



Monday 20th October

07:45-08:15	Registration
08:15-08:30	Opening & Welcome
08:30-10:10	Session 1: Testing I
10:10-10:45	Poster Break 1
10:45-12:25	Session 2: Testing II
12:25-13:25	Lunch
13:25-15:25	Session 3: Fracture
15:25-16:00	Poster Break 2
16:00-17:40	Session 4: Scaling Effects & Joints
18:00-20:00	Reception at Engineer's Club

Tuesday 21st October

08:00-10:00	Session 5: Textile Composites I
10:00-10:35	Poster Break 3
10:35-12:15	Session 6: Textile Composites II
12:15-13:15	Lunch
13:15-14:55	Session 7: Structures
14:55-15:35	Tour of the National Composites Center
15:35-15:55	Coffee Break
15:55-17:35	Session 8: Full-Field Techniques
18:00-22:00	Banquet/Tour of National Museum of the U.S. Air Force

Wednesday 22nd October

08:00-10:00	Session 9: Fatigue & Durability
10:00-10:35	Poster Break 4
10:35-12:15	Session 10: Damage Models
12:15-13:15	Lunch
13:15-14:55	Session 11: Virtual Field/Inverse Methods
14:55-15:15	Coffee Break
15:15-16:55	Session 12: Novel Methods
16:55-16:55	Conference Closes

Monday 20th October

07:45-08:15 **Registration**

08:15-08:30 **Opening & Welcome**

08:30-10:10 **Session 1: Testing I (Chair: Professor Fabrice Pierron – France)**

- 08:30 ***Accelerated Composite Moisture Infusion Test and Characterization***
Siva P Pilli, Kevin L Simmons, James D Holbery, Vaithiyalingam Shutthanandan,
(Pacific Northwest National Laboratory, USA / Boeing Company, USA)
- 08:55 ***An Experimental and Numerical Analysis of the V-notched Rail Shear Test to Measure the Shear Properties of Fiber-Reinforced Polymers***
Essam Totry, Sergio Sádaba, Carlos González, Javier Llorca
(Universidad Politécnica de Madrid, Spain / Instituto Madrileño de Estudios Avanzados en Materiales, Spain)
- 09:20 ***Clamping Issues in Iosipescu Shear Testing of Composite Laminates***
Jonas M. Neumeister, L. Niklas Melin
(KTH - Royal Institute of Technology, Sweden)
- 09:45 ***Composite Materials Specimen Design for Validation of an Energy-Based Multi-Axial Characterization Methodology***
Adrian C. Orifici, John G. Michopoulos, Paul A. Lagacé, Israel Herszberg
(Royal Melbourne Institute of Technology, Australia, Cooperative Research Centre for Advanced Composite Structures Ltd, Australia, U.S. Naval Research Laboratory, USA, Massachusetts Institute of Technology, USA)

10:10-10:45 **Poster Break 1:**

Bending Test of Dry Composite Reinforcements and Inverse method for Characterization

E. De Bilbao, D. Soulat, G. Hivet, A. Gasser
(University of Orléans, France)

Identification of the Through-Thickness Shear Modulus of Composites from Full-Field Surface Deformation Measurements

F. Pierron, R. Rotinat
(ParisTech Arts et Métiers, France)

Characterization of Dynamic Response of Composite Plates with Embedded FBG Sensors

J. Frieden, J. Cugnoni, J. Botsis, Th. Gmür, D. Coric
(École Polytechnique Fédérale de Lausanne - EPFL, Switzerland)

In-Situ NDE for Composite Testing

Gary Georgeson, Mike Fogarty
(Boeing Phantom Works, USA)

Hertzian Fracture, Kinetic Friction and the Mechanical Impact LOX Compatibility

Roger Gerzeski
(Air Force Research Laboratory, USA)

Testing and Evaluation of Glass-PP Composite Behavior in Tension

S.G. Ivanov, D.S. Ivanov, S.V. Lomov, I. Verpoest
(Katholieke Universiteit Leuven, Belgium)

Optimising Materials and Production Modeling for Composite Boat Hull Structures

A.J. Sobey, J.I.R. Blake, R.A. Shenoi
(University of Southampton, UK)

Effects of Injection Molding Parameters on the Weldline Strength of Thin-Wall Fiber-Reinforced Thermoplasti

Cheng-Hsien Wu, Ming-Yu Lin
(National Kaohsiung University of Applied Sciences, Taiwan / Da-Yeh University, Taiwan)

10:45-12:25 Session 2: Testing II (Chair: Professor Jona Neumeister – Sweden)

10:45 ***Experimental Techniques and Data Acquisition for High-Rate Loading of Composite Joints and Structures***

Alastair Johnson, Garth Pearce
(German Aerospace Center, Germany / University of New South Wales, Australia)

11:10 ***High Strain Rate Tensile Testing of Notched Composites***

Yi Chen, Stephen R. Hallett
(University of Bristol, UK)

11:35 ***Mechanical Tests for FoldCore Base Material Properties***

S. Fischer, K. Drechsler, S. Kilchert, A.F. Johnson
(University of Stuttgart, Germany / German Aerospace Center (DLR), Germany)

12:00 ***Sensing strain gradients with embedded Bragg gratings across the width of a composite laminate***

P. Casari, P. A. Morvan, X. Chapeleau, N. Daher, C. Lupi, D. Leduc.
(University of Nantes, France)

12:25-13:25 Lunch

13:25-15:25 Session 3: Fracture (Chair: Professor Bent Sørensen – Denmark)

13:25 ***Invited Lecture 1: Fracture Analysis for Bondlines and Interfaces of Composite Structures***

Gerald Mabson
(The Boeing Company, USA)

14:10 **Modeling R-Curve Toughening Mechanisms with Complex Softening Laws**

Carlos G. Dávila, Cheryl Rose, Pedro P. Camanho
(NASA Langley Research Center, USA / Universidade do Porto, Portugal)

14:35 **Measurement of Cohesive Laws for Delamination of Composites**

Ulf Stigh, Anders Biel, K. Svante Alfredsson
(University of Skövde, Sweden)

15:00 **Length of the Cohesive Zone in Delaminated Composite Materials**

Albert Turon, Pedro P. Camanho, Josep Costa, Pere Maimí
(University de Girona, Spain / Universidade do Porto, Portugal)

15:25-16:00

Poster Break 2:

Progressive Damage and Failure Prediction of Notched Specimens with Multi Modality, In-situ NDE Methods

G. Aksel, S. Finn, B. Knight, J. Li, M. Osterlitz, Y.A. Plotnikov, H.I. Ringermacher, J.L. Thompson, G. Mabson
(GE Global Research Center, USA / Boeing Phantom Works, USA)

Identifying Damage in Thin-Wall Anisotropic Composite Structures by Lamb Wave Reflection

A. S. Liberson, T. S. Meyer, M. J. Roemer, G. P. Tandon
(Impact Technologies LLC, USA / University of Dayton Research Institute, USA)

Comparison of Various Multiaxial Failure Criteria of Laminated Composites in a Design Process

Sérgio P. Santos, Arlindo Silva, Luis Reis
(Leiria Polytechnic Institute, Portugal / Instituto Superior Técnico, Portugal)

Investigation of the Effect of Specimen Width on Open Hole Tensile Strength

Marco Cheung, Stephen Hallett
(University of Bristol, UK)

Test development for adhesively bonded assemblies

Casari P, Jacquemin F, Bourmaud A, Davies P, Choqueuse D
(University of Nantes, France)

Composite reinforced high pressure tubular with flaws in outer wall

Wang Feng-hui, Wang Yong-jun, Wang Peng, Bai Zhen-quan, Zhao Xin-wei
(Northwestern Polytechnic University, China / Institute of Tubular Goods Research Center, China)

Influence of Underwater Preconditioning of GRP Pipes in Ring Load Creep Tests Results

Hugo Faria, Rui M. Guedes, António T. Marques
(Instituto de Engenharia Mecânica e Gestão Industrial, Portugal / Faculdade de Engenharia da Universidade do Porto, Portugal)

16:00-17:40

Session 4: Scaling Effects & Joints (Chair: Dr. Carlos Davila – USA)

16:00 ***Crack Growth in Adhesive Joints in Polymer Matrix Composites: Numerical Modelling and Experiments***

Bent F. Sørensen, Stergios Goutianos, Torben K. Jacobsen
(The Technical University of Denmark, Denmark / LM Glasfiber A/S, Denmark)

16:25 ***Optimal Design of a Composite Scarf Repair Patch under Uniaxial Tension Load***

Tim Breitzman, Greg Schoepner, Ben Cook, Endel larve
(Air Force Research Laboratory, USA / University of Dayton Research Institute, USA)

16:50 ***Hybrid Titanium-CFRP Laminates For High-Performance Bolted Joints***

Pedro P. Camanho, Axel Fink, Cristóvão Cardoso, Andreas Obst
(Universidade do Porto, Portugal / DLR German Aerospace Center, Germany / INEGI – Instituto de Engenharia Mecânica e Gestão Industrial, Portugal / European Space Agency, The Netherlands)

17:15 ***Progressive Failure Modelling of Composite Laminates Containing Tapered Holes***

Andrew J. Gunnion, Adrian C. Orifici, Chun H. Wang
(Cooperative Research Centre for Advanced Composite Structures Ltd, Australia / Royal Melbourne Institute of Technology, Australia / Defence Science and Technology Organisation, Australia)

18:00-20:00

Reception at Engineer's Club of Dayton

Tuesday 21st October

08:00-10:00

Session 5: Textile Composites I (Chair: Dr. Endel Iarve – USA)

08:00 **Invited Lecture 2: Experimental methodology and FEA for damage studies in textile composites**

Stepan V. Lomov, Dmitry S. Ivanov, Ignaas Verpoest
(Katholieke Universiteit Leuven, Belgium)

08:45 ***Testing and Modeling of Yarn Pullout in Plain Woven Kevlar Fabrics***

Zhaoxu Dong, C.T. Sun
(Purdue University, USA)

09:10 ***Enhancement of Tow Visualisation in Carbon Composites***

Luke P. Djukic, Israel Herszberg, Greg A. Schoeppner
(The University of New South Wales, Australia / Cooperative Research Centre for Advanced Composite Structures, Australia / Air Force Research Laboratory, USA)

09:35 ***Experimental Analysis and Modeling of Z-Pinned Joints Under Pull-Out, Shear and Flexural Loading***

Xavier Toral Vazques, Bruno Castanie, Jean-Jacques Barrau, Sébastien Didierjean
(Université de Toulouse, France / EADS IW, France)

10:00-10:35

Poster Break 3:

The Development of a Dispersion-Strengthened Tin Composite Using Silica Nanopowders

J.S. Jatau, E.I. Mbaya, Y.A. Barau
(Abubakar Tafawa Balewa University, Nigeria)

New Method to Real Time Monitoring of Specimens Compliance in Mode II Delamination Tests

J. Vicens, J. Costa, J. Renart
(Universitat de Girona, Spain)

A Comparison of Moiré Interferometry and Digital Image Correlation

Ryan Davidson, David Mollenhauer, Anthony Palazotto
(Air Force Institute of Technology, USA / Air Force Research Laboratory, USA)

A Whole-field Measurement Based Identification Procedure for Polymer Composites

F. Grytten, R.H. Gaarder, E. Andreassen, E.L. Hinrichsen
(SINTEF Materials and Chemistry, Norway)

The Modified Iosipescu Shear Test for Composites – Accuracy and Robustness

L. Niklas Melin, Jonas M. Neumeister
(KTH - Royal Institute of Technology, Sweden)

Thermo-oxidative Behavior of Laminated Composites

G.P. Tandon, W.R. Ragland, G.A. Schoeppner
(University of Dayton Research Institute, USA / Air Force Research Laboratory, USA)

Structural-Electric Characterization of a Load Bearing Antenna RF Laminate

Brian Smyers, William Baron, Joseph Marshall

(Air Force Research Laboratory, USA / Boeing Phantom Works, USA)

10:35-12:15

Session 6: Textile Composites II (Chair: Dr. Kim Branner – Denmark)

10:35 *Three-dimensional Stress Analysis in Complex Fiber Architecture Composites by Using Independent Mesh Method*

E.V. Iarve, E. Zhou, T.J. Whitney, D. Mollenhauer

(University of Dayton Research Institute, USA / Air Force Research Laboratory, USA)

11:00 *Characterization of the Microstructure and Deformation of Woven Composites*

Robert J. Young, Stephen J Eichhorn, James A Bennett, Prasad Potluri, Richard J Davies

(University of Manchester, UK / European Synchrotron Radiation Facility, France)

11:25 *Identification of Meso Scale Damage Parameters of Carbon-Epoxy Composite*

Dmitry Ivanov, Stepan Lomov, Ignaas Verpoest

(Katholieke Universiteit Leuven, Belgium)

11:50 *Effect of microscopic damage events on static and ballistic impact strength of triaxial braid composites*

Justin D. Littell, Wieslaw K. Binienda, William A. Arnold, Gary D. Roberts, Robert K. Goldberg

(The University of Akron, USA / NASA Glenn Research Center, USA)

12:15-13:15

Lunch

13:15-14:50

Session 7: Structures (Chair: Professor Prasad Potluri – United Kingdom)

13:15 *Buckling Strength of Thick Composite Panels in Wind Turbine Blades – Part I: Effect of Geometrical Imperfections*

Christian Berggreen, Nicholas Tsouvalis, Brian Hayman, Kim Branner

(Technical University of Denmark, Denmark / National Technical University of Athens, Greece / Det Norske Veritas AS and University of Oslo, Norway)

13:40 *Buckling Strength of Thick Composite Panels in Wind Turbine Blades – Part II: Effect of Delaminations*

Kim Branner, Peter Berring, Christian Berggreen

(Technical University of Denmark, Denmark)

14:05 *Integrating Materials Modeling Aspects into the Industrial Analysis of Composite Structures,*

Stephane Mahdi

(Airbus, France)

14:30 *Composite Torsion Catapult Research: A Fun Use for Modern Engineering*

David Mollenhauer, Chase Nessler, Bryan Langley, John Camping

(Air Force Research Laboratory, USA / YUSA Corporation, USA / University of Dayton Research Institute, USA)

14:55-15:35 **Tour of the National Composites Center**

15:35-15:55 **Coffee Break**

15:55-17:35 **Session 8: Full-Field Techniques (Chair: Dr. Justin Littell – USA)**

15:55 ***Detecting and Monitoring the Development of Surface Cracks Using the Grid Method***

S. Fhaikhao, M.R. Wisnom, F. Pierron
(University of Bristol, UK / ParisTech Arts et Métiers, France)

16:20 ***Experimental Aspects of Virtual Tests***

Brian Cox
(Teledyne Scientific, USA)

16:45 ***Influence of Microstructure Heterogeneities on Free Edge Stress Fields of a Laminate Using Digital Image Correlation Technique***

P. Grosbras, B. Paluch, M. Brieu, L. Sabatier
(ONERA, France / Laboratoire de Mécanique de Lille, France)

17:10 ***Meso-Scale Strain Mapping and Strength Predictions in UD Woven Composites***

P. Potluri, A. Manan, J. Stein, R.J. Young, Y.T. Shyng
(University of Manchester, UK)

18:00-22:00 **Banquet/Tour of National Museum of the U.S. Air Force**

Wednesday 22nd October

08:00-10:00

Session 9: Fatigue & Durability (Chair: Dr. Tim Breitzman – USA)

08:00 **Invited Lecture 3: *New Fire Models & Test Methods for Polymer Matrix Composites***

A.P. Mouritz, S. Feih, Z. Mathys, A.G. Gibson, S.W. Case, B.Y. Lattimer
(Royal Melbourne Institute of Technology, Australia / Defence Science & Technology Organisation, Australia / Newcastle University, UK / Virginia Polytechnic Institute and State University, USA)

08:45 ***Effects of moisture on ageing and debonding in a single fiber composite using a long FBG sensor and numerical modeling***

J. Botsis, M. Lai, J. Cugnoni, D. Coric
(École Polytechnique Fédérale de Lausanne (EPFL), Switzerland)

09:10 ***Damage Tolerance of Composite Laminate subjected to Edge Impact***

A. Malhotra, F.J. Guild
(University of London, UK / University of Bristol, UK)

09:35 ***Coupled Evolution of Damage and Oxidation in High Temperature Polymeric Matrix Composites***

Kishore Pochiraju, Gyaneswar P. Tandon, Gregory Schoeppner
(Stevens Institute of Technology, USA / University of Dayton Research Institute, University of Dayton Research Institute, USA / Air Force Research Laboratory, USA)

10:00-10:35

Poster Break 4:

Experimental Tool for Shaping Double Curvature Forms of Woven Reinforcement

S. Allaoui, J. Launay, D. Soulat, S. Chatel
(Université d'Orléans, France / EADS France)

Mechanical Characterization of Thick 3D Woven E-glass Composite Laminate

Seung Min Lee, Ozden O. Ochoa, Alexander Bogdanovich, Dmitri Mungalov
(Texas A&M University, Texas, USA / 3TEX Inc., USA)

Prediction of the residual behaviour of impacted composite curved panels

L. Ballère, P. Viot, J.L. Lataillade
(LAMEFIP-ENSAM-PARISTECH, France)

Environmental Testing on Composites Overwrap Repairs: Effect of Curing on Durability

S.H.M. Ramli, K.H. Leong, F. Ahmad, Z. Man
(PETRONAS Research, Malaysia / Universiti Teknologi PETRONAS, Malaysia)

Thermal Aging and Fatigue Effect on Resistance to Transverse Cracking

Janis Varna, Roberts Joffe
(Lulea University of Technology, Sweden)

Interaction Between FRP Side Plated to R.C Beams and Concrete Under Cyclic Shear Action Experimental Part (I)

Louay Mahmoud, N. Shafiq, M. Fadhil, Waleed Thanoon
(University Teknologi, Malaysia)

Rate Dependence in Engineered Cementitious Composites

Yu, Jihuan
(University of Michigan, USA)

Design, Testing, and Simulation of Morphing Composites

Jason Hermiller, H. Jerry Qi
(Cornerstone Research Group Inc, USA /University of Colorado, USA)

10:35-12:15 Session 10: Damage Models (Chair: Dr. Robin Olsson – Sweden)

10:35 *Critical Energy Densities of Resin Systems: The Key to Matrix Dominated Composites Failure*

Leif E. Asp, Janis Varna, Ramesh Talreja
(Swerea SICOMP, Sweden / Luleå University of Technology Sweden / Texas A&M University, USA)

11:00 *Failure Criterion Development for Composite Materials loaded Transverse to Fiber Direction*

Dean Foster, G.P. Tandon
(Air Force Research Laboratory, USA / University of Dayton Research Institute, USA)

11:25 *Experimental and Numerical Analyses on the Low-Velocity Impact Damage of Composite Laminates*

C. Lopes, P.P Camanho, Z. Gürdal, P. Maimí
(Universidade do Porto, Portugal / Delft University of Technology, The Netherlands / Universitat de Girona, Spain)

11:50 *Micro-mechanics of Kink-band Formation*

S.T. Pinho, S. Pimenta, P. Robinson
(Imperial College, UK)

12:15-13:15 Lunch

13:15-14:55 Session 11: Virtual Field/Inverse Methods (Chair: Masamichi Kawai – Japan)

13:15 *Identification of the Local Stiffness Reduction of a Damaged Composite Plate Using the Virtual Fields Method*

Jin-Hwan Kim, Fabrice Pierron, Michael R. Wisnom
(ENSAM, France / University of Bristol, UK)

13:40 *Identification of Anisotropic Properties from Erroneous Full-field Measurements*

Tomonari Furukawa, Jan Wei Pan
(University of New South Wales, Australia / Virginia Polytechnic Institute and State University, USA)

14:05 ***An Inverse Method for Determining the Stiffness of Impact damage in Laminate composites***

Pavel Sztefek, Robin Olsson
(Imperial College London, UK)

14:30 ***Parameter Identification by the Virtual Fields Method: Application to the Stiffness Radial Variability of P. Pinaster within the Stem***

J. Xavier, S. Avril, F. Pierron, J. Morais
(Arts et Metiers ParisTech, France / ENSM, France / CITAB-UTAD, Portugal)

14:55-15:15 **Coffee Break**

15:15-16:55 **Session 12: Novel Methods (Chair: Dr. Dean Foster – USA)**

15:15 ***Multiscale Modeling for Characterization of Damage Resilient Nanocomposites***

Akhilesh Jha, Terrisa Duenas, Shaoping Xiao, Ajit Mal, Fred Wudl, James R. Alexander, Aaron Corder, Teng K. Ooi
(NextGen Aeronautics, USA / University of Iowa, USA / University of California Los Angeles & Santa Barbara, USA / U.S. Army Aviation & Missile Research, Development and Engineering Center, USA / Missile Defense Agency, USA / Office of Naval Research, USA)

15:40 ***OffAxis Notch Sensitivity Modeling of Fiber Metal Laminates***

M. Kawai, Y. Arai
(University of Tsukuba, Japan)

16:05 ***Experimental and Numerical Study of Damage Propagation in Overheight Compact Tension Tests***

Xiangqian Li, Stephen R. Hallett, Michael R. Wisnom, Reza Vaziri, Anoush Poursartip
(University of Bristol, UK / University of British Columbia, Canada)

16:30 ***Measurements OF Elastic and Visoelastic Properties of Polymer Matrix Composites through High Temperature Nanoindentation***

Y.C. Lu, G. A. Schoeppner, D.C. Jones, G. P. Tandon, S. Putthanasarat
(University of Kentucky, USA / Air Force Research Laboratory, USA / University of Dayton Research Institute, USA)

16:55-16:55 **Conference Closes**