O Rodriguez, NASA-MSFC; P. Allison, University of Alabama; C. Mason, University of Alabama; O. Mireles, NASA-MSFC*

11:30 A **#750 Additive Manufacturing of Nanotwinned Copper by Localized Pulsed Electrodeposition**

*S Daryadel, The University of Texas at Dallas; A. Behroozfar, The University of Texas at Dallas; S. Morsali, The University of Texas at Dallas; R. Bernal, The University of Texas at Dallas; M. Minary-Jolandan, The University of Texas at Dallas*

11:50 A **#215 Mechanical Behavior of Additively Manufactured Ti-6Al-4V Following a New Heat Treatment**

*J Ligda, ARL; N. Saenz, CQL; J. Paramore, ARL; B. Butler, ARL*

12:10 P **#350 Correlation Between Process Parameters and Mechanical Properties in Parts Printed by the Fused Deposition Modelling Process**

*S Attoye, Center for Additive Manufacturing Research at IUPUI (CAMRI)/ Purdue School of Engineering and Technology; E. Malekipour, Center for Additive Manufacturing Research at IUPUI (CAMRI)/ Purdue School of Engineering and Technology; H. El-Mounayri, Center for Additive Manufacturing Research at IUPUI (CAMRI)/ Purdue School of Engineering and Technology*

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Wednesday, June 06, 2018

**Research in Progress**

## **054. Research in Progress I**

**Organizer(s)**

**Chair Person** E. Koricho, Georgia Southern University

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10:30 A **#325 Realization and Dynamic Studies of CNTs-PDMS Membranes for Biomimetic Flapping Wing Applications**

*D Kumar, Department of Aerospace Engineering, Indian Institute of Technology Kanpur, India; G. Kamath, Department of Aerospace Engineering, Indian Institute of Technology Kanpur, India*

10:50 A **#573 Experimental Investigation of Segmental Post-tensioned Girders**

*A Allawi, University of Bag; M. Al-Sherrawi, University of Baghdad; B. AL-Bayati, University of Baghdad; M. Al Gharawi, University of Missouri; A. El-Zohairy, University of Missouri*

11:10 A **#603 Novel Technique for In-Situ Characterization of GRS Timber Bridge**

*N Bechle, USDA Forest Service Forest Products Laboratory; J. Hermanson, USDA Forest Service Forest Products Laboratory; J. Michopoulos, US Naval Research Laboratory*

- 11:30 A **#572 A Case Study to Evaluate Live Load Distributions for Pre-stressed RC Bridge**  
*A Allawi, University of Baghdad; M. Al-Sherrawi, University of Baghdad; M. Al Gharawi, University of Missouri; A. El-Zohairy, University of Missouri*
- 11:50 A **#574 EXPERIMENTAL EVALUATIONS OF LIVE LOAD DISTRIBUTIONS OF STEEL-CONCRETE COMPOSITE BRIDGE**  
*A Allawi, University of Baghdad; A. AlBayati, University of Baghdad; M. Al Gharawi, University of Missouri; A. El-Zohairy, University of Missouri*
- 12:10 P **#682 Energy Absorption of Metal-Organic-Frameworks Functionalized Liquids**  
*Y Sun, University of Oxford*

Wednesday, June 06, 2018

Fracture & Fatigue

## 055. Interfacial Fracture

**Organizer(s)** S. Grutzik, Sandia National Laboratories; C. Wu, Missouri University of Science and Technology  
**Chair Person** S. Grutzik, Sandia National Laboratories; C. Wu, Missouri University of Science and Technology

- 10:30 A **#86 Observations of Adhesive Fracture for an Evolving Cohesive-Length Scale**  
*J Gorman, University of Michigan; M. Thouless, University of Michigan*
- 10:50 A **#447 Cohesive Zone Smoothing of Bending Stiffness Heterogeneities in Tape Peeling Experiments**  
*L Avellar, California Institute of Technology; K. Bhattacharya, California Institute of Technology; G. Ravichandran, California Institute of Technology*
- 11:10 A **#260 Characterization of Transverse Deformation and Failure Initiation at the Fiber/Matrix Interface using DIC in a SEM**  
*C Montgomery, University of Illinois at Urbana-Champaign; A. Klepacki, University of Illinois at Urbana-Champaign; B. Koohbor, University of Illinois at Urbana-Champaign; P. Geubelle, University of Illinois at Urbana-Champaign; N. Sottos, University of Illinois at Urbana-Champaign*
- 11:30 A **#705 Adhesion between Silver Nano Wire and Graphene**  
*Y Li, Missouri University of Science and Technology; C. Guo, Missouri University of Science and Technology; C. Wu, Missouri University of Science and Technology*
- 11:50 A **#707 Effect of Adhesion on Graphene-Optical Fiber Sensor in Corrosion Detection**  
*Y Li, Missouri University of Science and Technology; C. Guo, Missouri University of Science and Technology; C. Wu, Missouri University of Science and Technology*
- 12:10 P **#733 Atomistic Modeling on Adhesion of Polyurea and Silica Aerogel Interface**  
*A Ghasemi, The University of Texas at San Antonio; Y. Li, Missouri University of Science and Technology; W. Gao, The University of Texas at San Antonio; C. Wu, Missouri University of Science and Technology*

Wednesday, June 06, 2018

Thermomechanics and Infra-red Imaging

## 056. Material Characterizations Using Thermography I

**Organizer(s)**  
**Chair Person** J. Dulieu-Barton, University of Southampton; R. Tighe, Defence Academy of the UK

- 11:10 A **#606 Infrared Thermography for Material Characterization at Intermediate Strain Rates**  
*T Fourest, ONERA; J. Berthe, ONERA*

- 11:30 A **#545 Towards Integrating Imaging Techniques to Assess Manufacturing Features and In-service Damage in Composite Components**  
*I Jiménez-Fortunato, University of Southampton; D. Bull, University of Southampton; J. Dulieu-Barton, University of Southampton; O. Thomsen, University of Southampton*
- 11:50 A **#281 Experimental Investigation of Emissivity Influence to Obtain Thermal Field by Near Infrared Thermography**  
*C Zhang, Department of Mechanical Engineering, LaMCos, Université de Lyon/INSA Lyon/UMR CNRS 5259, 20 Avenue des Sciences, F-69621 Villeurbanne Cedex, France; J. Marty, Department of Mechanical Engineering, LaMCos, Université de Lyon/INSA Lyon/UMR CNRS 5259, 20 Avenue des Sciences, F-69621 Villeurbanne Cedex, France / ESTA LAB, 3 Rue du Dr Frery, F-90000 Belfort, France; A. Maynadier, Univ. Bourgogne Franche-Comté, FEMTO-ST Institute, CNRS/UFC/ENSMM/UTBM, Department of Applied Mechanics, Chemin de L'épitaque, 25000 Besançon, France; P. Chaudet, Department of Mechanical Engineering, LaMCos, Université de Lyon/INSA Lyon/UMR CNRS 5259, 20 Avenue des Sciences, F-69621 Villeurbanne Cedex, France; J. Rethore, GeM, Ecole Centrale de Nantes/Université de Nantes/UMR CNRS 6183, 1 rue de la Noë, BP 92101, F-44321 Nantes, France; M. Baietto, Department of Mechanical Engineering, LaMCos, Université de Lyon/INSA Lyon/UMR CNRS 5259, 20 Avenue des Sciences, F-69621 Villeurbanne Cedex, France*
- 12:10 P **#798 MEASURING THE TAYLOR-QUINNEY COEFFICIENT**  
*D RITTEL, Technion - Israel Institute of Technology*
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Wednesday, June 06, 2018

Dynamic Behavior of Materials

## 057. Dynamic Response of Low-Impedance Materials II

**Organizer(s)** P. Moy, Army Research Lab; J. Jordan, Los Alamos National Laboratory

**Chair Person** J. Jordan, Los Alamos National Laboratory

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- 02:30 P **#479 The effect of in-plane properties on the ballistic response of polyethylene composites**  
*J Cline, Army Research Laboratory*
- 02:50 P **#327 Interface Chemistry Dependent Mechanical Properties in Energetic Material using Nano-scale Impact Experiment**  
*C Prakash, Purdue University; A. Olokun, Purdue University; I. Gunduz, Purdue University; V. Tomar, Purdue University*
- 03:10 P **#432 On the Response of Polymer Bonded Explosives at Different Impact Velocities**  
*S Ravindran, University of South Carolina; A. Tessema, University of South Carolina; A. Kidane, University of South Carolina*
- 03:30 P **#491 Experimental Measurement of Time and Temperature Dependent Interfacial Strength**  
*L Lea, University of Cambridge; D. Williamson, University of Cambridge*
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Wednesday, June 06, 2018

Dynamic Behavior of Materials

## 058. Dynamic Failure & Fragmentation II

**Organizer(s)** B. Aydelotte, U.S. Army Research Laboratory; P. Jannotti, US Army Research Laboratory

**Chair Person**

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- 02:30 P **#98 Comparison of Structure and Deformation Mechanisms in Boron Carbide and Boron Suboxide**  
*G Subhash, University of Florida; C. Kunka, University of Florida*

- 02:50 P **#235 Measurement of Impact Properties of Reinforced Lithium Disilicate Glass-Ceramic**  
*B Sundaram, Corning Research and Development Corporation; J. Westbrook, Corning Research and Development Corporation; C. Smith, Corning Research and Development Corporation; J. Finkeldey, Corning Research and Development Corporation*
- 03:10 P **#119 Mitigation of Amorphous Effects in Boron Carbide through Grain Size Reduction and Secondary Phase Addition**  
*M DeVries, University of Florida; J. Pittari III, U.S. Army Research Laboratory; G. Subhash, University of Florida*
- 03:30 P **#681 X-Ray Computed Tomography Characterization of Damage in Advanced Ceramics**  
*C Lo, University of Alberta; B. Koch, University of Alberta; T. Walter, Army Research Laboratory; T. Sano, Army Research Laboratory; J. Hogan, University of Alberta*
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Wednesday, June 06, 2018

#### 4th International Symposium on the Mechanics of Composite and Multifunctional Materials

### 059. Composites for Wind Energy & Aerospace Applications

**Organizer(s)** M. Eydani Asl, University of Massachusetts Lowell; R. Singh, Oklahoma State University

**Chair Person** M. Eydani Asl, University of Massachusetts Lowell; R. Singh, Oklahoma State University

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- 02:30 P **#458 A new approach for assessing the load response and failure of wind turbine blade substructures**  
*J Callaghan, Universtiy of Southampton; J. Dulieu-Barton, University of Southampton; O. Thomsen, University of Southampton; S. Laustsen, Siemens Gamesa Renewable Energy; C. Burchardt, Siemens Gamesa Renewable Energy*
- 02:50 P **#580 Investigating the structural response of a wind turbine rotor blade sub-component under combined loading**  
*M Rosemeier, Divison Structural Components, Fraunhofer Institute for Wind Energy and Energy System Technology IWES; A. Antoniou, Divison Structural Components, Fraunhofer Institute for Wind Energy and Energy System Technology IWES*
- 03:10 P **#441 Fatigue Life Assessment of Recyclable Bio-Based Resin for Wind Turbine Blades using Sub-Component Testing**  
*M Asl, University of Massachusetts Lowell; C. Niezrecki, University of Massachusetts Lowell; J. Sherwood, University of Massachusetts Lowell; P. Avaitabile, University of Massachusetts Lowell*
- 03:30 P **#487 HIGH-FIDELITY TESTING AND INTEGRATED MODELLING OF COMPOSITE SUBSTRUCTURES AND COMPONENTS**  
*D Bull, Faculty of Engineering and the Environment, University of Southampton; J. Dulieu-Barton, Faculty of Engineering and the Environment, University of Southampton; O. Thomsen, Faculty of Engineering and the Environment, University of Southampton*
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Wednesday, June 06, 2018

#### Advancement of Optical Methods in Experimental Mechanics

### 060. Optical Methods in SEM: History & Perspective II

**Organizer(s)** L. Lamberti, Politecnico di Bari; M.T. Lin, National Chung Hsing University

**Chair Person** M.T. Lin, National Chung Hsing University; L. Lamberti, Politecnico di Bari

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- 02:30 P **#430 Recent Digital Image Correlation Measurements and Observations for Civil Engineering Structures and Materials**  
*M Sutton, Department of Mechanical Engineering, University of South Carolina; S. Rajan, Department of Mechanical Engineering, University of South Carolina; A. Kidane, Department of Mechanical Engineering, University of South Carolina; R. Fuerte, Department of Mechanical Engineering, University of South Carolina; J. Seidt, Department of Mechanical and Aerospace Engineering, Ohio State University; A. Gilat, Department of Mechanical and Aerospace Engineering, Ohio State University*
- 03:00 P **#757 Recent advancements and perspective about digital holography: a super-tool in biomedical and bioengineering fields**  
*P Ferraro, Institute of Applied Sciences & Intelligent Systems (ISASI-CNR); P. Memmolo, CNR-ISASI; F. Merola, CNR-ISASI; L. Miccio, CNR-ISASI; M. Mugnano, CNR-ISASI; M. Villone, DICMAPI - University of Naples Federico II; P. Maffettone, DICMAPI University of Naples Federico II*
- 03:30 P **#816 Recent Advances in the Development of Optical Metrology for the Hearing and Speech Sciences**  
*C Furlong, WPI-ME/CHSLT; R. Franco, MEEI/Harvard Medical School; J. Cheng, MEEI/Harvard Medical School; J. Rosowski, MEEI/Harvard Medical School*

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Wednesday, June 06, 2018

Mechanics of Additive and Advanced Manufacturing

## 061. Additively manufactured Metals & Structures II

**Organizer(s)**

**Chair Person** J. Carroll, Sandia National Laboratories

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- 02:30 P **#674 Multiscale Digital Image Correlation Study of Additively Manufactured Ti-6Al-4V**  
*D Foehring, University of Illinois Urbana-Champaign; R. VanSickle, University of Illinois Urbana-Champaign; H. Chew, University of Illinois Urbana-Champaign; J. Lambros, University of Illinois Urbana-Champaign*
- 02:50 P **#686 Microstructure and Deformation Mechanisms of Stainless Steel 316L Made by Selective Laser Melting**  
*T Voisin, Lawrence Livermore National Laboratory; J. McKeown, Lawrence Livermore National Laboratory; J. Ye, Lawrence Livermore National Laboratory; N. Caltà, Lawrence Livermore National Laboratory; Z. Li, Lawrence Livermore National Laboratory; W. Chen, Lawrence Livermore National Laboratory; T. Roehling, Lawrence Livermore National Laboratory; M. Santala, Oregon State University; Y. Wang, Lawrence Livermore National Laboratory*
- 03:10 P **#688 Deformation Mechanics of Ti-6Al-4V Alloys Made by Selective Laser Melting**  
*T Voisin, Lawrence Livermore National Laboratory; N. Caltà, Lawrence Livermore National Laboratory; J. Ye, Lawrence Livermore National Laboratory; R. Cunningham, Carnegie Mellon University; A. Rollett, Carnegie Mellon University; Y. Wang, Lawrence Livermore National Laboratory*
- 03:30 P **#189 Texture and Porosity Effects on Quasi-Static and Dynamic Behavior of Additively Manufactured Nickel-Based Superalloy**  
*A Minor, University of Alabama in Huntsville; J. Cuadra, Lawrence Livermore National Laboratory; O. Rodriguez, Marshall Space Flight Center, NASA; O. Mireles, Marshall Space Flight Center, NASA; K. Hazeli, University of Alabama in Huntsville*

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Wednesday, June 06, 2018

Research in Progress

## 062. Research in Progress II

**Organizer(s)**

**Chair Person** A. Kidane, University of South Carolina

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02:30 P **#672 A Progression on the Determination of Dynamic Fracture Initiation Toughness using Spiral Crack**  
*A Fahem, University of South Carolina; A. Kidane, University of south Carolina*

02:50 P **#392 Selection of Shear Sample Test Geometry for Bulk Adhesive Characterization**  
*B Watson, University of Waterloo; M. Worswick, University of Waterloo; D. Cronin, University of Waterloo*

03:10 P **#422 A numerical-experimental study on the fatigue life and crack propagation of thin low porosity metallic auxetic structures**  
*L Francesconi, Santa Clara University; M. Taylor, Santa Clara University; A. Baldi, Università degli Studi di Cagliari*

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Wednesday, June 06, 2018

Fracture & Fatigue

## 063. Integration of Models & Experiments I

**Organizer(s)** J. Carroll, Sandia National Laboratories; S. Grutzik, Sandia National Laboratories

**Chair Person** J. Carroll, Sandia National Laboratories; S. Grutzik, Sandia National Laboratories

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02:30 P **#209 Keynote: The Sandia Fracture Challenge: How Ductile Failure Predictions Fair (40-min)**  
*S Kramer, Sandia National Laboratories; B. Boyce, Sandia National Laboratories; A. Jones, Sandia National Laboratories; J. Gearhart, Sandia National Laboratories; B. Salzbrenner, Sandia National Laboratories*

03:10 P **#146 Failure Testing under In-plane Biaxial Tension and Out of Plane Compression**  
*N Spulak, The Ohio State University; R. Lowe, University of Dayton; J. Seidt, The Ohio State University; A. Gilat, The Ohio State University*

03:30 P **#571 Experimental Study on Fatigue Performance of Steel-concrete Composite Girders**  
*A El-Zohairy, University of Missouri; H. Salim, University of Missouri; A. Saucier, University of Missouri*

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Wednesday, June 06, 2018

Thermomechanics and Infra-red Imaging

## 064. Thermoelastic Stress Analysis

**Organizer(s)**

**Chair Person** B. Boyce, Stress Photonics Inc.; S. Quinn, University of Southampton

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02:30 P **#668 Thermographic Assessment of Sub-surface Damage in Composite Overwrapped Pressure Vessels**  
*R Tighe, Defence Academy of the UK; D. Crump, University of Southampton; T. Allan, Canada Revenue Agency; N. Sathon, University of Southampton; P. Reed, University of Southampton; J. Dulieu-Barton, University of Southampton*

02:50 P **#765 Thermoelastic Measurement Techniques Enabled by Self-Reference**  
*B Boyce, Stress Photonics Inc; J. Lesniak, Stress Photonics Inc.*

03:10 P **#657 Thermoelastic Stress Field Investigation of a Multiply-Loaded Disk**  
*M Yousefi, Rochester Institute of Technology; X. Balandraud, Université Clermont-Auvergne; W. Samad, Rochester Institute of Technology*

03:30 P **#230 Experimentally Determined Stresses in a Deep-Notched Aluminum Tensile Plate**  
*Y Ro, University of Wisconsin-Madison; A. Alshaya, Kuwait University; B. Yang, University of Wisconsin-Madison; S. Kurunthottikkal Philip, Cummins Inc, Columbus; J. Freire, Pontifical Catholic University; R. Rowlands, University of Wisconsin-Madison*

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Wednesday, June 06, 2018

Dynamic Behavior of Materials

## 065. Dynamic Response of Low-Impedance Materials III

**Organizer(s)** P. Moy, Army Research Lab; J. Jordan, Los Alamos National Laboratory

**Chair Person** J. Jordan, Los Alamos National Laboratory

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04:20 P **#477 A Tensile Split Hopkinson Pressure Bar for Low Impedance Materials**  
*D Williamson, University of Cambridge*

04:40 P **#401 Investigating the Mechanical and Thermal Relationship for Epoxy Blends**  
*M Harr, Oak Ridge Institute for Science and Education; P. Moy, Army Research Lab; T. Walter, Army Research Lab; K. Masser, Army Research Lab*

05:00 P **#542 Effects of Pressure and Strain Rate on the Mechanical Behavior of Glassy Polymers**  
*A Wohlford, University of South Carolina; T. Walter, Army Research Lab; D. Casem, Army Research Lab; P. Moy, Army Research Lab; A. Kidane, University of South Carolina*

05:20 P **#345 Experimental Investigation of Rate Sensitive Mechanical Response of Polyurea**  
*S K, Department of Applied Mechanics, Indian Institute of Technology Madras, Chennai; L. Rao C, Department of Applied Mechanics, Indian Institute of Technology Madras, Chennai; V. Parameswaran, Department of Mechanical Engineering, Indian Institute of Technology Kanpur, Kanpur*

05:40 P **#448 Dynamic Mode II Fracture Response of PMMA Within an Aquatic Environment**  
*I Delaney, University of California, San Diego; R. Chavez, University of California, San Diego; V. Gomez, University of California, San Diego; V. Eliasson, University of California, San Diego*

06:00 P **#498 Storage and Loss Moduli of Low-impedance Materials at kHz Frequencies**  
*W Nantasetphong, SCG Chemicals Co., Ltd.; Z. Jia, University of Connecticut; M. Hasan, University of California San Diego; A. Amirkhizi, University of Massachusetts, Lowell; S. Nemat-Nasser, University of California, San Diego*

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Wednesday, June 06, 2018

Dynamic Behavior of Materials

## 066. Dynamic Failure & Fragmentation III

**Organizer(s)** B. Aydelotte, U.S. Army Research Laboratory; P. Jannotti, US Army Research Laboratory

**Chair Person**

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04:20 P **#107 Compression Strength of Ceramics**  
*J Swab, Army Research Laboratory; C. Meredith, Army Research Laboratory; G. Bobby, owhead*

04:40 P **#106 Comparison of Pressure-Sensitive Strength Models for Ceramics Under Ultrahigh Confinement**  
*S Bavdekar, University of Florida; G. Subhash, University of Florida*

- 05:00 P **#87 Fracture and Failure Characterization of Transparent Acrylic-based graft Interpenetrating Polymer Networks (graft-IPNs)**  
*B Sundaram, Auburn University; H. Tippur, Auburn University; R. Mendez, Auburn University; M. Auad, Auburn University*
- 05:20 P **#88 Dynamic Crack Branching in Soda-lime Glass: An Optical Investigation using Digital Gradient Sensing**  
*B Sundaram, Auburn University; H. Tippur, Auburn University*
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Wednesday, June 06, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

## 067. Computed Tomography of Composites

**Organizer(s)** P. Thakre, The Dow Chemical Company; H. Truong, The Dow Chemical Company

**Chair Person** P. Thakre, The Dow Chemical Company; H. Truong, The Dow Chemical Company

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- 04:20 P **#272 Quantitative Relationships Between Composite Microstructure and Mechanics by Digital Volume Correlation**  
*B Croom, University of Virginia; X. Li, University of Virginia*
- 04:40 P **#306 3D Characterisation of Fibre-orientation and Voids at the Microscale in Ceramic Matrix Composites**  
*W Christian, University of Liverpool; K. Dvurecenska, University of Liverpool; E. Patterson, University of Liverpool; C. Przybyla, Materials and Manufacturing Directorate, Air Force Research Laboratory*
- 05:00 P **#754 In-situ Imaging of Flexure-induced Fracture in Fiber-reinforced Composites Using High-resolution X-ray Computed Tomography**  
*B Wingate, University of Utah; M. Czabaj, University of Utah*
- 05:20 P **#653 Imaging the Life-Cycle of CMCs using High-Resolution X-ray Computed Tomography**  
*P Creveling, University of Utah; M. Czabaj, University of Utah*
- 05:40 P **#481 Mechanical Characterization of Open Cell Aluminum Foams Using X-ray Computed Tomography**  
*K Matheson, University of Utah; M. Czabaj, University of Utah*
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Wednesday, June 06, 2018

Advancement of Optical Methods in Experimental Mechanics

## 068. Optical Methods in SEM: History & Perspective III

**Organizer(s)** L. Lamberti, Politecnico di Bari; M.T. Lin, National Chung Hsing University

**Chair Person** C. Furlong, WPI-ME/CHSLT; M.T. Lin, National Chung Hsing University

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- 04:20 P **#379 Advanced Applications of Polarized Light- Mueller Matrix Polarimetry/Ellipsometry**  
*Y Lo, National Cheng Kung University*
- 04:50 P **#128 A Stress Measurement Method by Analyzing Spectroscopy of White Light Photoelasticity**  
*W Wei-Chung, National Tsing Hua University; S. Po-Chi, National Tsing Hua University*
- 05:20 P **#269 High-speed and Accurate Shape Measurement for Vibration and Motion Capture by OPPA Method**  
*Y Morimoto, 4D Sensor Inc.*
- 05:50 P **#470 Evaluation of Residual Stress with Optical Methods**  
*C Pappalettere, Politecnico di Bari*



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Wednesday, June 06, 2018

Mechanics of Additive and Advanced Manufacturing

**069. AM Process Acharacterization**

**Organizer(s)**

**Chair Person** S.L.B. Kramer, Sandia National Laboratories

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- 04:20 P **#179 Real Time Monitoring of Additive Manufacturing Processes using High-speed Synchrotron X-ray Imaging**  
*N Parab, Advanced Photon Source, Argonne National Laboratory; C. Zhao, Advanced Photon Source, Argonne National Laboratory; K. Fezzaa, Advanced Photon Source, Argonne National Laboratory; T. Sun, Advanced Photon Source, Argonne National Laboratory*
- 04:40 P **#191 Buckling of Prepreg Slit Tape during Automated Fiber Placement Process: A DIC Based Study.**  
*S Rajan Kattil, University of South Carolina; M. Sutton, University of South Carolina; R. Wehbe, University of South Carolina; B. Tatting, University of South Carolina; Z. Gurdal, University of South Carolina*
- 05:00 P **#369 Tribomechanics of Ultrasonic Additive Manufacturing**  
*A Ward, Rice University; Y. Zhang, Rice University; Z. Cordero, Rice University*
- 05:20 P **#488 Residual Stresses Involved in the 3D Printing of Biomaterials in a Granular Microgel**  
*A Mcghee, University of Florida; D. Nguyen, University of Florida; P. Ifju, University of Florida*
- 05:40 P **#744 A Framework for Estimating of Mold Performance Using Experimental and Numerical Analysis of Injection Mold Tooling Prototypes**  
*S Jahan, Purdue University; H. El-Mounayri, IUPUI; A. Tovar, IUPUI; Y. Shin, Purdue University*
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Wednesday, June 06, 2018

Research in Progress

**070. Research in Progress III**

**Organizer(s)**

**Chair Person** J. Jordan, Los Alamos National Laboratory

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- 04:20 P **#787 Numerical Study of Composite Airfoil and Blade Root Joint Subjected to Vortex Interaction**  
*E Koricho, Georgia Southern University; M. Ilie, Georgia Southern University*
- 04:40 P **#786 Experimental and Numerical Study of GFRP Composite Oscillating Wave Surge Converter (OWSC)**  
*E Koricho, Georgia Southern University; M. Ilie, Georgia Southern University; V. Soloiu, Georgia Southern University*
- 05:00 P **#658 On the Edgewise Compressive and Buckling Behavior of Paper Honeycomb Sandwich Panels: an Experimental Investigation**  
*A Warsame, Rochester Institute of Technology; A. Khan, Rochester Institute of Technology; S. Pervaiz, Rochester Institute of Technology; W. Samad, Rochester Institute of Technology*
- 05:20 P **#131 Evaluation of Dynamic Fracture Parameters of Al7075-T651 at Different Loading Rates Using Modified Hopkinson Pressure Bar**  
*S Kumar, Delhi Technological University, Delhi; A. Panouria, Department of Applied Mechanics, Indian Institute of Technology, Hauz Khas, New Delhi, 110016, India; V. Tiwari, Department of Applied Mechanics, Indian Institute of Technology, Hauz Khas, New Delhi, 110016, India*

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Wednesday, June 06, 2018

Fracture & Fatigue

## 071. Mechanics of Energy & Energetic Materials

**Organizer(s)** S. Xia, Georgia Institute of Technology; S. Nadimpalli, NJIT

**Chair Person** S. Xia, Georgia Institute of Technology; S. Nadimpalli, NJIT

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04:20 P **#82 In-Situ Strain Measurement in Solid-State Li-ion Batteries**

*B Koohbor, University of Illinois; L. Sang, University of Illinois; O. Capraz, University of Illinois; A. v, University of Illinois; S. White, University of Illinois; N. Sottos, University of Illinois*

04:40 P **#566 Characterization of Stress-Diffusion Coupling in Lithiated and Sodiated Germanium by Dynamic Nanoindentation**

*M Papakyriakou, Georgia Institute of Technology; X. Wang, Georgia Institute of Technology; S. Xia, Georgia Institute of Technology*

05:00 P **#613 An improved diffusion coefficient measurement method for Li-ion anode materials**

*R Tripuraneni, New Jersey Institute of Technology; S. Rakshit, New Jersey Institute of Technology; S. Nadimpalli, New Jersey Institute of Technology*

05:20 P **#614 Structural Changes and Associated Stress Evolution in Na-ion Battery Electrodes during Sodiation/De-sodiation Cycling**

*S Rakshit, New Jersey Institute of Technology; S. Nadimpalli, New Jersey Institute of Technology; E. Detsi, University of Pennsylvania*

05:40 P **#521 In-Situ Characterizations of Mechanical Degradation in All-Solid-State Rechargeable Batteries**

*M Lu, georgia institute of technology; s. xia, georgia institute of technology*

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Wednesday, June 06, 2018

Thermomechanics and Infra-red Imaging

## 072. Fatigue & Damage Evaluation Using Infrared Thermography

**Organizer(s)**

**Chair Person** J.L.F. Freire, Pontifical Catholic University of Rio de Janeiro; X. Balandraud, University Clermont-Auvergne Sigma-Clermont

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04:20 P **#92 Comparison Between 0D and 1D Heat Source Reconstruction for Fatigue Characterization**

*P Jongchansitto, Chiang Mai University; C. Douellou, University Clermont-Auvergne Sigma-Clermont; X. Balandraud, University Clermont-Auvergne Sigma-Clermont; I. Preechawuttipong, Chiang Mai University*

04:40 P **#158 Fatigue Properties Assessment of API 5L Gr. B Pipeline Steel using Infrared Thermography**

*V Paiva, PUC-Rio; R. Vieira, PU-Rio; J. Freire, PUC-Rio*

05:00 P **#467 A Rapid Life-prediction Approach for High Cycle Fatigue of Metals by Means of Quantitative Infrared Thermography**

*W Yang, State Key Laboratory of Structural Analysis for Industrial Equipment, Department of Engineering Mechanics, Dalian University of Technology, Dalian 116024, China; X. Guo, State Key Laboratory of Structural Analysis for Industrial Equipment, Department of Engineering Mechanics, Dalian University of Technology, Dalian 116024, China; Q. Guo, State Key Laboratory of Structural Analysis for Industrial Equipment, Department of Engineering Mechanics, Dalian University of Technology, Dalian 116024, China*

- 05:20 P **#655 Evaluation of Fatigue Damage in Short Carbon Fiber Reinforced Plastics Based on Thermoelastic Stress and Phase Analysis**  
*T Sakagami, Kobe University; D. Shiozawa, Kobe University; Y. Nakamura, Kobe University; S. Nonaka, DIC Corporation; K. Hamada, DIC Corporation*
- 05:40 P **#318 Correlation of Microscopic Damage and Thermal Expansion in Composite Laminates**  
*M Haile, Army Research Laboratory; N. Bradley, Army Research Laboratory*
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Thursday, June 07, 2018

Dynamic Behavior of Materials

## 073. Hybrid Experimental/Computational Studies

**Organizer(s)** T. Weerasooriya, US Army Research Laboratory; S. Sockalingam, University of South Carolina  
**Chair Person** S. Sockalingam, University of South Carolina

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- 09:00 A **#104 A Hybrid Experimental-Numerical Study of Crack Initiation and Growth in Transparent Bilayers Across a Weak Interface**  
*S Dondeti, Auburn University; H. Tippur, Auburn University*
- 09:20 A **#226 Full-Scale Testing and Numerical Modeling of Adhesively Bonded Hot Stamped Tubular Rails for Automotive Applications**  
*Y Liu, University of Waterloo; M. Worswick, University of Waterloo; D. Cronin, University of Waterloo*
- 09:40 A **#334 High Strain Rate Response of Adhesively Bonded Fiber-Reinforced Composite Joints – A Hybrid Computational Experimental Study**  
*S Ravindran, University of South Carolina; S. Sockalingam, University of South Carolina; A. Kldane, University of South Carolina; M. Sutton, University of South Carolina; Z. Gurdal, University of South Carolina*
- 10:00 A **#565 A Combined Experimental and Computational Approach for the Observation of Rayleigh Waves and Impact Surface Motion in Glass**  
*J McDonald, US Army Research Laboratory; S. Satopathy, US Army Research Laboratory; M. Pena, NSTech; M. Trabia, University of Nevada; B. O'toole, University of Nevada*
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Thursday, June 07, 2018

Dynamic Behavior of Materials

## 074. Novel Experimental Techniques II

**Organizer(s)** T. Walter, US Army Research Lab; O. Kingstedt, University of Utah  
**Chair Person** O. Kingstedt, University of Utah

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- 09:00 A **#160 An Optimization Based Approach to Design a Complex Loading Pattern Using Modified Split Hopkinson Pressure Bar**  
*S Vidhate, Michigan State University; A. Yucesoy, Michigan State University; R. Mejia-Alvarez, Michigan State University; A. Willis, Department of Neurology, San Antonio Military Medical Center; T. Pence, Michigan State University*
- 09:20 A **#182 A New Look on Specimen Strain Measurement in a Kolsky Tension Bar Experiment**  
*Y Qiu, Southern Methodist University, Dallas, USA; B. Song, Sandia National Laboratories, Albuquerque, NM, USA; B. Martin, Air Force Research Laboratory, Eglin AFB, FL, USA; G. Kleiser, Air Force Research Laboratory, Eglin AFB, FL, USA; X. Nie, Southern Methodist University, Dallas, USA*

- 09:40 A **#174 Development of “Dropkinson” Bar for Intermediate Strain-rate Testing**  
*B Song, Sandia National Laboratories; B. Sanborn, Sandia National Laboratories; J. Heister, Sandia National Laboratories; R. Everett, Sandia National Laboratories; T. Martinez, Sandia National Laboratories; G. Groves, Sandia National Laboratories; E. Johnson, Sandia National Laboratories; D. Kenney, Sandia National Laboratories; M. Knight, Sandia National Laboratories; M. Spletzer, Sandia National Laboratories*
- 10:00 A **#395 Constitutive Modeling of Polyamide Split Hopkinson Pressure Bars for the Design of a Pre-stretched Apparatus**  
*A Bracq, University of Valenciennes; G. Haugou, University of Valenciennes; H. Morvan, University of Valenciennes*

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Thursday, June 07, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

## 075. Multifunctional Materials II

**Organizer(s)** P. Thakre, The Dow Chemical Company; L. Bodelot, Ecole Polytechnique - LMS  
**Chair Person** P. Thakre, The Dow Chemical Company; L. Bodelot, Ecole Polytechnique - LMS

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- 09:00 A **#118 Characterization of Multi-functional Glass Fiber/Epoxy Reinforced Composites**  
*J O'Donnell, University of Massachusetts Dartmouth; A. Hall, U.S. Army Research Laboratory, Aberdeen Proving Ground; M. Haile, U.S. Army Research Laboratory, Aberdeen Proving Ground; L. Nataraj, U.S. Army Research Laboratory, Aberdeen Proving Ground; V. Chalivendra, University of Massachusetts Dartmouth; Y. Kim, University of Massachusetts Dartmouth*
- 09:20 A **#121 Multi-functional Carbon Fiber/Epoxy Reinforced Composites**  
*R Sherman, University of Massachusetts Dartmouth; A. Hall, U.S. Army Research Laboratory, Aberdeen Proving Ground; M. Haile, U.S. Army Research Laboratory, Aberdeen Proving Ground; L. Nataraj, U.S. Army Research Laboratory, Aberdeen Proving Ground; V. Chalivendra, University of Massachusetts Dartmouth; Y. Kim, University of Massachusetts Dartmouth*
- 09:40 A **#689 Mechanical Behavior of Electromagnetically Detectable Polyethylene**  
*L Waldman, The University of Tulsa; A. Evans, The University of Tulsa; P. Hawrylak, The University of Tulsa; M. Keller, The University of Tulsa*
- 10:00 A **#116 Electro-Mechanical Response of Multi-functional Natural Fiber Composites under Inter-laminar Fracture Loading**  
*S Yang, University of Massachusetts Dartmouth; J. Zulu, University of Massachusetts Dartmouth; V. Chalivendra, University of Massachusetts Dartmouth; Y. Kim, University of Massachusetts Dartmouth*

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Thursday, June 07, 2018

Advancement of Optical Methods in Experimental Mechanics

## 076. Mechanical Characterization of Materials & Structures with Optical Methods I

**Organizer(s)** H. Jin, Sandia National Laboratories  
**Chair Person** P.L. Reu, Sandia National Laboratories

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- 09:00 A **#669 Digital Volume Correlation and Cohesive Zone Modeling Study of Interfacial Debonding in Particulate Composites**  
*M Martinez, University of Illinois Urbana-Champaign; J. Li-Mayer, Imperial College of Science Technology and Medicine; M. Charalambides, Imperial College of Science Technology and Medicine; J. Lambros, University of Illinois at Urbana-Champaign*

- 09:20 A **#271 Role of Intrinsic Microstructural Features on Accuracy of Digital Volume Correlation**  
*B Croom, University of Virginia; H. Jin, Sandia National Laboratories; B. Mills, Sandia National Laboratories; J. Carroll, Sandia National Laboratories; X. Li, University of Virginia*
- 09:40 A **#510 Determining a Relationship between Digital Volume Correlation and Digital Image Correlation for Polyurethane Foams**  
*J Gearhart, Sandia National Laboratories; E. Quintana, Sandia National Laboratories; A. Jones, Sandia National Laboratories; P. Reu, Sandia National Laboratories; S. Kramer, Sandia National Laboratories*
- 10:00 A **#620 A digital laser speckle technique for generating slope contours of bent plate**  
*A Giordano, Stony Brook University; F. Chiang, Stony Brook University*

Thursday, June 07, 2018

Mechanics of Additive and Advanced Manufacturing

## 077. Processing & Mechanical Behavior of AM Materials

**Organizer(s)**

**Chair Person** H. Jin, Sandia National Laboratories

- 09:00 A **#813 Keynote: Linking Thermal History to Mechanical Behavior in Directed Energy Deposited Materials (40-min)**  
*J Cao, NorthWestern Univ*
- 09:40 A **#739 High stiffness-to-weight ratio zero coefficient of thermal expansion lattices fabricated by additive manufacturing methods**  
*M de Boer, Carnegie Mellon University; S. Sun, University of Wisconsin; M. Miller, Carnegie Mellon University; J. Beuth, Carnegie Mellon University*
- 10:00 A **#749 Effect of Processing Parameters on Interlayer Fracture Toughness of Fused Filament Fabrication Thermoplastic Materials**  
*D Young, University of Utah; C. Otten, University of Utah; M. Czabaj, University of Utah*

Thursday, June 07, 2018

Applications

## 078. Applications I

**Organizer(s)**

**Chair Person** P. Reynolds, University of Exeter

- 09:00 A **#289 Dynamic Response of Thermally Stressed Plates with Reinforced Edges**  
*C Santos Silva, University of Liverpool; J. Lambros, University of Illinois at Urbana-Champaign; E. Patterson, University of Liverpool*
- 09:20 A **#343 Experimental and Theoretical Study on the Robustification of Ultrasonic Guided Waves for In-Situ Inspection**  
*C Hsu, U.S. Army Research Laboratory, Vehicle Technology Directorate, Aberdeen Proving Ground, MD; M. Haile, U.S. Army Research Laboratory, Vehicle Technology Directorate, Aberdeen Proving Ground, MD; N. Epps-Bradley, U.S. Army Research Laboratory, Vehicle Technology Directorate, Aberdeen Proving Ground, MD; J. Chen, U.S. Army Research Laboratory, Vehicle Technology Directorate, Aberdeen Proving Ground, MD*
- 09:40 A **#711 Effect of Hot-Wet Conditioning on the shear Properties of Carbon Fiber Composite, using Digital Image Correlation techniques**  
*S Ghaffari, University Of Texas at Arlington; A. Makeev, University Of Texas at Arlington; B. Shonkwiler, University Of Texas at Arlington*

10:00 A **#474 Mode I delamination behaviour of Fused Deposition Modelling parts**

*C Barile, Politecnico di Bari - Dipartimento di Meccanica, Matematica e Management; C. Casavola, Politecnico di Bari - Dipartimento di Meccanica, Matematica e Management; A. Cazzato, Politecnico di Bari - Dipartimento di Meccanica, Matematica e Management*

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Thursday, June 07, 2018

Fracture & Fatigue

## 079. Integration of Models & Experiments II

**Organizer(s)** J. Carroll, Sandia National Laboratories; S. Grutzik, Sandia National Laboratories

**Chair Person** S. Grutzik, Sandia National Laboratories; J. Carroll, Sandia National Laboratories

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09:00 A **#241 Low Modulus Composite Patched Aluminum Center Crack Tension Specimen DIC Surface Displacements Compared with Predictions**

*D Hart, Naval Surface Warfare Center Carderock Division; H. Bruck, University of Maryland, College Park*

09:20 A **#659 Numerical Modeling of Charpy Impact Test to Determine the Fracture Characteristics of AISI 1045**

*S Pervaiz, Rochester Institute of Technology; S. Kannan, American University of Sharjah; W. Samad, Rochester Institute of Technology*

09:40 A **#706 Combined Modelling and Experimental Approach to Improve Mechanical Impact Survivability of GaN Power FET**

*J Ferguson, Air Force Research Laboratory, Materials and Manufacturing Directorate; S. Sihn, University of Dayton Research Institute, Nonstructural Materials Division; A. Hilton, Wyle Laboratories; C. McKinion, Air Force Research Laboratory, Munitions Directorate; S. Dooley, Air Force Research Laboratory, Sensors Directorate; A. Roy, Air Force Research Laboratory, Materials and Manufacturing Directorate; A. Schrand, Air Force Research Laboratory, Munitions Directorate; E. Heller, Air Force Research Laboratory, Materials and Manufacturing Directorate*

10:00 A **#127 Experimental characterization of the crack-tip plastic zone size and shape via DIC**

*G Gonzáles, PUC-Rio; J. González, PUC-Rio; J. Freire, PUC-Rio*

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Thursday, June 07, 2018

Thermomechanics and Infra-red Imaging

## 080. Integration of Infrared Thermography & DIC

**Organizer(s)**

**Chair Person** R. Tighe, Defence Academy of the UK; W. Samad, Rochester Institute of Technology

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09:00 A **#321 Experimental Validation of the Energy Balance Equation in the Presence of Acoustic Emission**

*N Bradley, Army Research Laboratory; M. Haile, Army Research Laboratory; B. Northington, Tennessee State University; M. Coatney, Army Research Laboratory*

09:20 A **#459 Understanding heterogeneity in discontinuous compression moulded composite materials for high-volume applications**

*D Bull, University of Southampton; J. Dulieu-Barton, University of Southampton; O. Thomsen, University of Southampton*

09:40 A **#387 Effects of Strain Path Changes on Calorimetric Signature of Portevin-Le Chatelier Bands in Al-Mg Alloys**

*J LE CAM, Université de Rennes 1, Institut de Physique; E. ROBIN, Université de Rennes 1, Institut de Physique; L. LEOTOING, INSA de Rennes, LGCGM; D. GUINES, INSA de Rennes, LGCGM*

10:00 A **#389 Multi-instrumentation of Very High Temperature Tests**

*T Archer, ONERA; P. Beauchêne, ONERA; C. Huchette, ONERA; M. Berny, LMT; F. Hild, LMT*

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Thursday, June 07, 2018

Dynamic Behavior of Materials

## 081. Advances in Material Modeling I

**Organizer(s)** P. Allison, University of Alabama

**Chair Person** P. Allison, University of Alabama

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- 10:50 A **#597 Modeling of the Temperature Influence on the Dynamic Behavior of AFS Additive Manufactured Inconel 625**  
*O Rodriguez, NASA-MSFC; C. Mason, University of Alabama; P. Allison, University of Alabama; J. Jordon, University of Alabama*
- 11:10 A **#609 Internal State Variable Plasticity Modeling of Temperature Influence on Dynamically Loaded PBF EBM AM Ti6Al4V**  
*O Rodriguez, NASA; P. Allison, The University of Alabama; W. Whittington, Mississippi State University; S. Mates, NIST*
- 11:30 A **#623 Plasticity and Damage Modeling of Temperature Dependence and Strain Rate Effects of Wrought Aluminum Alloy 7075**  
*C Mason, The University of Alabama; O. Rodriguez, The University of Alabama; D. Avery, The University of Alabama; P. Allison, The University of Alabama; O. Rivera, The University of Alabama; Z. McClelland, U.S. Army ERDC; B. Jordon, The University of Alabama*
- 11:50 A **#629 Plasticity and Damage Modeling of Stress Asymmetry and Dynamic Behavior of AFS Additive Manufactured Aluminum Alloy 2219**  
*O Rivera, Sikorsky Aircraft Corporation; Stratford, CT; J. Jordon, Department of mechanical Engineering, The University of Alabama; Tuscaloosa, AL; W. Whittington, Department of mechanical Engineering, Mississippi State University; Strakville, MS; P. Allison, Department of mechanical Engineering, The University of Alabama; Tuscaloosa, AL*
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Thursday, June 07, 2018

Dynamic Behavior of Materials

## 082. Novel Experimental Techniques III

**Organizer(s)** T. Walter, US Army Research Lab; O. Kingstedt, University of Utah

**Chair Person** T. Sano, Air Force Research Lab

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- 10:50 A **#292 Development of an Interferometer and Schlieren-based Measurement Technique for Resolving Cavitation Pressure Fields**  
*S Buyukozturk, Brown University; A. Landauer, Brown University; C. Franck, Brown University*
- 11:10 A **#399 Novel Inertial Impact Tests to Characterize the Plastic Properties of Metals**  
*F Davis, University of Southampton; L. Fletcher, University of Southampton; F. Pierron, University of Southampton*
- 11:30 A **#740 Dynamic Spherical Indentation of Single Crystal Quartz with Compression and Torsion**  
*K Leonard, Johns Hopkins University; K. Ramesh, Johns Hopkins University*
- 11:50 A **#502 Development of a Combined Shear and Compression Test for Soft Impact Mitigating Materials**  
*M Riley, National Institute of Standards and Technology; A. Forster, National Institute of Standards and Technology*

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Thursday, June 07, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

**083. Manufacturing & Joining of Composites**

**Organizer(s)** G. Miller, The Boeing Company ; C. Degen, South Dakota School of Mines & Technology

**Chair Person** G. Miller, The Boeing Company ; C. Degen, South Dakota School of Mines & Technology

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- 10:50 A **#357 Experimental and Numerical Characterization of CFRP Composite and Aluminum Tubes Using Tailorable Adhesive**  
*E Stubblefield, Georgia Southern University; E. Koricho, Georgia Southern University*
- 11:10 A **#492 Crack-Growth Rates of Interfacial Cracks in Bonded Composite Repairs**  
*I Alnaser, The University of Tulsa; M. Keller, The University of Tulsa*
- 11:30 A **#236 Application of DIC for Development of a Computational Framework Representative of Ultrasonically Spot Welded Composite Joints**  
*J Newkirk, South Dakota School of Mines and Technology; C. Degen, South Dakota School of Mines and Technology; A. Romkes, South Dakota School of Mines and Technology*
- 11:50 A **#656 Experimental and Numerical Study of Hybrid Joint with Wave Washer Subjected to Impact Loading**  
*S DeVries, Georgia Southern University Allen E. Paulson College of Information & Engineering Technology; E. Koricho, Georgia Southern University Allen E. Paulson College of Engineering & Information Technology*
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Thursday, June 07, 2018

Advancement of Optical Methods in Experimental Mechanics

**084. Mechanical Characterization of Materials & Structures with Optical Methods II**

**Organizer(s)**

**Chair Person** H. Jin, Sandia National Laboratories

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- 10:50 A **#296 Investigating Fatigue Striation Morphology in Crystallisable Elastomers by using a Phase Extraction Algorithm**  
*B Ruellan, Cooper Standard; E. Robin, University of Rennes 1; J. Le Cam, University of Rennes 1; I. Jeanneau, Cooper Standard; F. Canévet, Cooper Standard; D. Loison, University of Rennes 1; G. Mauvoisin, University of Rennes 1*
- 11:10 A **#461 A combined high-resolution full-field imaging and metallography approach to assess the local properties of FSW Cu-SS joints**  
*S Ramachandran, University of Southampton, Highfield, Southampton SO17 1BJ, United Kingdom; J. Dulieu-Barton, University of Southampton, Highfield, Southampton SO17 1BJ, United Kingdom; P. Reed, University of Southampton, Highfield, Southampton SO17 1BJ, United Kingdom; L. A.K., SSN College of Engineering, Kalavakkam-603110, Tamilnadu, INDIA*
- 11:30 A **#533 Effect of thermomechanical processing on the ballistic performance of alpha+beta and metastable-beta titanium alloys**  
*S Mujahid, Mississippi State University; A. Oppedal, Mississippi State University; W. Whittington, Mississippi State University; P. Allison, University of Alabama; A. Boostani, Mississippi State University; H. Elkadiri, Mississippi State University*
- 11:50 A **#460 Compression tests on CFRP analyzed by Digital Image Correlation**  
*C Barile, Politecnico di Bari - Dipartimento di Meccanica, Matematica e Management; C. Casavola, Politecnico di Bari - Dipartimento di Meccanica, Matematica e Management; G. Pappalettera, Politecnico di Bari - Dipartimento di Meccanica, Matematica e Management*



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Thursday, June 07, 2018

Mechanics of Additive and Advanced Manufacturing

## 085. Dynamic Response of AM Materials

**Organizer(s)**

**Chair Person** A. Beese, Pennsylvania State University

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11:10 A **#552 Shock Propagation and Deformation of Additively-Manufactured Polymer Foams with Engineered Porosity**

*J Spowart, Air Force Research Laboratory, Materials and Manufacturing Directorate; K. Neel, Air Force Research Laboratory, Munitions Directorate; D. Lacina, University of Dayton Research Institute; G. Frank, University of Dayton Research Institute; A. Abbott, University of Dayton Research Institute; B. Branch, Los Alamos National Laboratory*

11:30 A **#114 Static and Dynamic Fracture of Additively Printed ABS Studied Using DIC: Effect of Build Architecture and Loading Rate**

*I John, Auburn University; H. Tippur, Auburn University*

11:50 A **#511 Mechanical Behaviors of new developed PDMS-based inks for additive manufacturing**

*S Crum, Los Alamos National Laboratory; J. Dumont, Los Alamos National Laboratory; C. Park, Gyeongnam National University of Science and Technology; A. Labouriau, Los Alamos National Laboratory; K. Lee, Los Alamos National Laboratory*

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Thursday, June 07, 2018

Applications

## 086. Applications II

**Organizer(s)**

**Chair Person** J. Helm, Lafayette College

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10:50 A **#713 Ultrasonic Imaging of Rail Flaws using Transducer Wedge and GPU Processing**

*S Sternini, University of California, San Diego; A. Liang, University of California, San Diego; F. Lanza di Scalea, University of California, San Diego; R. Wilson, U.S. Federal Railroad Administration*

11:10 A **#618 Finite Element Model Updating using Digital Image Correlation Data**

*M Mathew, Drexel University; A. Ellenberg, Drexel University; S. Ye, Drexel University; I. Bartoli, Drexel University; A. Kontsos, Drexel University*

11:30 A **#416 In-situ Brittle Fracture with Microscopic DIC**

*C Spellman, Psylotech, Inc.; A. Arzoumanidis, Psylotech, Inc.*

11:50 A **#428 A Design of Experiments Approach for Determining Sensitivities of Forming Limit Analyses to Experimental Parameters**

*M Iadicola, National Institute of Standards and Technology; D. Banerjee, National Institute of Standards and Technology*

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Thursday, June 07, 2018

Fracture & Fatigue

## 087. In Situ Techniques for Fatigue & Fracture I

**Organizer(s)** G. Pataky, Clemson University; R. Berke, Utah State University

**Chair Person** G. Pataky, Clemson University; R. Berke, Utah State University

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- 10:50 A **#634 In-situ/ex-situ damage precursor identification for an aluminum alloy tapered test specimen**  
*T Henry, US Army Research Laboratory; D. Cole, US Army Research Laboratory; R. Haynes, US Army Research Laboratory*
- 11:10 A **#699 Damage Evolution and Local Strain Redistribution in Composite Laminate with Various Stacking Arrangement**  
*A Tessema, University of South Carolina; S. Ravindran, University of South Carolina; A. Kidane, University of South Carolina*
- 11:30 A **#180 An Experimental Method to Induce and Measure 3D Crack Propagation in Thin Brittle Polymers with Heterogeneities**  
*K Mac Donald, Caltech; G. Ravichandran, Caltech*
- 11:50 A **#791 Full-Field Vibration Fatigue Strains at Extreme Temperatures**  
*M Nelson, Utah State University; J. Matsen, Utah State University; S. Burton, Utah State University; R. Berke, Utah State University*

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Thursday, June 07, 2018

Thermomechanics and Infra-red Imaging

## 088. Materials Characterizations Using Thermography II

**Organizer(s)**

**Chair Person** X. Balandraud, University Clermont-Auvergne Sigma-Clermont; S. Quinn, University of Southampton

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- 10:50 A **#93 Analysis of the Thermomechanical Response of Granular Materials by Infrared Thermography**  
*P Jongchansitto, Chiang Mai University; X. Balandraud, University Clermont-Auvergne Sigma-Clermont; I. Preechawuttipong, Chiang Mai University; J. Le Cam, University of Rennes 1; P. Garnier, PCM Technologies S.A.S.*
- 11:10 A **#361 Measuring Strain-induced Crystallinity in Rubbers from IR Thermography**  
*J LE CAM, University of Rennes 1*
- 11:30 A **#741 Investigation of layer based thermal behavior in FDM process by infrared thermography**  
*E Maleki Pour, Center for Additive Manufacturing Research at IUPUI (CAMRI)/Purdue School of Engineering and Technology; S. Attoye, Purdue School of Engineering and Technology; H. El-Mounayri, Purdue School of Engineering and Technology*
- 11:50 A **#434 Design and Development of a High-speed Infrared Microscope for Investigation of Dynamic Deformation in Solids**  
*O Skartsis, Brown University; P. Guduru, Brown University*

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Thursday, June 07, 2018

Dynamic Behavior of Materials

## 089. Advances in Material Modeling II

**Organizer(s)** P. Allison, University of Alabama

**Chair Person** P. Allison, University of Alabama

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- 01:20 P **#624 Microstructure Influence on the Strain-Rate and Stress-State Behavior of Solid-State AM AFS-Deposition Aluminum Alloy 6061**  
*B Phillips, The University of Alabama; D. Avery, The University of Alabama; C. Mason, The University of Alabama; P. Allison, The University of Alabama; J. Jordon, The University of Alabama*

- 01:40 P **#632 Additive Friction Stir Simulations by Smoothed Particle Hydrodynamics of Additive Manufactured Aluminum Alloy 6061**  
*G Stubblefield, University of Alabama; K. Fraser, National Research Council Canada; P. Allison, University of Alabama; B. Jordon, University of Alabama*
- 02:00 P **#732 Material Modeling of Al-Li Alloys**  
*A Cisko, University of Alabama; J. Jordon, University of Alabama*
- 02:20 P **#751 Meshfree Simulation of Oxide Dispersion in Additive Friction Stir Deposition of Aluminum Alloy 5083**  
*R Escobar, The University of Alabama; K. Fraser, National Research Council Canada; J. Jordon, The University of Alabama; P. Allison, The University of Alabama*
- 02:40 P **#683 Numerical study of the failure mechanism of ceramics during low velocity impact used in protective systems**  
*C Fountzoulas, U.S. Army Research Laboratory; R. Brennan, U.S. Army Research Laboratory*

Thursday, June 07, 2018

Dynamic Behavior of Materials

## 090. Shock & Blast I

**Organizer(s)** V. Eliasson, University of Southern California; B. Koohboor, University of Illinois at Urbana-Champaign  
**Chair Person** V. Eliasson, University of Southern California

- 01:20 P **#75 A Novel Approach for Plate Impact Experiments to Obtain Properties of Materials Under Extreme Conditions**  
*B Zuanetti, CWRU; T. Wang, CWRU; V. Prakash, CWRU*
- 01:40 P **#65 Error Analysis for Shock Equation of State Measurements using Manganin Gauges**  
*J Jordan, Los Alamos National Laboratory; D. Casem, U.S. Army Research Laboratory*
- 02:00 P **#97 Shock Compression of Molybdenum Single Crystals to High Stresses**  
*T Oniyama, Division of Engineering and Applied Science, California Institute of Technology; Y. Toyoda, Institute for Shock Physics, Washington State University; Y. Gupta, Institute for Shock Physics, Washington State University; G. Ravichandran, Division of Engineering and Applied Science, California Institute of Technology*
- 02:20 P **#140 Inelastic Behavior of Tungsten-Carbide in Pressure-Shear Shock Experiments beyond 20 GPa**  
*Z Lovinger, Caltech; C. Kettenbeil, Caltech; M. Mello, Caltech; G. Ravichandran, Caltech*
- 02:40 P **#214 Improved Richtmyer-Meshkov Instability Experiments for Very-High-Rate Strength & Application to Tantalum**  
*M Prime, Los Alamos National Laboratory; W. Buttler, Los Alamos National Laboratory; S. Fensin, Los Alamos National Laboratory*

Thursday, June 07, 2018

4th International Symposium on the Mechanics of Composite and Multifunctional Materials

## 091. Nanoparticulate Based Recycled Constituent Composites III

**Organizer(s)** I. Miskoiglu, Michigan technological University; E. Bayraktar, SUPMECA-Paris  
**Chair Person** I. Miskoiglu, Michigan technological University; E. Bayraktar, SUPMECA-Paris

- 01:20 P **#134 Toughening Mechanism in Epoxy Resin Modified Recycled Rubber Based Composites Reinforced with Gamma-Alumina, Graphene and CNT**  
*A IREZ, Ecole Centrale de Paris, University Paris-Saclay, FRANCE; G. Zambelis, Airbus-helicopter-Paris, Reserch and Development, FRANCE; I. Miskoiglu, Michigan Technical University MI/USA; E. BAYRAKTAR, Supmeca/Paris, School of Mechanical and Manufacturing Engineering, France*

- 01:40 P **#193 Reinforcement of Recycled Rubber Based Composite with Nano-Silica/Graphene Hybrid Fillers**  
*A Irez, Ecole CentraleSupélec, University Paris - Saclay, France; I. Miskioglu, Michigan Technological University ME-EM Department, Houghton, MI-USA; E. BAYRAKTAR, Supmeca-Paris, School of Mechanical and Manufacturing Engineering, France; D. Katundi, Supmeca-Paris, School of Mechanical and Manufacturing Engineering, France*
- 02:00 P **#590 Toughening Mechanisms on the Recycled Rubber modified epoxy Based Composites Reinforced with Graphene Nano Platelets**  
*A Irez, Ecole CentraleSupélec, University Paris - Saclay, France; I. Miskioglu, Michigan Technological University ME-EM Department, Houghton, MI-USA; E. Bayraktar, Supmeca-Paris, School of Mechanical and Manufacturing Engineering, France*
- 02:20 P **#282 Design of Aluminium Matrix Composites (AMCs) Reinforced with Nano Fe<sub>3</sub>O<sub>4</sub>, Recycled Nickel - Copper Particles**  
*L Ferreira, Federal University of Southern and Southeastern, PA, BRAZIL; E. BAYRAKTAR, Supmeca / Paris, School of Mechanical and Manufacturing Engineering FRANCE; I. Miskioglu, Michigan Technology University, Engineering Mechanics Department, Houghton, MI-USA; M. Robert, University of Campinas, UNICAMP-FEM, SP/Campinas, BRAZIL*
- 02:40 P **#291 Reinforcement Effect of Nano Fe<sub>3</sub>O<sub>4</sub> and ZnO on the Mechanical and Physical Properties of Recycled Aluminium Based Composites**  
*L Ferreira, Federal University of Southern and Southeastern, PA, BRAZIL; I. Miskioglu, Michigan Technology University, Engineering Mechanics Department, Houghton, MI-USA; E. Bayraktar, Supmeca / Paris, School of Mechanical and Manufacturing Engineering FRANCE; D. Katundi, Supmeca/Paris, School of Mechanical and Manufacturing Engineering, France*

Thursday, June 07, 2018

Advancement of Optical Methods in Experimental Mechanics

## 092. Bioengineering

**Organizer(s)**

**Chair Person** C. Furlong, WPI-ME/CHSLT; L. Lamberti, Politecnico di Bari

- 01:20 P **#799 High-speed holographic shape and transient response measurements of mammalian tympanic membrane**  
*P Razavi, Worcester Polytechnic Institute; H. Tang, Worcester Polytechnic Institute; N. Maftoon, Department of Otology and Laryngology, Harvard Medical School; J. Cheng, Department of Otology and Laryngology, Harvard Medical School; J. Rosowski, Department of Otology and Laryngology, Harvard Medical School; C. Furlong, Worcester Polytechnic Institute*
- 01:40 P **#803 High-speed Digital Image Correlation for Endoscopy: a Feasibility Study**  
*H Tang, Worcester Polytechnic Institute; K. Pooladvand, Worcester Polytechnic Institute; P. Razavi, Worcester Polytechnic Institute; T. Chen, Massachusetts Eye and Ear Infirmary; M. Ravicz, Massachusetts Eye and Ear Infirmary; J. Rosowski, Massachusetts Eye and Ear Infirmary*
- 02:00 P **#678 Use of Digital Image Correlation Method to Measure Bio-tissue Deformation**  
*T Chen, National Cheng Kung University; L. chang, National Cheng Kung University*
- 02:20 P **#151 Image Analysis of Curvature Using Classical Mechanics, The Elastica**  
*C Wilson, Medtronic, Inc.; J. Dawson, Medtronic, Inc.*
- 02:40 P **#317 Investigating the Impact Bruise of Fruits with Drop Test and Hyperspectral Imaging**  
*Q Pham, Southern Taiwan University of Science and Technology; N. Liou, Southern Taiwan University of Science and Technology*

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Thursday, June 07, 2018

Mechanics of Additive and Advanced Manufacturing

**093. Additively Manufactured Polymers**

**Organizer(s)**

**Chair Person** B. Antoun, Sandia National Laboratories

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01:20 P **#125 3D Printed Polymers for Enhanced Fracture Properties**

*S Yang, University of Massachusetts Dartmouth; J. Li, University of Massachusetts Dartmouth; D. Li, University of Massachusetts Dartmouth; V. Chalivendra, University of Massachusetts Dartmouth*

01:40 P **#120 Compression and Shear Response of 3D Printed Foam Pads**

*W Lu, Sandia National Laboratories*

02:00 P **#124 Dynamic Fracture Characterization of 3D Printed Materials**

*M Rabbi, University of Massachusetts Dartmouth; D. Li, University of Massachusetts Dartmouth; V. Chalivendra, University of Massachusetts Dartmouth*

02:20 P **#746 Three-Dimensional Shape Memory Polymer Microstructures and Microelectronics Through Mechanically-Guided Assembly**

*X Wang, Northwestern University; X. Guo, Tsinghua university; Y. Zhang, Tsinghua university; Y. Huang, Northwestern University; J. Rogers, Northwestern University*

02:40 P **#712 Tensile Mechanical Properties of a Thermoplastic Polymer 3D Printed in Extreme Environments**

*J Torres, St. Mary's University; O. Onwuzurike, St. Mary's University; A. McClung, St. Mary's University; J. Ocampo, St. Mary's University*

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Thursday, June 07, 2018

Fracture & Fatigue

**095. In Situ Techniques for Fatigue & Fracture II**

**Organizer(s)** G. Pataky, Clemson University; R. Berke, Utah State University

**Chair Person** R. Berke, Utah State University; G. Pataky, Clemson University

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01:20 P **#403 In Situ Observations of Cracking during Constrained Sintering**

*J Carazzone, Rice University; M. Bonar, Rice University; Z. Cordero, Rice University*

01:40 P **#793 One Order Magnitude Frequency Effect on Ti64 Fatigue Behavior**

*O Scott-Emuakpor, Air Force Research Laboratory; T. George, Air Force Research Laboratory; C. Holycross, Air Force Research Laboratory; R. O'Hara, Air Force Research Laboratory*

02:00 P **#298 Injection Initiated Fracture in Soft Solids**

*S Yang, University of Illinois Urbana-Champaign; D. Bahk, University of Illinois Urbana-Champaign; S. Hutchens, University of Illinois Urbana-Champaign*

02:20 P **#280 Influence of the Temperature on the Lifetime Reinforcement of a Filled NR**

*B Ruellan, Cooper Standard; J. Le Cam, University of Rennes 1; E. Robin, University of Rennes 1; I. Jeanneau, Cooper Standard; F. Canévet, Cooper Standard; F. Mortier, Cooper Standard*

02:40 P **#807 Integrated Measurement and Modeling of Closure Stresses During Fatigue Crack Propagation**

*A Bastawros, Iowa State University*

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Thursday, June 07, 2018

Thermomechanics and Infra-red Imaging

## 096. Material Characterizations Using Thermography III

**Organizer(s)**

**Chair Person** J.-B. Le Cam, University de Rennes; J. Dulieu-Barton, University of Southampton

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- 01:20 P **#677 Dissipative Heat Source Distribution in a Laser Welded 316 L Stainless Steel**  
*V Seelan, University of Southampton; F. Pierron, University of Southampton; J. Dulieu-Barton, University of Southampton*
- 01:40 P **#363 Mechanical and Thermomechanical Characterization of Different Leathers**  
*N DI CESARE, Université Bretagne Sud; G. CORVEC, University of Rennes 1; X. BALANDRAUD, SIGMA Clermont; J. LE CAM, University of Rennes 1*
- 02:00 P **#244 Purely Temporal Filtering for IR Images Denoising**  
*E Robin, University of Rennes 1; j. Le Cam, university of Rennes 1*
- 02:20 P **#349 Mechanical Response and Energy Stored During Deformation of Crystallizing TPU**  
*A LACHHAB, Cooper Standard; E. ROBIN, University of Rennes 1; J. LE CAM, University of Rennes 1; F. MORTIER, Cooper Standard; Y. TIREL, Cooper Standard; F. CANEVET, Cooper Standard*
- 02:40 P **#679 Fatigue Limit Estimation for Single Bead-on-plate weld Based on Dissipated Energy measurement**  
*D Shiozawa, Kobe University; Y. Ogino, Kobe Univerisy; T. Washio, Kobe University; T. Sakagami, Kobe University; H. Ueda, Nippon Steel & Sumitomo Metal Corporation; T. Makino, Nippon Steel & Sumitomo Metal Corporation*
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Thursday, June 07, 2018

Dynamic Behavior of Materials

## 097. Industrial Applications

**Organizer(s)** S. Mates, NIST

**Chair Person** S. Mates, NIST

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- 03:20 P **#253 The Flow Stress of AM IN 625 Under Conditions of High Strain and Strain Rate**  
*R Ananda Kumar, Wichita State University; H. Lopez Hawa, Wichita State University; V. Madhavan, Wichita State University; W. Moscoso-Kingsley, Wichita State University; G. Jacob, National Institute of Standards and Technology; S. Mates, National Institute of Standards and Technology; A. Donmez, National Institute of Standards and Technology*
- 03:40 P **#258 Dynamic Thermal Softening Behavior of Additive Materials for Hybrid Manufacturing**  
*S Mates, NIST; M. Stoudt, NIST; W. Moscoso-Kingsley, Wichita State University; V. Madhavan, Wichita State University*
- 04:00 P **#192 Historical Note: Machining, Strain Gages, and a Pulse-heated Kolsky Bar**  
*R Rhorer, National Institute of Standards and Technology; S. Mates, National Institute of Standards and Technology; E. Whitenton, National Institute of Standards and Technology; T. Burns, National Institute of Standards and Technology*
- 04:20 P **#313 Assessment of Constitutive Models in Capturing the High Strain Rate Behavior of Various AHSSs**  
*R Alturk, Clemson University; L. Hector, Jr., General Motors Global Research and Development; F. Abu-Farha, Clemson University; C. Enloe, GM Product Integrity, Body Structures & Closures Materials Engineering; T. Brown, General Motors Global Research and Development*

- 04:40 P **#257 Effect of Strain-rate on the Plastic Anisotropy of a Low-carbon Steel**  
*Y Korkolis, University of New Hampshire; B. Mitchell, University of New Hampshire; M. Locke, University of New Hampshire; S. Mates, NIST; B. Kinsey, University of New Hampshire*
- 05:00 P **#133 Combining Viscoelastic Properties and Architecture to Control the Dynamic Response of Soft Materials**  
*A Forster, NIST; M. Riley, NIST*
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Thursday, June 07, 2018

## Dynamic Behavior of Materials

### 098. Shock & Blast II

**Organizer(s)** V. Eliasson, University of Southern California; B. Koohboor, University of Illinois at Urbana-Champaign  
**Chair Person** B. Koohboor, University of Illinois at Urbana-Champaign

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- 03:20 P **#335 Pressure-shear Shock Experiments on Soda-Lime Glass at Pressures Beyond 20 GPa**  
*C Kettenbeil, California Institute of Technology; Z. Lovinger, California Institute of Technology; M. Mello, California Institute of Technology; T. Jiao, Brown University; R. Clifton, Brown University; G. Ravichandran, California Institute of Technology*
- 03:40 P **#544 Dynamic Shearing Resistance of Constituents of a Simulant of an Active Material**  
*P Malhotra, Brown University; T. Jiao, Brown University; R. Clifton, Brown University; P. Guduru, Brown University*
- 04:00 P **#570 Compression wave profiles in shock loaded polymer-metal composites**  
*D Bober, Lawrence Livermore National Laboratory; Y. Toyoda, Washington State University; B. Maddox, Lawrence Livermore National Laboratory; R. Minich, Lawrence Livermore National Laboratory; E. Herbold, Lawrence Livermore National Laboratory; Y. Gupta, Washington State University; M. Kumar, Lawrence Livermore National Laboratory*
- 04:20 P **#675 Uncertainties in Low-Pressure Shock Experiments on Heterogeneous Materials**  
*T Vogler, Sandia National Laboratories; M. Hudspeth, Sandia National Laboratories; S. Root, Sandia National Laboratories*
- 04:40 P **#480 Investigating the response behavior of a surrogate head model due to blast-induced pressure wave impact**  
*R Banton, US Army Research Laboratory; T. Piehler, US Army Research Laboratory; N. Zander, US Army Research Laboratory; R. Mrozek, US Army Research Laboratory*
- 05:00 P **#222 Mechanical Characterization and Numerical Material Modeling of Polyurea**  
*J LeBlanc, Naval Undersea Warfare Center, Divison Newport; S. Bartyczak, Naval Surface Warfare Center, Dahlgren Division; L. Edgerton, Naval Surface Warfare Center, Dahlgren Division*
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Thursday, June 07, 2018

## 4th International Symposium on the Mechanics of Composite and Multifunctional Materials

### 099. Novel Developments in Composites

**Organizer(s)** D. Sequera, Baker Hughes Inc; G. Slipher, U.S. Army Research Laboratory  
**Chair Person** D. Sequera, Baker Hughes Inc; G. Slipher, U.S. Army Research Laboratory

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- 03:20 P **#509 Microscale Investigation of Transverse Tensile Failure of Fiber-Reinforced Polymer Composites**  
*C Arndt, University of Utah; P. DaBell, University of Utah; M. Czabaj, University of Utah*
- 03:40 P **#130 Study of Mechanical Characteristics of Banana and Jute Fiber Reinforced Polyester Composites**  
*G Easwara Prasad, Manglore Institute of Technology and Engineering; B. Megha, Maharaja Institute of Technology; B. Keerthi Gowda, Visvesvaraya Technological University*

- 04:00 P **#644 Improvement of Mechanical Properties of Carbon Fiber Reinforced Hybrid Aluminum Matrix Composites (HAMCs)**  
*A Rahman, Pennsylvania State University - Harrisburg*
- 04:20 P **#320 Composites from Recycled Copper as an Alternative Replacement for Electric Motor Repair Parts**  
*H Chaouche, Supmeca/Paris, School of Mechanical and Manufacturing Engineering Paris-FRANCE; A. Larbi, Supmeca / Paris, School of Mechanical and Manufacturing Engineering FRANCE; D. Katundi, Supmeca / Paris, School of Mechanical and Manufacturing Engineering FRANCE; E. BAYRAKTAR, Supmeca/Paris, School of Mechanical and Manufacturing Engineering, France*
- 04:40 P **#526 Recycling A Duplex Stainless Steel Chips By High Energy Milling And Addition of Vanadium Carbide, Aluminum And Copper**  
*F Gatamorta, University of Campinas, FEM/Campinas - São Paulo, Brazil.; E. Bayraktar, Supmeca-Paris, School of Mechanical and Manufacturing Engineering, France; C. Mendonça, Universidade Federal de Itajubá. Av. BPS, 1303, Bairro Pinheirinho. Itajubá- Minas Gerais, Brasil.; M. SILVA, Universidade Federal de Itajubá. Av. BPS, 1303, Bairro Pinheirinho. Itajubá- Minas Gerais, Brasil.; M. Melo, Universidade Federal de Itajubá. Av. BPS, 1303, Bairro Pinheirinho. Itajubá- Minas Gerais, Brasil.; G. Silva, Universidade Federal de Itajubá. Av. BPS, 1303, Bairro Pinheirinho. Itajubá- Minas Gerais, Brasil.*

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Thursday, June 07, 2018

Advancement of Optical Methods in Experimental Mechanics

## 100. Mechanical Characterization of Materials & Structures with Optical Methods III

**Organizer(s)**

**Chair Person** F. Pierron, University of Southampton

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- 03:20 P **#730 Identifying the role of precipitates on the failure of light weight alloys using x-ray micro computed tomography**  
*T Walter, Army Research Laboratory; P. Moy, Army Research Laboratory; T. Sano, Army Research Laboratory; J. Sietins, Army Research Laboratory*
- 03:40 P **#484 In situ measurements of full field deformation in soft hydrogels due to sliding contact**  
*J Famiglietti, University of Florida; A. McGhee, University of Florida; E. McGhee, University of Florida; J. Urueña, University of Florida; G. Sawyer, University of Florida; P. Ifju, University of Florida*
- 04:00 P **#309 Inferring Material Parameters from Imprecise Biaxial Experiments on Soft Materials**  
*N Afsar Kazerooni, Texas A&M University; Z. Wang, Texas A&N University; A. Srinivasa, Texas A&M University*
- 04:20 P **#660 LARGE ELASTIC- PLASTIC SHEAR DEFORMATION OF ALUMINUM ALLOY 7475-T761**  
*P CHAKRABORTY, INDIAN INSTITUTE OF TECHNOLOGY DELHI, INDIA; V. Tiwari, INDIAN INSTITUTE OF TECHNOLOGY DELHI, INDIA; M. Singha, INDIAN INSTITUTE OF TECHNOLOGY DELHI, INDIA*
- 04:40 P **#802 An Optimization Approach for Improving Geometric Moire Resolution**  
*S Palvadi, Saint-Gobain; K. Liechti, UT Austin*

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Thursday, June 07, 2018

Mechanics of Additive and Advanced Manufacturing

## 101. Additively Manufactured Polymers & Composites

**Organizer(s)**

**Chair Person** Y. Hu, University of Illinois

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- 03:20 P **#69 Thermomechanical Evaluation of Additively Manufactured Polymeric Structures Fabricated With Novel, Multi-Material Filaments**  
*K Hart, U.S. Army Research Laboratory; R. Dunn, U.S. Army Research Laboratory; E. Wetzel, U.S. Army Research Laboratory*
- 03:40 P **#384 3D Free-form Printing by Frontal Polymerization**  
*J Aw, University of Illinois at Urbana-Champaign; I. Robertson, University of Illinois at Urbana-Champaign; N. Sottos, University of Illinois at Urbana-Champaign; J. Moore, University of Illinois at Urbana-Champaign; S. White, University of Illinois at Urbana-Champaign*
- 04:00 P **#411 Mechanical Characterization of Cellulose Nanofibril Materials made by Additive Manufacturing**  
*L Mariani, University of Pennsylvania; J. Considine, USDA Forest Products Laboratory; K. Turner, University of Pennsylvania*
- 04:20 P **#684 Mechanical Characterization of Fused Filament Fabrication Polyvinylidene Fluoride Printed (PVDF) Composites**  
*N Momenzadeh, University of Louisville; T. Berfield, University of Louisville*
- 04:40 P **#515 Experimental quantification of path dependencies when 3D printing in a granular microgel system**  
*D Nguyen, University of Florida; A. McGhee, University of Florida; P. Ifju, University of Florida*
- 05:00 P **#402 Bend it Like Bingham: Feature Accuracy when 3D Printing into Liquid-Like Solids**  
*S Niemi, University of Florida; A. McGhee, University of Florida; W. Ebert, University of Florida; D. Nguyen, University of Florida; P. Ifju, University of Florida; W. Sawyer, University of Florida*

Thursday, June 07, 2018

Fracture & Fatigue

## 103. Microscale & Microstructural Effects on Mechanical Behavior

**Organizer(s)** J. Carroll, Sandia National Laboratories; A. Beese, Pennsylvania State University

**Chair Person** A. Beese, Pennsylvania State University; J. Carroll, Sandia National Laboratories

- 03:20 P **#81 Microstructural Fatigue Damage on the Mechanical Properties of  $\alpha$ -Iron**  
*J Indeck, The University of Alabama in Huntsville; C. Williams, U.S. Army Research Laboratory; K. Hazeli, The University of Alabama in Huntsville*
- 03:40 P **#85 Strain Measurement during Plastic Deformation of Polycrystalline Materials under Electron Microscopy by Heaviside-DIC**  
*J Stinville, UCSB; F. Bourdin, Institut PPRIME; M. Echlin, UCSB; W. Lenthe, UCSB; F. Bridier, DCNS Research; J. Cormier, Institut PPRIME; P. Villechaise, Institut PPRIME; V. Valle, Institut PPRIME; T. Pollock, UCSB*
- 04:00 P **#517 Ultra-Stretchable Interconnects for High-Density Stretchable Electronics – a multi-scale experimental analysis**  
*J Hoefnagels, Eindhoven University of Technology, the Netherlands; S. Shafqat, Eindhoven University of Technology, the Netherlands; S. Kleinendorst, Eindhoven University of Technology, the Netherlands; J. Neggels, Eindhoven University of Technology, the Netherlands; O. van der Sluis, Philips Research, Eindhoven, the Netherlands; A. Savov, Philips Research, Eindhoven, the Netherlands; S. Joshi, Philips Research, Eindhoven, the Netherlands; R. Dekker, Philips Research, Eindhoven, the Netherlands; M. Geers, Eindhoven University of Technology, the Netherlands*
- 04:20 P **#693 Investigating Microscale Deformation across Large Sample Area via Multi-tile SEM-DIC**  
*Z Chen, University of California Santa Barbara; S. Daly, University of California Santa Barbara*
- 04:40 P **#355 Void Initiation in Pure Metals During Ductile Rupture**  
*P Noell, SANDIA NATIONAL LABS; J. Carroll, SANDIA NATIONAL LABS; K. Hattar, SANDIA NATIONAL LABS; B. Clark, SANDIA NATIONAL LABS; B. Boyce, SANDIA NATIONAL LABS*

- 05:00 P **#225 Developing Crystal Plasticity Models from the Basics—Single Crystal Experiments**  
*J Carroll, Sandia National Laboratories; H. Lim, Sandia National Laboratories; M. Lane, Sandia National Laboratories; C. Battaile, Sandia National Laboratories; B. Boyce, Sandia National Laboratories*
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Thursday, June 07, 2018

Thermomechanics and Infra-red Imaging

## 104. Thermographic Non Destructive Evaluation (NDE)

**Organizer(s)**

**Chair Person** T. Sakagami, Kobe University; R. Tighe, Defence Academy of the UK

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- 03:20 P **#685 Effects of Surface Coatings on Pulse Thermography Inspections of Composite Materials**  
*G Olafsson, University of Southampton; R. Tighe, Defence Academy of the UK; J. Dulieu-Barton, University of Southampton*
- 03:40 P **#322 Model Based Inversion for Pulse Thermography**  
*S Holland, Iowa State University; A. Frishman, Iowa State University*
- 04:00 P **#425 Detection of Damage during Quasi-Static Loading of a Single Stringer Panel using Passive Thermography and Acoustic Emission**  
*J Zalameda, NASA Langley Research Center; W. Winfree, NASA Langley Research Center; M. Horne, National Institute of Aerospace*
- 04:20 P **#703 Identification of Lightning Strike Damage using Pulse Thermography through integration of thermal data**  
*T Harrell, Univeristy of Southampton; J. Dulieu-Barton, Univeristy of Southampton; O. Thomsen, Univeristy of Southampton*
- 04:40 P **#723 Effect of Electrical Conduction on the Mechanical Properties of Carbon-Fiber Reinforced Epoxy Matrix Composites**  
*R Akula, Oklahoma State University; K. Misra, Oklahoma State University; R. Singh, Oklahoma State University*
- 05:00 P **#135 Identification of Subsurface Defects in Materials by Means of Pulsed Infrared Thermography**  
*W Oliferuk, Bialystok University of Technology; M. Klosek, Bialystok University of Technology*
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Dynamic Behavior of Materials

## 900. Accepted - To Be Programmed

**Organizer(s)**

**Chair Person**

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- #550 The role of texture on the strain-rate sensitivity of Mg and Mg alloy AZ31B**  
*N Briggs, University of Utah; O. Kingstedt, University of Utah*
- #548 A Comprehensive Study under Laser Cutting Conditions of Pure Titanium and Titanium Alloy (TA6V)**  
*B El-Aoud, Supmeca/Paris, School of Mechanical and Manufacturing Engineering Paris-FRANCE; M. Boujelbene, University of Tunis El Manar, ENIT, Ecole Nationale d'Ingénieurs de Tunis, Tunisia; E. Bayraktar, Supmeca / Paris, School of Mechanical and Manufacturing Engineering FRANCE; S. Ben Salem, University of Tunis El Manar, ENIT, Ecole Nationale d'Ingénieurs de Tunis, Tunisia.*
- #801 Effect of Moisture Silicon/Epoxy Interactions**  
*D Ferreira, UT Austin; C. Wu, Missouri University of Science & Technology; R. Huang, UT Austin; K. Liechti, UT Austin*

**#391 Mechanical Behavior of Ta at Extreme Strain-rates**

*D Casem, US Army Research Laboratory; D. Magagnosc, US Army Research Laboratory; J. Ligda, US Army Research Laboratory; B. Schuster, US Army Research Laboratory*

**#436 Energy absorption characteristics of graded foams under high velocity impact**

*A Wohlford, University of South Carolina; S. Ravindran, University of South Carolina; A. Kidane, University of South Carolina*

**#525 Process Reliability of Abrasive Water Jet to Cut Complex Shapes of Titanium Alloy Ti-6Al-4V**

*M Douiri, Supmeca/Paris School of Mechanical and Manufacturing Engineering, St - Ouen-France; M. Boujelbene, University of Tunis El Manar, ENIT, Ecole Nationale d'Ingénieurs de Tunis, Tunisia.; E. Bayraktar, Supmeca-Paris, School of Mechanical and Manufacturing Engineering, France; S. Ben Salem, University of Tunis El Manar, ENIT, Ecole Nationale d'Ingénieurs de Tunis, Tunisia.*

**#805 High Strain Rate Multi-Axial Loading Behavior of Granular Boron Carbide**

*X Sun, Johns Hopkins University; A. Tonge, Army Research Lab; K. Ramesh, Johns Hopkins University; J. LaSalvia, Army Research Lab*

**#524 A Study of The Surface Integrity of Titanium Alloy Ti-6Al-4V in The Abrasive Water Jet Machining Process**

*M Douiri, Supmeca/Paris School of Mechanical and Manufacturing Engineering, St - Ouen-France; M. Boujelbene, University of Tunis El Manar, ENIT, Ecole Nationale d'Ingénieurs de Tunis, Tunisia.; E. Bayraktar, Supmeca-Paris, School of Mechanical and Manufacturing Engineering, France; S. Ben Salem, University of Tunis El Manar, ENIT, Ecole Nationale d'Ingénieurs de Tunis, Tunisia.*

**#725 Investigating anisotropic failure response in Rolled AZ31B Under Dynamic Tensile Loading**

*A Matejunas, New Mexico Institute of Mining and Technology; J. Lloyd, Army Research Laboratory; M. Priddy, Mississippi State University; T. Walter, Army Research Laboratory; J. Kimberley, New Mexico Institute of Mining and Technology*

**#806 Correlating Interfacial Fracture Toughness to Surface Roughness in Polymer-based Interfaces**

*D Yavas, Iowa State University; A. Bastawros, Iowa State University*

**#216 The Fundamental Reason Why Measuring Residual Stress is a Significant Experimental Mechanics Challenge**

*M Prime, Los Alamos National Laboratory*

**#397 Transitioning Automotive Powertrain Components from Metallic to Light-weighting Materials**

*Y Dong, Kettering University; J. Baqersad, Kettering University; A. Mazzei, Kettering University*

**#822 Some Results on the Mechanics of Inverse Freezing Gels**

*Y Rotbaum, Technion; G. Parvari, Technion; Y. Eichen, Technion; D. Rittel, Technion*

**#616 Developing an Alternative to Roma Plastilina #1 as a Ballistic Backing Material for Body Armor Evaluation**

*R Mrozek, US Army Research Laboratory; T. Edwards, US Army Research Laboratory; E. Bain, US Army Research Laboratory; S. Cole, US Army Research Laboratory; E. Napadensky, US Army Research Laboratory; R. Freeney, Aberdeen Test Center; V. Halls, PEO-Soldier; J. Zheng, PEO-Soldier*

**#808 Viscoelasticity and Dissipations in Liquid Crystal Elastomers**

*A Azoug, Oklahoma State University*

**#731 Characterization of dynamic deformation and failure of novel light weight steel alloy**

*T Walter, Army Research Laboratory; P. Moy, Army Research Laboratory; T. Sano, Army Research Laboratory; K. Limmer, Army Research Laboratory*

**#457 The effect of chamber temperature on residual stresses of FDM parts**

*C Casavola, Politecnico di Bari; A. Cazzato, Politecnico di Bari; D. Karalekas, University of Piraeus; V. Moramarco, Politecnico di Bari; G. Pappalettera, Politecnico di Bari*

**#223 HowdyFFF**

*J Tingets, SEM*

- #341 Dynamic Mechanical Response of T800/F3900 Composite under Tensile and Compressive Loading**  
*Y Deshpande, The Ohio State University; J. Seidt, The Ohio State University; A. Gilat, The Ohio State University*
- #435 Meso-scale dynamic behavior of cast magnesium at high strain rate loading**  
*P Malchow, University of South Carolina; S. Ravindran, University of South Carolina; A. Kidane, University of South Carolina*
- #523 Optimization of Kerf Quality During CO2 Laser Cutting of Titanium Alloy Sheet Ti-6Al-4V and Pure Titanium Ti**  
*B El-Aoud, Supmecca/Paris School of Mechanical and Manufacturing Engineering, St - Ouen-France; M. Boujelbene, University of Tunis El Manar, ENIT, Ecole Nationale d'Ingénieurs de Tunis, Tunisia.; E. Bayraktar, Supmecca-Paris, School of Mechanical and Manufacturing Engineering, France; S. Ben Salem, University of Tunis El Manar, ENIT, Ecole Nationale d'Ingénieurs de Tunis, Tunisia.*
- #715 Influence of High Strain Rate Transverse Compression on the Tensile Strength of Polyethylene Ballistic Single Fibers**  
*D Casem, US Army Research Laboratory, Aberdeen Proving Ground, MD, USA; T. Weerasooriya, US Army Research Laboratory, Aberdeen Proving Ground, MD, USA; S. Sockalingam, Department of Mechanical Engineering, University of South Carolina, USA; J. Gillespie Jr., Department of Mechanical Engineering, University of Delaware, DE, USA*
- #692 Improving the Crashworthiness of High Strength Steel using Localized Induction Heat-treatment for Vehicle Applications**  
*C Beveridge, Georgia Southern University*
- #66 Mesomechanical Modeling of Tensile Damage Modes in Single Layer Plain Weave S-2 Glass/SC15 Composites**  
*C Meyer, U.S. Army Research Laboratory/University of Delaware; B. Haque, University of Delaware; E. Bonyi, Morgan State University; D. O'Brien, U.S. Army Research Laboratory; K. Aslan, Morgan State University; J. Gillespie Jr., University of Delaware*
- #507 Comparison of porcine brain tissue with surrogate materials in quasi-static compression and dynamic mechanical analysis**  
*D Singh, University of Waterloo; S. Boakye-Yiadom, York University; D. Cronin, University of Waterloo*
- #472 Microstructural Evaluation of Strain Localization on Deformed 5083-H131 Aluminum**  
*C Williams, Army Research Laboratory; C. Kale, Arizona State University; K. Solanki, Arizona State University; J. Spencer, Southwest Research Institute; R. Bigger, Southwest Research Institute; A. Carpenter, Southwest Research Institute; N. Scott, Southwest Research Institute; K. Dannemann, Rensselaer Polytechnic Institute; S. Chocron, Southwest Research Institute*
- #779 Influence of nanoscale phase behavior on ballistic performance**  
*K Masser, Army Research Laboratory; E. Bain, Army Research Laboratory; T. Long, Army Research Laboratory; F. Beyer, Army Research Laboratory; A. Savage, Army Research Laboratory; J. Yu, Army Research Laboratory; J. Lenhart, Army Research Laboratory*
- #424 A novel auxetic structure with enhanced impact performances by means of periodic tessellation with variable Poisson's ratio**  
*M Taylor, Santa Clara University; L. Francesconi, Santa Clara University; F. Aymerich, University of Cagliari; X. Liang, Santa Clara University*
- #783 EXPERIMENTAL STUDY OF CREEP RUPTURE OF A UNIDIRECTIONAL POLYMER MATRIX COMPOSITE LAMINA UNDER CYCLIC LOADING**  
*A Emmanuel, University of Manitoba; R. J, University of Manitoba*
- #785 The effect of strain rate on the plastic flow and failure of an AZ31B magnesium alloy**  
*V Kannan, Johns Hopkins University; N. Krywopusk, Johns Hopkins University; L. Kesckes, US Army Research Laboratory; T. Weihs, Johns Hopkins University; K. Ramesh, Johns Hopkins University*

- #359 Weight Optimization of Cone Continuously Variable Transmission using Optistruct Software**  
*E Malekipour, Center for Additive Manufacturing Research at IUPUI (CAMRI)/Purdue School of Engineering and Technology; N. Patil, Center for Additive Manufacturing Research at IUPUI (CAMRI)/Purdue School of Engineering and Technology; H. El-Mounayri, Center for Additive Manufacturing Research at IUPUI (CAMRI)/Purdue School of Engineering and Technology*
- #267 Dynamic Failure of Rail and Naval Steels in Cold Environments**  
*M Conway, Department of Mechanical Engineering, University of Alberta; M. Hendry, Department of Civil Engineering, University of Alberta; A. Nolting, DRDC Atlantic Research Centre; J. Hogan, Department of Mechanical Engineering, University of Alberta*
- #727 Mechanics of Materials and Fracture for High School Students**  
*L Avellar, California Institute of Technology; K. Mac Donald, California Institute of Technology*
- #169 Identification of Plasticity Parameters and Failure Criteria of Ship-building Steel**  
*M Korgesaar, Aalto University; D. Smyl, Aalto University; S. Bossuyt, Aalto University*
- #132 A Transition Phenomenon and its Mechanism in the Vibrational Frequency Spectrum of Polycarbonate**  
*W Liu, The University of New South Wales; L. Zhang, The University of New South Wales*
- #348 Experimental Study on Dynamic Fracture Response of Al6063-T6 under High Rates of Loading**  
*A Pandouria, Indian Institute of Technology, New Delhi, India; P. Chakraborty, Indian Institute of Technology, New Delhi, India; S. Kumar, Delhi Technological University, Delhi, India; V. Tiwari, Indian Institute of Technology, New Delhi, India*
- #823 Polyurea Coated Aluminum Plates for Maritime Applications**  
*O Rijensky, Technion - Israel Institute of Technology; D. Rittel, Technion - Israel Institute of Technology*
- #499 In situ Electrochemical Nanoindentation for Lithium Ion Battery Research**  
*Y Wang, University of Kentucky; Y. Cheng, University of Kentucky*
- #149 Back Face Deformation Reconstruction of Soft Body Armor During Ballistic Impact Using Fiber Bragg Gratings**  
*D Hackney, North Carolina State University; F. Seng, Brigham Young University; A. Noever, North Carolina State University; T. Goode, North Carolina State University; G. Shoemaker, Naval Undersea Warfare Center, Newport; M. Pankow, North Carolina State University; S. Schultz, Brigham Young University; K. Peters, North Carolina State University*
- #745 The Effect of Dispersion Techniques and Functionalization on the Mechanical Properties of Graphene Reinforced Epoxy Resin**  
*S Mondal, Oklahoma State University; K. Mishra, Oklahoma State University; R. Singh, Oklahoma State University*
- #162 Multi Objective Optimization Process Parameters in Wire Cut Electrical Discharge Machining (WEDM) of Recycled Composite**  
*S EZEDDINI, SUPMECA/PARIS, School of Mechanical and Manufacturing Engineering; E. BAYRAKTAR, SUPMECA/PARIS, School of Mechanical and Manufacturing Engineering; M. Boujelbene, University of Hail, College of Engineering, Hail, Kingdom of Saudi Arabia; S. Ben Salem, National School of Engineering of Tunis - University of Tunis El Manar/ TUNISE*
- #122 Impact Energy Absorption Characterization of Novel Energy Absorbing Materials for Sport Helmet Applications**  
*J Corriea, University of Massachusetts Dartmouth; J. Paquette, University of Massachusetts Dartmouth; V. Chalivendra, University of Massachusetts Dartmouth; Y. Kim, University of Massachusetts Dartmouth; A. Lewis, University of Massachusetts Dartmouth*

**#800 Application of High-speed DIC to Study Damage of Thin Membranes Under Blast**

*H Tang, Worcester Polytechnic Institute; k. Pooladvand, Worcester Polytechnic Institute; C. Tao, Massachusetts Eye and Ear Infirmary; M. Ravicz, Massachusetts Eye and Ear Infirmary; J. Rosowski, Massachusetts Eye and Ear Infirmary; A. Remenschneider, Massachusetts Eye and Ear Infirmary; C. Furlong, Worcester Polytechnic Institute*

**#263 Determination of Constitutive Parameters using Thermoelastic Data**

*A Alshaya, Kuwait University; J. Considine, USDA, Forest Service, Forest Products Laboratory*

**#407 Phase Transformation in Single-crystal Silver Microcubes During High-velocity Impact**

*R Thevamaran, Department of Engineering Physics, University of Wisconsin-Madison, Madison, WI 53706, USA; S. Yazdi, Department of Materials Science and NanoEngineering, Rice University, Houston, TX 77025, USA.; M. Ponga, Department of Mechanical Engineering, University of British Columbia, Vancouver, BC V6T 1Z4, Canada.; O. Lawal, Department of Materials Science and NanoEngineering, Rice University, Houston, TX 77025, USA.; S. Jeon, Department of Polymer Science and Engineering, Kumoh National Institute of Technology, Gumi, Gyoengbuk 39177, South Korea.; E. Thomas, Department of Materials Science and NanoEngineering, Rice University, Houston, TX 77025, USA.*