

SAMPE Conference and Exhibition (SAMPE 2026)

Seattle, Washington, USA
27 - 30 April 2026

Volume 1 of 2

ISBN: 979-8-3313-3736-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2026) by SAMPE
All rights reserved.

Printed with permission by Curran Associates, Inc. (2026)

For permission requests, please contact SAMPE
at the address below.

SAMPE
21680 Gateway Center Drive, Suite 300
Diamond Bar, California, USA
91765-2454

Phone: +1-626-521-9460

www.sampe.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Title Index

#

3D Printed Foam Lattices: Engineering Applications of Elastomeric Multiscale Cellular Materials

1

Dodd Grande

3M Digital Materials Hub: A Case Study in Modeling and Simulating an Epoxy Cure Cycle

16

Alec Redmann, Piri Ertem, Dmitriy Salnikov

A

A Comparative Study on the Viscoelastic Bending Stiffness of Various Uncured Carbon Fiber Prepreg Materials

23

Roudy Wehbe, Breanna Badger, Damon Call

A Data-Efficient Machine Learning Framework for Uncertainty Quantification of Assembly Gap in Aerospace Composites

33

Kendall Johnson, Rowan Preedy, Navid Zobeiry

A Failure Criteria for Honeycomb Core

46

Patrick O'Callaghan

A Techno-Economic Analysis of End-of-Life Wind Turbine Blade Processing and Positioning to Assess Large-Scale Glass Fiber–Thermoset Composite End-of-Life Cost Drivers

63

Mitchell Rencheck

A User-Friendly GUI Tool for Automated Microstructural Analysis of Fiber-Reinforced Composites and Porous Structures

75

Komal Chawla, Ahmed Hassen, Vipin Kumar, Segun Talabi, Seokpum Kim, Vlastimil Kunc

Accelerating Additive Manufacturing Qualification Through Non-Destructive Directed Energy Deposition Geometry Analysis

87

Caleb Fairburn, Marissa Baker, Thale Smith, Xuan Wang, Eltahry Elghandour

Accelerating and Digitalizing the Path from Design to Production with COAST and HyperX

101

August Noeverre, Matt Zupan, Von Jamora, Dallen Unruh, Elle Jeries, Marc Palardy-Sim

Additive Manufacturing of Complex Silicon Carbide Structures for Hypersonic Applications

116

Juno Johnson, Marissa Baker, Thale Smith, Xuan Wang, Eltahry Elghandour

Additively Manufactured Thermoplastic π -joint for eVTOL

130

Umesh Marathe, Chinmay Mungale, Segun Isaac Talabi, Adwoa Owusu, Brittany Rodriguez, David Nuttall, Aniruddh Vashisth, John Geriguís, Nobu Kawamura, Dan Coughlin, Vipin Kumar

Additively Reinforced Thermoformable PETG Composite Sheets for Improved Structural Efficiency

146

Segun Talabi, Brittany Rodriguez, Tyler Smith, Katie Copenhaver, Vipin Kumar, Ahmed Hassen, Sana Elyas

Advanced Assessment of Resin Integrity in FRP Stack Liners Using Nanoindentation

155

Sang Kim

Advanced Green Composites

168

Anil Netravali

Advances in Plasma Surface Engineering for High-Performance Composite Bonding

177

Daphne Pappas, Ryan Robinson, Dhia Ben Salem, Jake Charles, Khoren Sahagian, Sarah Montrowl

Affordable Composite Manufacturing via Collaborative Robotic Automated Fiber-placement Technology (CRAFT)

185

Md Raqibul Hasan Prince, Levi Peck, Kathleen McNamara, Wei Zhao

Affordable Housing Embracing the Concept of Sustainable Reconfigurable Manufacturing System (SRMS)

202

Moutushi Dey

AI Agents for Manufacturing for Maximized Efficiency and Profitability

215

Avner Ben Bassat

Analysis of Material Flow Paths in Injection Compression Pultrusion – Development of an Experimental Analysis Methodology

230

Felix Flammer, Jonathan Alms, Kai Fischer, Christian Hopmann

Architectural Homogenization and Synergistic Toughening in Double-Double Fiber Metal Laminates

244

Jason Moon, Logesh Shanmugam, Jeffery Baur

Automated In-Line Monitoring of Fibre Paths in Complex Filament Wound Composite Structures Using Multi-Modal Deep Learning

263

Christopher Mimra, Tristan Shelley, Philip Teakle, Peter Schubel

B

Best Practice in Executing Workforce Training for New Advanced Composites Design and Manufacturing

275

Andew Pokelwaldt

Beyond Homogeneity: Fiber Architecture Effects on the Structural Performance of Pultruded Thermoset Composites

293

Luohaoran Wang, Jacob Harris, Ali Zolali, Elias Shakour, Mihaela Banu

C

Capabilities of Robot-Based Double-Sided Incremental Hot-forming of Fiber-Reinforced Thermoplastics

307

Björn Riecken, Jan-Erik Rath, Doran Nettig, Benedikt Kötter, Christian Keun, Thorsten Schüppstuhl

Carbon Fiber Composite Processing Using Isothermal Resins

322

John Gardner, Joseph Smith, Elizabeth Moore, Godfrey Sauti, Scott Zavada, Keith Gordon, Benjamin Jensen, Emilie Siochi

Characterization of Composite Materials Using Atomic Force Microscopy and Finite Element Simulation for Industrial Application

335

William Bruner, Maximillian Westby, Masoud Yekani Fard

Characterization of the Transverse Shear Viscosity of Unidirectional C/LM-PAEK

348

Gerben Bieleman, Wouter Grouve, Francesco Rondina, Edwin Klompen, Remko Akkerman

Comparative Assessment of Feedstock Production Routes for Solid-State Additive Processing Using Recycled Metallic Chips

361

Sweta Baruah, Tony Schmitz, Bradley Jared

Comparison of Fusion Welding Hand-Lay vs. AFP of a Stepped-Lap Joint for Thermoplastic Carbon Fiber-Reinforced Composites

377

Alan Austin, Sam Pint

Comparison of Ultrasound-Hot Plate and High-Shear Centrifugal Mixing Techniques for Fabricating CNT-Reinforced Nanocomposite Panels

392

Jacky Liang, Wyatt Barnes, Ramanan Sritharan

Converting Hard Graphite Powder into Graphene Nanoflakes via Cryogenic Milling for Highly Stiff Hydrogel Productions

407

Fatih Altun, Abdulhammed K. Hamzat, Aditi Shiromani, Waseem S. Khan, Ramazan Asmatulu

Curing Properties and Post-Cure Characterization of an Epoxy Resin by Encapsulated Sample Rheometry

416

Charles Johnson, Unal Yilmazoglu

D

Design and Analysis of a Large Multi-Axial Loading Test Fixture for Structural Repair of Configured Composite Panels

433

Lillian Owen, John Lin, Erick Espinar-Mick, Michael Fleming, Reewanshu Chadha, Yongzhe Tian, Ahmet Oztekin

Design of Ballistic Armor Using Multi-composite Sandwich Structures with Nanomaterial Additives

447

Carmen Alaichamy, Carlos Perez, Travis Murphy, Jack Bride, Eltahry Elghandour, Amro El Badawy

Developing Material Data Cards to Accelerate Digital Manufacturing of Polymer Composites

462

Madhura Limaye, Sana Elyas, Ahmed Hassen, Bhagyashree Prabhune, Xiao Zhang, Seokpum Kim, Sanjay Sharma

Development of an In-Situ Mixed-Mode Tackiness Characterization Technique for Uncured Thermoset Carbon/Epoxy Prepreg Tows at Automated Tow Placement Relevant Timescales

475

Debrup Chakraborty, Karan Kodagali, Subramani Sockalingam, Michael Sutton

Direct Digital Manufacture of a Continuous Fiber Reinforced Thermoplastic Composite 6-meter I-beam Incorporating an Integral Grid Stiffened Shear Web

489

Alexander Eriksson, Carter Dojan, Donald Radford

Dynamic Crush and Energy Absorption of Porous Glass Foam Composite Arrays

505

Jungjin Park, Norman Wereley

Dynamic Crush Response of Bilayer Glass Foam Structures with Tailorable Architectures

516

Sri Suhas Chokkaku, Jungjin Park, Norman Wereley

Dynamic Crush Testing and Characterization of Elastomeric Honeycomb Structures in Crashworthiness Applications

530

Norman Wereley, Colleen Murray

Dynamic Energy Absorption and Crush Efficiency of Additively Manufactured Tubular Honeycomb Structures with Buckling Initiators

544

Grace Johnson, Colleen Murray, Norman Wereley

Dynamic Response of Open Cell Aluminum Foams

558

Damian Stoddard, Huadian Zhang, Brendan O' Toole, Mohamed Trabia, Arunachalam Rajendran

E

Effect of Composition Variation on Isothermal Rapid-Curing Resins for Aerospace Applications

574

Elizabeth Moore, Jospeh Smith, John Gardner, Godfrey Sauti, Scott Zavada, Benjamin Jensen, Keith Gordon, Emilie Siochi

Effect of Cure and Conditioning on the Fracture Properties of MTM45 Woven Carbon Epoxy Composite

589

Shayan Fahimi, Hannes Koerber, Scott Nesbit, Gabriel Valenzuela, Anoush Poursartip, Casey Keulen

Effect of Fiber-Matrix Co-Carbonization on Carbon-Carbon Composite Pore Morphology

601

William Beck, Joseph Stanzione III, James Newell

Effect of Layer Height on Mechanical Performance of Additively Manufactured PC/CF with Integrated Fiber Reinforcement

611

Benjamin Steva, Roberto Lopez-Anido, Senthil Vel

Effect of Layup Architecture and Notch Formation on the Fracture Toughness of 3D-Printed Glass Fiber-Reinforced Nylon Composites

623

Jacey Wright, Morgan Sikes, Peter Sheldon, Siavash Sattar

Effects of Fiber Length and Coating on Recycled Ultra-High Molecular Weight Polyethylene Nonwoven Composites

635

John Misasi, Akash Parmar, Paige Yount

Effects of Stress Relief Heat Treatment Process on Thermal Analysis and Kinetics of Ti-6Al-4V Alloys

649

Fatih Altun, Gozde Altuntas, Abdulcelil Bayar, Eylem Asmatulu, Bulent Bostan, Ramazan Asmatulu

Electrophoretic Deposition on Additively Manufactured Non-conductive Porous Thermoplastic Composites

657

Samiul Alam, Devin Young, Dae Han Sung, Juhyeong Lee

Enabling In-Space Manufacturing of Reactive Thermoset Composite via Flexible Containment

672

Ivan Wu, Zheyuan Zheng, Logesh Shanmugam, Jeff Baur

Enhanced Thermal and Mechanical Properties in Carbon Fiber Reinforced Composites via Benzoxazine Resin

692

Ayşegül Hisar Telli

Enhancement of Interlaminar Shear Strength of Carbon Epoxy Composites by interleaving of Electrospun Polyacrylonitrile Nanofibers

705

Dattaji Shinde, Ajit Kelkar, Amit Kamble, Nilesh Shahpure, Nitin Dhamal, Sachin Solanke

Enhancing Ballistic Armor Performance Using Nanomaterial-Modified Epoxy and Polyurethane

720

Travis Murphy, Eltahry Elghandour, Amro El Badawy

Evaluation of Deep Learning Architectures for Defect Detection in Fused Filament Fabrication

733

Israt Sharmin Dola, Rakin Ahmed, Muhammed Jawaad Zulqernine, Tanvir Ahmed Shanto, Robert M Taylor

F

Fatigue Characterization of Extrusion-Based Additively Manufactured Thermoplastic Composites: A Repeatable Coupon Printing Protocol and Case Study on PA6-GF and PA12-CF

747

Mohammad Amjadi, Peter Woytowicz, Minh Tran, Reza Molaei

Fatigue Performance Under Rotational Bending and Axial Performance of 1018 Steel: Effect of Surface Roughness and Failure

762

Brennan Hume, Akawut Siriruk, Dayakar Penumadu

Feature Quantification for Complex Geometries Manufactured Using Powder Bed Fusion for Polymeric and Metallic Materials

775

Savannah Rose, David Jack, Nathan Emerson, Adam Swinney

Folded and Unfolded Wrinkle Formation During Steering Using an AFP Tabletop Simulator

784

Ryan Pederson, Nima Bakhshi, Adam Clare, Anoush Poursartip

High-Speed Radio-Frequency (RF) Welding of Carbon-Fiber–Polyetherketoneketone Laminates Using an Automated Platform

795

Sarmad Hassan, Agni Biswal, Vipin Kumar, Aniruddh Vashisth

H

Hybrid Composites via Co-Extrusion Additive Manufacturing-Compression Molding for Performance Optimization

805

Sanjita Wasti, Segun Isaac Talabi, Amber Hubbard, Adwoa Owusu, Vipin Kumar, Halil Tekinalp, Chinmay Mungale, Uday Vaidya, Ahmed Hassen, Soydan Ozcan

Hybrid Dovetail Core Joints for Composite Sandwich Structures: Mechanical–Adhesive Splicing for Improved Strength and Toughness

818

Rawan Aqel, Patrick Severson, Rani Elhajjar

Hybrid Fastening System with Dissimilar Substrates: An Experimental and Numerical Approach

832

Kunle Adeyemo, Andrew Valentine, Syed Fahad Hassan, Mahmoodul Haq

!

Impact Resistance of Corrugated Composite Structures Incorporating Polyurethane for Ballistic Armor

847

Carlos Perez, Jack Bride, Eltahry Elghandour

Influence of Functionalized Iron Oxide Nanoparticles on the Mechanical Performance of Thermoplastic Adhesives

863

Abdifitah Adan, Syed Fahad Hassan, Mohamed Abdelwahab, Mahmoodul Haq

Influence of Surface Treatment on the Interfacial and Mechanical Performance of Metal-Insert Overmolded Composites

874

Subhabrata Saha, Segun Isaac Talabi, Nadim Hmeidat, Ryan Ogle, Brittany Rodriguez, David Nuttall, Jesse Murphy, Marco Martinez, Vipin Kumar, Ahmed Hassen

Influence of Vacuum in Isothermal Healing of Additively Manufactured Thermoplastic Composites

891

Jimesh Bhagatji, Ryan Guenthner, Oleksandr Kravchenko

Injection-Based Repair of Delaminated Composites Using a Low-Viscosity, Room Temperature Gel Epoxy Resin

907

Lu Han, Ken Wong, Hideki Yamatomo, Masaya Kotaki

Insulation Effectiveness Assessment of Thermal Barrier Materials

919

Marcos Pantoja

Integration of Microvascular Networks for Multifunctionality in Extreme-Environment Composites

941

Joshua Tucker, Ajit Kelkar, Mookesh Dhanasar, Vishwas Jadhav

Intelligent Process Monitoring and Control to Reduce Defects and Cycle Times in Composites Serial Production

956

Nikos Pantelelis, Gregoire Lebreton

Interlaminar Fracture Toughness of Hybrid Thermoplastic Composites made using Advanced Tape Layer Additive Manufacturing

967

Owen Libby, Roberto Lopez-Anido

Interlaminar Fracture Toughness of Quasibrittle Composites Under Crack-Parallel Tension

978

Genki Matsubara, Gaurav Joshi, Marco Salviato

Investigation of Bead Overlap for Large-Scale Additive Manufacturing with Composites

989

Eric Luscher, Pasita Pibulchinda, R. Byron Pipes, Eduardo Barocio

Investigation Of Optimal Machining Parameters For Fiber-Reinforced Thermoplastic Composite Tooling

1004

Sucheol Woo, Garam Kim, Yuseop Sim, Jiho Lee, Andrew Sheedy, Varunavi Raghuraman



Low-CTE Functional Nanocomposites for High-Precision Stereolithography

1025

Rahul Sheley, Jitendra Tate, Sachin Shendekar, Shourav Ghosh

M

Manufacturing and Machining Effects on Recycled Composite Connecting Rods

1041

Walter Oppelt, Eltahry Elghandour, Alan Zhang, Masoud Yekani Fard

Mechanical and Electrical Characteristics of L-Glass 8 Harness Satin Fabric Prepregs with Three Families of Resin for Aircraft Radome Applications

1053

Jamie Freitag-Delaney, Barry Meyers

Mechanical Characterization of Biobased and Vitrimeric Analogues of SC-79 Epoxy for Structural Panels

1069

Jonathan Barboza, Brendan O' Toole, Nolan Manzanares, Fermin Tello, Jonathan Lazatin, Mohamed Trabia, Arunachalam Rajendran

Mechanical Response of Carbon-Based ABS Nanocomposites Across Quasi-Static and Intermediate Strain Rates

1084

Syed Fahad Hassan, Mahmoodul Haq

Micro-Sample Testing for Efficient Qualification of Laser Powder Bed Fusion Inconel 718 Parts

1098

Prudhvi Raj Pola, Clinton Swizter, Siddhesh Chaudhari, Olukayode Fatoki, Santosh Kumar Parupelli, Salil Desai, Ranji Vaidyanathan

Microstructures Effect on Anisotropic Thermal Conduction in Additive Manufactured Composites

1104

Harry Zhou, Tiantian Ke, Soroush Azhdari, Sergii Kravchenko

Multifunctional Nonwovens Coated with Carbon Nanocomposites for Flexible Sensors – Measuring Tactile Pressures to Tons

1116

Sagar M. Doshi

Multiscale Analysis of Composite Panels Made from Agricultural Byproducts via VARTM

1131

Gemma Criollo, Avishek Chanda, Muhammad Khusairy Bin Bakri, Vikram Yadama

Multi-scale Modeling of the High Velocity Perforation Behavior of UHMWPE Hard Ballistic Soft Laminates (HBSL)

1145

Bazle Haque, Jennifer Reeves, Leslie Hall

N

Nano-Reinforced Potting Paste Compounds with Improved Mechanical Properties for Primary Structural Applications

1157

Davood Askari, Amrith Pulipaka

Next Generation of Liquid Shims for Structural and High Temperature Aerospace Applications

1175

Adam Meng

O

Optimization of VBO Consolidation Cycle for Thermoplastic AFP Laminates

1193

Terry Hines, DeWayne Howell, Wyatt Taylor, Zachary Peck, Salvador Calderon

Overcoming Attenuation: Single-Sided NDI Characterization of Distal Bondlines in Engineered Foam Core Sandwich Structures

1214

Nathaniel Blackman

P

PCL Nanofibers Incorporated with Natural and Synthetic Calcium Hydroxyapatite Particles for Tooth Regeneration

1229

S.M. Hughes, F. Altun, W.S. Khan, R. Asmatulu

Polymer Composite Material Screening for a Cryotank Application

1240

Joseph Pinakidis, Sandi Miller

Powering Intelligence: The Strategic Role of Hybrid Carbon/Glass Composites in Accelerating the AI Frontier

1254

Clement Hiel

Preliminary Study of In-Plane Shear Strength of Carbon Nanofiber Z-Threaded Carbon Fiber-Reinforced Polymer Laminates After Extreme Elevated Temperature Exposure

1270

Ryna Warren, Will Dollison, Jordan Thomas, Kuang-Ting Hsiao

Preparation of High-Performing Porous Nanocomposites for Noise Absorption and Transmission Loss Reduction in Aircraft Interiors

1285

Kunza Arifa, Ramazan Asmatulu

Primary vs. Secondary Crystallization Effects on Bond Strength in Thermoplastic Composites

1304

Saeed Khaleghi, Mehran Tehrani

Printed Modular Tooling with Vacuum Integrity for Large-Scale Composite Structures

1315

Garam Kim, Jordan Kalman, Alexander Carlson, Johnathan Goodsell, R. Byron Pipes, Eduardo Barocio

R

Rapid Cryogenic Immersion Effects on Bond Integrity in Metal– and Carbon Fiber–Polymer Interfaces

1331

Ana De Leon, Emma Martin, Mitesh Patadia, Alexander Hamberg, Charlotte Ormond, Roy Rudd, Aniket Ingrole, Peter Cheetham, Rebekah Downes

Real-Time Material Certification of Composites using a Digital Twin

1342

Yuksel Yabansu, Tiffany Stewart, Andy Bauer, Gwen Gross, David Shahan

S

Simulating Buckling Behavior During the Laser Powder Bed Fusion Process

1357

Mina Ghabbour, Xueyong Qu, Jacob Rome

Smart Roller: Real-Time Measurement Of Pressure Distribution At Nip Point Of Automated Fiber Placement Process

1371

Charles Picciotto, Xiulun Yin, John Madden, Adam Clare, Anoush Poursartip

Structural Performance Restoration of Fiber-Reinforced Composite Patch Repair for Steel Bridge Girders

1387

Caden Cowles, Garam Kim, Gourab Ghosh

T

Thermomechanical Stress Prediction and Validation in Modular Additively Manufactured Fiber-Reinforced Composite Tooling with Adhesive Bonding

1404

Paul Park, Garam Kim, Eduardo Barocio

Towards Automated Control of Fibre Volume Content in Wet Filament Winding through Sensor-Based Process Analysis

1416

Jannick Fuchs, Lukas Kneer, Jonathan Alms, Christian Hopmann

U

Ultra-High-Rate Manufacturing of Thermoplastic Aircraft Tip Rib using Hybrid Overmolding

1432

Waruna Seneviratne, Jerome Teoh, John Tomblin

Understanding Freezer Aging of Prepregs Using NIR Spectroscopy

1447

Lara Fadel, Steven Nutt

Unique Methods of Interfacial Adhesion Evaluation for Diverse Fibers/Various Polymer Composites via Wettability with Electro-Micro- & in situ MacroMechanical Techniques

1460

Joung-Man Park, Dong-Jun Kwon, Lawrence DeVries

V

Vitrimer Matrix Composite Pressure Vessels with Recyclability

1472

Alison Kennedy, Carineh Ghafafian, Steve Nutt