

SAMPE 2019

OFFICIAL EVENT DIRECTORY



Celebrating 75 Years 1944-2019



May 20-23, 2019: Conference
May 21-22, 2019: Exhibition
Charlotte Convention Center
Charlotte, North Carolina



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Shimadzu new-generation Autograph AGX-V Series Precision Universal Testers feature proprietary control technology for unparalleled functionality. The AGX-V testers are newly designed for optimal operability and ease of use. Enhanced safety measures protect operators and equipment while intuitive software allows for easy creation of test conditions and data management.

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WELCOME TO SAMPE 2019!

The SAMPE Carolinas, Baltimore/Washington, and the Great Lakes Chapters take great pride in welcoming you to Charlotte, North Carolina! The Southeast area is home to NASCAR and the rich offerings of textile and reinforcement technology.

2019 is a monumental year as it marks SAMPE's 75th Anniversary! Please join us at Tuesday evening's Welcome Reception for a celebration not to be missed. We will also commemorate our 75 years with a historical display in the SAMPE booth in the Exhibit Hall on Tuesday and Wednesday. The Exhibit Hall will feature more than 275 suppliers, manufacturers and services providers.

In addition to this year's regular program consisting of technical papers, tutorials and panel presentations – we are excited to announce our featured speaker line-up, as well as bring you original experiences and programming created to inspire and energize.



Dr. Greg Hyslop, Chief Technology Officer, Boeing will share his perspectives on how the community can maximize its world-changing impact in the coming years at Tuesday Morning's Keynote presentation.

Gain insights from the Materials Forecast Forum track. Get an in-depth view into where emerging technologies and advanced materials and processes will go in the next 75 years.

Create a foundation for opportunities to come. Squash generational myths and learn from leaders who have transformed the workplace. SAMPE is excited to present an inspirational Leadership Development Series free to all badged attendees.

Gain inspiration: An Honorary Session for Katie Thorp. This 9-session track will illustrate how Katie's philosophy, passion, and hard work towards advancing technical progress with respect to advanced materials and processes continues to impact the scientific and engineering community.

Celebrate your peers! Join us for the Thursday Awards Breakfast featuring Jeff Andrews, Vice President of Competition at Hendrick Motorsports, presenting the ever-increasing use of composites in NASCAR.

Network and have fun! Unique to SAMPE 2019, on Thursday afternoon the program includes three company tours and a Golf Tournament with all proceeds benefiting student programs via the SAMPE Carolinas chapter and the SAMPE Foundation.

Thank you for being part of SAMPE 2019 and making it such an incredible event. We hope that you enjoy your time in Charlotte!

Best Regards,

Kevin Ahlstrom and Stephen Scarborough
SAMPE 2019 General Chairs

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Download the SAMPE Mobile App

Download the SAMPE mobile app. Plan your schedule, view the floor plan, see exhibitor product listings, and keep up to date with events. Search "SAMPE 2019" in your app marketplace.



SAMPE 2019 Event Highlights

INSPIRATIONAL SPEAKERS



Keynote

Greg Hyslop, D.Sc.
*The Boeing Company, Chief
Technology Officer*
May 21, 2019
8:30 - 9:30 AM
Ballroom A

Awards Breakfast

Jeff Andrews
*Hendrick Motorsports,
Vice President of Competition*
May 23, 2019
8:00 - 9:15 AM
Ballroom A



CELEBRATORY EVENTS

SAMPE 75th Celebration Reception | May 21, 2019 | 5:00 - 6:00 PM | Ballroom A

Join 4,000+ peers to celebrate SAMPE's 75th anniversary at this industry networking event, open to all badged attendees. Make new connections while having a great time!



SAMPE 75th Anniversary Golf Tournament | May 23, 2019 | 1:00 - 6:00 PM | Ballantyne Resort Golf Course

SAMPE Carolinas is hosting their annual scholarship golf tournament in celebration of 75 years of M&P innovation.

SAMPE 75th Anniversary Golf Reception | May 23, 2019 | 6:00 - 9:00 PM | Ballantyne Resort Golf Course

Mix and mingle with tournament participants, sponsors, and golf fanatics. This networking reception takes place after the SAMPE 75th Anniversary Golf Tournament.

PROFESSIONAL DEVELOPMENT SERIES

May 21, 2019

1:00 - 2:00 PM
Room 203A

The Times are Changing: Leveraging Generations, Lifecycles and Lifestyles

Cynthia Mills, FASAE, CAE, CMC, CPC, CCRCC, Founder, President & CEO of The Leaders' Haven™, LLC

May 21, 2019

2:00 - 3:00 PM
Room 203A

Transformative Leadership

Panel moderated by **Heidi Scott Giusto, Ph.D., ACRW, CPRW, CEIP, CEMC**, Owner, Career Path Writing Solutions

May 21, 2019

3:00 - 4:00 PM
Room 203A

How to Proactively Manage your Career

Heidi Scott Giusto, PhD, ACRW, CPRW, CEIP, CEMC, Owner, Career Path Writing Solutions

May 22, 2019

11:00 AM - 1:00 PM
Room 210AB

Women in SAMPE Forum

The Women in SAMPE Forum provides a space to discuss topics that are relevant to women's professional development, ranging from negotiation to how to plan your career and future family.

May 22, 2019

2:30 - 3:30 PM
Room 210AB

Future Leaders of SAMPE: Opportunities to Expand your Career

SAMPE Committee Leaders Panel

INTERACTIVE TOURS

Interactive Tours | May 23, 2019 | 1:00 - 4:00 PM

Designed to place you front and center with today's latest manufacturing technologies and applications, choose from Composite Resources, Hendrick Motorsports, and Roctool facilities. Pre-registration is required.

MATERIALS FORECAST FORUM

The **Materials Forecast Forum Track** (Room 207A) will present a lively and interesting perspective on many different technology sectors most relevant to future advanced materials and processing technology development within the next 75 years.



Toolfusion® Out of Autoclave Composite Tooling

Toolfusion® 3

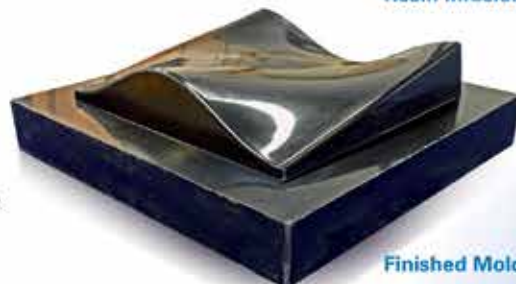
2-part, low viscosity epoxy infusion resin designed to produce prepreg quality composite molds.

Benefits

- **High glass transition temperature**
Longer, higher temperature tool life, reducing cost and remanufacturing.
- **Nano-technology to enhance toughness**
Manufacture tougher tools, reducing the cost of repair.
- **Low viscosity and long pot life**
Ability to produce more complex tools with low cost resin infusion process.



Resin Infusion



Finished Mold

Video Available Online

TMGC-TX Fabrics

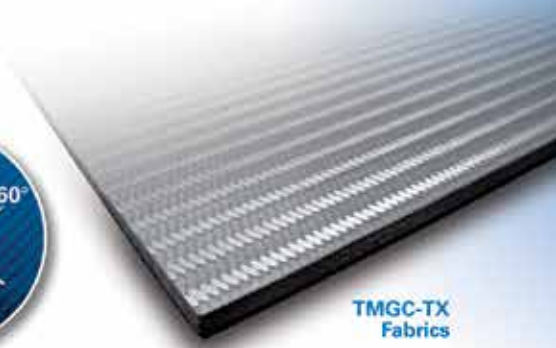
Triaxial Carbon Fabrics developed for the manufacture of composite molds with Airtech Toolfusion® resins.

Benefits

- **Balanced quasi-isotropic fabrics in every layer**
Balanced fabrics do not require ply orientation, reducing layup times dramatically.
- **Easy lay-up process**
Simplified ply patterns minimize material waste.
- **Low cost tooling solution with superior performance**
Engineered for Toolfusion® for ease of infusion and high quality tooling laminates.



Balanced triaxial fabric -60°/0°/60°

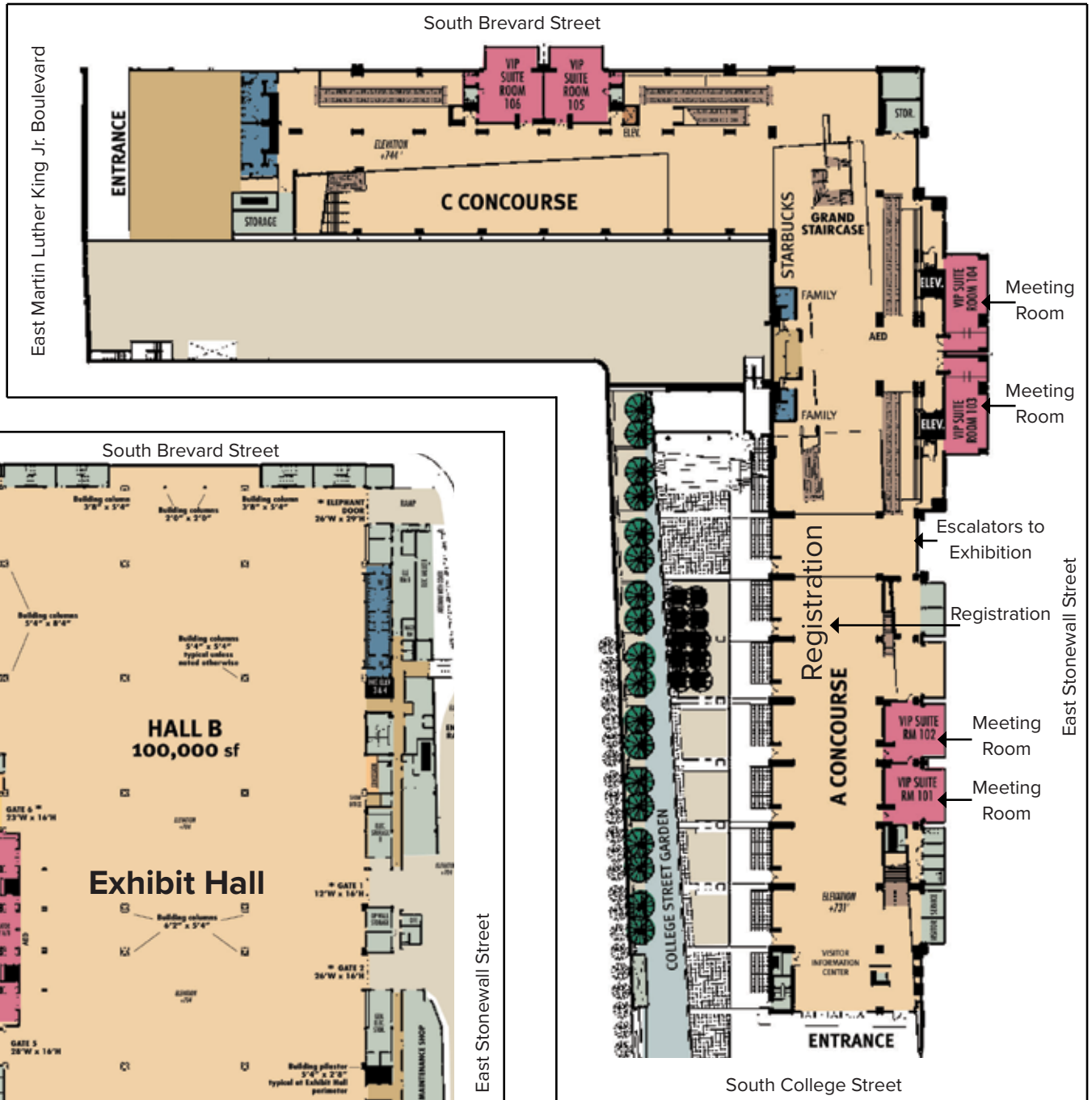


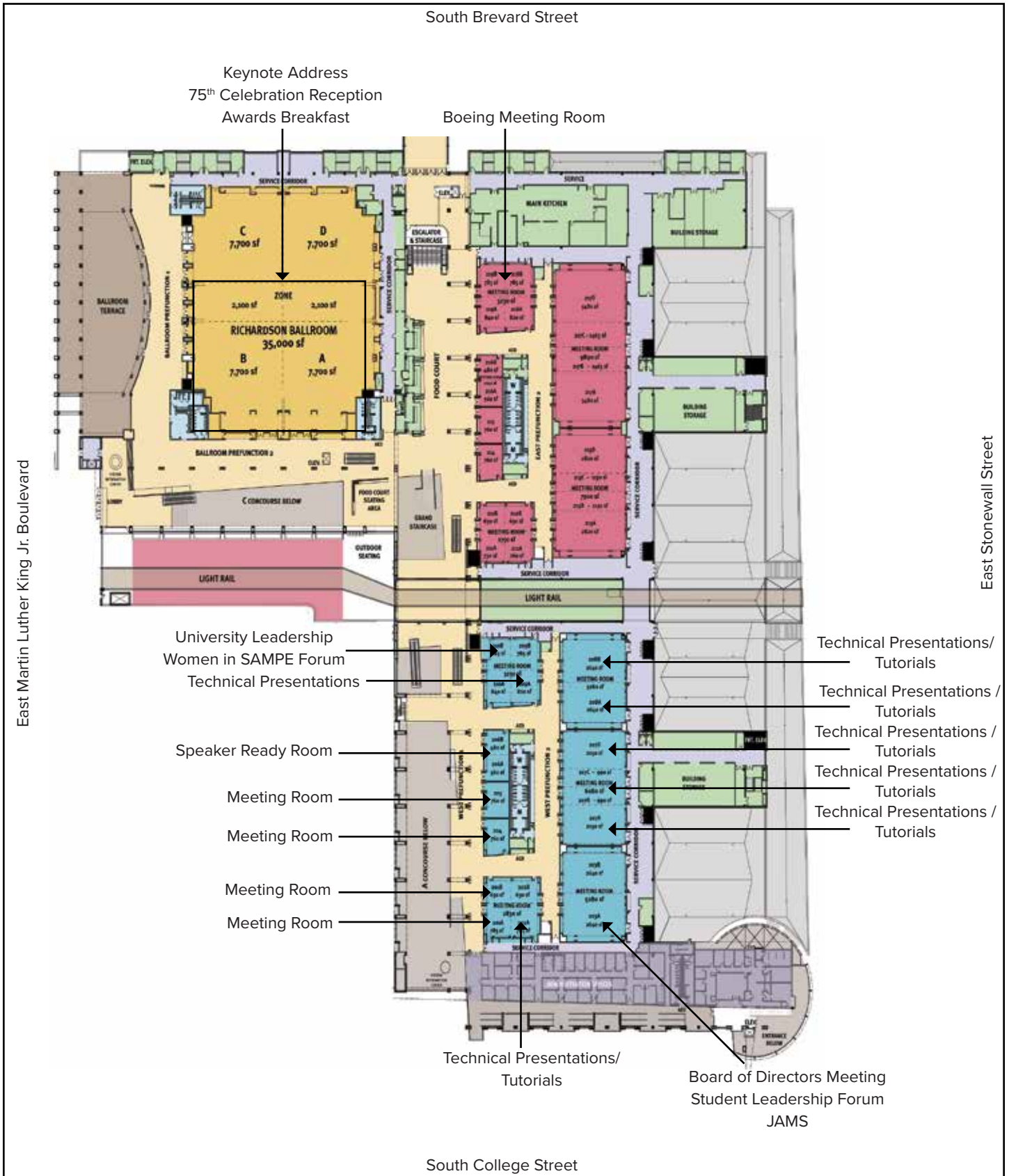
TMGC-TX Fabrics

www.airtechonline.com



CHARLOTTE CONVENTION CENTER | SAMPE 2019 CHARLOTTE, NC





STUDENT EVENTS & COMPETITIONS

May 21, 2019

1:00 – 2:00 PM

Competition Test Area
– Exhibit Hall

SAMPE Pilot Fuselage Program

A new SAMPE competition currently in its initial pilot program for new university chapters in SAMPE. University chapters are challenged to provide and test innovative design solutions to building a Fuselage. Testing is a 3-point bend test - students will test their design and provide a presentation poster describing their innovative solutions.

May 21, 2019

2:00 - 5:00 PM

Competition Test Area
– Exhibit Hall

SAMPE Additive Manufacturing Contest

The SAMPE Student Additive Manufacturing Contest provides an opportunity for students to learn and expand their abilities in additive manufacturing and engineering design. Structures are tested on-site in the Exhibit Hall.

May 22, 2019

10:00 AM - 4:00 PM

Competition Test Area
– Exhibit Hall

SAMPE Student Bridge Contest

For more than 20 years, SAMPE has hosted the bridge contest for students to design, analyze, build, and test a bridge structure at the annual SAMPE Convention. In 2018, 96 teams from 28 universities and colleges participated.

May 22, 2019

1:00 - 2:00 PM

Competition Test Area
– Exhibit Hall

SAMPE Student Poster Contest

Students will showcase their research in front of a connected community of materials and processes engineering professionals. Students will be present to discuss their research.

May 22, 2019

5:30 - 6:30 PM

Westin Charlotte Hotel
Grand Ballroom B

SAMPE Student Social Reception

All students are invited to attend the SAMPE Student Social Reception. Bridge, Additive Manufacturing Contest and Poster Session winners will be announced, and prizes will be raffled.

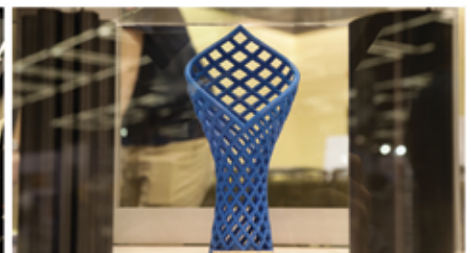
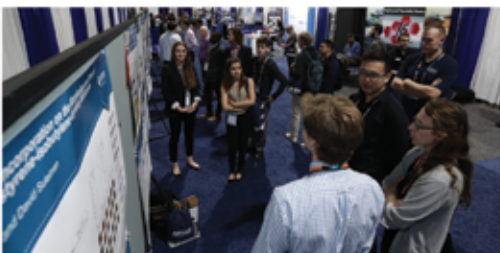
THANK YOU TO ALL PARTICIPATING SCHOOLS

Brigham Young University - Idaho
Cali-Baja
CAPE Lab, South Dakota School of Mines
and Technology
Chengdu Aeronautic Polytechnic
Clemson University
Columbia University
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Mexicali

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Unidad Valle de las Palmas
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University of Delaware
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University of South Carolina
University of Tennessee
University of Tennessee, Knoxville
University of Washington
Washington State University
West Virginia University
Western Washington University

**As of April 26, 2019.*



STUDENT LEADERS & CONTEST SPONSORS

International University Leadership Experience Award

Congratulations to the winners of the 2019 SAMPE International University Leadership Experience Award. The International University Leadership Experience Award brings student leaders to the SAMPE 2019 Conference and Exhibition to network with peers and industry professionals and increase their understanding of the Materials and Processes community. The award covers airfare costs, five nights of hotel accommodations, and a Free Full Conference registration.

Ajibola Adewole

South Dakota School of Mines and Technology

Harish Kallagunta

Texas State University

Alice Lamaro

ETH Zurich (SAMPE Europe winner)

Coleen Murray

University of Delaware

Abiodun Oluwalowo

Florida A&M University

Madhuparna Roy

Florida State University

William Schneider

Texas State University

Swayam Shree

Texas State University

THANK YOU TO COMMITTEES & SPONSORS

These student programs would not be successful without the gracious support of our sponsors and volunteers who donate their time, supplies and/or monetary contributions to support these wonderful learning opportunities for our student chapters.

Bridge Contest Governing Committee

TJ Zimmerman, The Boeing Company
Alison Lake, GE Aviation
Katelyn Virga, The Boeing Company
Brian Flinn, University of Washington
Ronda Coguill, Montana Tech

Additive Manufacturing Contest Governing Committee

Joe Vanherweg, Stellar Exploration
Harrison Scarborough, Electroimpact

International University Leadership Award Committee

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Alison Lake, GE Aviation
Adrie Kwakernaak, Delft University of Technology

STUDENT COMPETITION OFFICIAL SPONSORS

Student Competition Lead Sponsors



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Textile Products Inc.
Stellar Exploration

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SAMPE-Midwest
SAMPE-Northern California
SAMPE-Seattle
SAMPE-Utah



MONDAY May 20

7:00 AM - 5:00 PM [Registration Open](#) Concourse A, College Street Entrance
 Exhibit Hall Closed
 9:00 AM - 12:00 PM Tutorials
[Sandwich Structure Design and Mfg.](#) Room: 208B
[CMH-17 Civil Aircraft Certification \(Part 1\)](#) Room: 208A
[Adhesive Bonding](#) Room: 207A
[Graphene Technology From AtoG](#) Room: 202B
 1:00 PM - 4:00 PM Tutorials
[Obtaining Composite Parts](#) Room: 208B
[CMH-17 Civil Aircraft Certification \(Part 2\)](#) Room: 208A
[Composite Failure Criteria: What Do I Use?](#) Room: 202B
[High Performance Thermoplastic Composites](#) Room: 207A
 5:30 PM - 6:30 PM Fahrenheit Restaurant
[Young Professionals Meet and Greet](#)

TUESDAY May 21

7:00 AM - 5:00 PM	Registration Open	Concourse A, College Street Entrance
8:30 AM - 9:30 AM	Keynote Presentation	Ballroom A, Convention Center
9:30 AM - 5:00 PM	Exhibit Hall Open	
9:30 AM - 10:30 PM	Finance and Investment Committee Meeting	VIP Suite 103, Convention Center
10:00 AM - 12:00 PM	Young Professionals "open session" Meeting	203A, Convention Center
11:00 AM - 1:30 PM	Emerging Tech/Tech Excellence Meeting	210AB, Convention Center
1:00 PM - 2:00 PM	Featured Speaker	Room: 203B
	Challenges and Opportunities in Structural Bonding and Joining	
1:00 PM - 2:00 PM	Featured Speaker	Room: 208B
	Advances in Composite Materials and Design Tools	
1:00 PM - 2:00 PM	Leveraging Generations, Lifecycles and Lifestyles	Room: 203A
1:00 PM - 2:00 PM	SAMPE Pilot Fuselage Program	Competition Test Area-Exhibit Hall
1:00 PM - 3:00 PM	Material Forecast Forum	Room: 207A
2:00 PM - 3:00 PM	Transformative Leadership	Room: 203A
2:00 PM - 5:00 PM	Additive Manufacturing Contest	Exhibit Hall – End of Aisle G
2:00 PM - 5:00 PM	Panel	Room: 203B
	Advancements Toward Achieving Bonded Structural Applications	
1:00 PM - 5:00 PM	*Additive Manufacturing	Room: 207D
1:00 PM - 5:00 PM	*Advances in Comp Mfg. Technologies	Room: 207C
1:00 PM - 5:00 PM	*Advances in Thermoplastics	Room: 209A
1:00 PM - 5:00 PM	*Emergent Materials and Technologies	Room: 202B
1:00 PM - 5:00 PM	*NASA/ACP	Room: 208A
2:00 PM - 3:00 PM	Future Conferences and Events Working Group	VIP Suite 103, Convention Center
2:00 PM - 5:00 PM	*Tailorable Feedstock and Forming	Room: 208B
3:00 PM - 5:00 PM	*Design, Analysis, and Testing	Room: 207A
3:00 PM - 4:00 PM	How to Proactively Manage Your Career	Room: 203A
5:00 PM - 6:00 PM	SAMPE 75th Anniversary Welcome Reception	Ballroom A, Convention Center

*Technical Paper Presentations

The presentations listed in this Final Program are subject to change and cancellation due to circumstances beyond our control.

WEDNESDAY

May 22

7:00 AM - 5:00 PM	Registration Open	Concourse A, College Street Entrance
7:00 AM - 8:00 AM	Public Policy Committee Meeting	JP Charlotte Restaurant, Westin
8:00 AM - 10:00 AM	University Leadership Meeting	210AB, Convention Center
8:00 AM - 10:00 AM	Material Forecast Forum	Room: 207A
9:00 AM - 11:00 AM	Panel	Room: 203B
	Policy to Practice: Federal Government Investment in Advanced Materials Research and Development	
9:00 AM - 4:00 PM	Exhibit Hall Open	
10:00 AM - 11:00 AM	Student Chapter Support Committee Meeting	VIP Suite 103, Convention Center
10:00 AM - 4:00 PM	Student Bridge Contest	Exhibit Hall – End of Aisle G
11:00 AM - 1:00 PM	Women in SAMPE Forum	Room: 210AB
8:00 AM - 11:00 AM	*Bonding and Adhesive Technology	Room: 207D
8:00 AM - 11:00 AM	*Design, Analysis, and Testing	Room: 208B
8:00 AM - 11:00 AM	*High Temperature Materials	Room: 209A
8:00 AM - 11:00 AM	*NASA/ACP	Room: 208A
8:00 AM - 11:00 AM	*Sea-Based Aviation Structural Materials	Room: 202B
8:00 AM - 11:00 AM	*Simulation&Computational Modeling	Room: 207C
10:00 AM - 11:00 AM	*Space Structures and Materials	Room: 207A
1:00 PM - 2:00 PM	Student Poster Contest	Exhibit Hall – End of Aisle V
1:00 PM - 2:00 PM	Featured Speaker	Room: 203B
	Composite Material Handbook 17: History, Improvements & Advancements in Technology Transfer	
1:00 PM - 3:00 PM	Material Forecast Forum	Room: 207A
1:00 PM - 3:00 PM	SAMPE Foundation Board of Directors Meeting	VIP Suite 103, Convention Center
1:00PM - 4:00PM	Inspirations for Materials Research: An Honorary Session for Katie Thorp	Room: 208A
2:00 PM - 4:00 PM	Panel	Room: 203B
	Advancements in Textile Engineering- An Expert Panel Discussion	
2:30 PM - 3:30 PM	Future Leaders of SAMPE: Opportunities to Expand Your Career	Room: 210AB
1:00 PM - 5:00 PM	*Additive Manufacturing	Room: 207D
1:00 PM - 5:00 PM	*Advances in Composite Mfg. Technologies	Room: 207C
1:00 PM - 5:00 PM	*Sea-Based Aviation Structural Materials	Room: 202B
1:00 PM - 4:30 PM	*Tailorable Feedstock and Forming	Room: 208B
1:00 PM - 2:00 PM	*Advances in Thermoplastics	Room: 209A
2:00 PM - 3:30 PM	*NDE & Structural Health Monitoring	Room: 209A
3:00 PM - 5:00 PM	*Composite Fabrication Automation	Room: 207A
3:30 PM - 5:00 PM	*Sustainable Technologies	Room: 209A
4:00 PM - 5:00 PM	Featured Speakers	Room: 203B
	Air Force Responsive Composite Technology Development for the Future	
5:00 PM - 6:00 PM	International Reception	Harris Room, Westin
5:30 PM - 6:30 PM	Student Social Reception	Grand Ballroom B, Westin

*Technical Paper Presentations

THURSDAY

May 23

7:00 AM - 1:00 PM	Registration Open	Concourse A, College Street Entrance
7:00 AM - 8:00 PM	Awards Committee Meeting	204, Convention Center
	Exhibit Hall Closed	
8:00 AM - 9:15 AM	Awards Breakfast	Ballroom A, Convention Center
9:30 AM - 10:30 AM	Featured Speaker	Room: 203B
	Design to Cost Concept for Thermoplastic Laminates	
9:30 AM - 11:00 AM	North America Executive Cabinet Meeting	Trade Room, Westin
9:30 AM - 11:30 AM	*Bonding and Adhesive Technology	Room: 207D
9:30 AM - 11:30 AM	*Design, Analysis, and Testing	Room: 208B
9:30 AM - 12:00 PM	*Emergent Materials and Technologies	Room: 209A
9:30 AM - 12:00 PM	*Simulation & Computational Modeling	Room: 202B
9:30 AM - 12:00 PM	*Smart Fabrics and Structures	Room: 208A
9:30 AM - 12:00 PM	*Textiles and Reinforcements	Room: 207C
10:30 AM - 11:30 AM	Material Forecast Forum	Room: 207A
10:30 AM - 12:00 PM	Panel	Room: 203B
	Composites 4.0: Digitally Transforming the World of Composites	
1:00 PM - 4:00 PM	Site Tours:	
	1) Composite Resources, 2) Hendrick Motorsports, 3) Roctool	
1:00 PM - 6:00 PM	SAMPE Carolinas Golf Tournament	Ballantyne Resort Golf Course
6:00 PM - 9:00 PM	SAMPE Carolinas Golf Reception	Ballantyne Resort Golf Course

*Technical Paper Presentations



A large commercial airplane is shown from a low angle on a runway, with the sun setting in the background, creating a dramatic orange and yellow sky. The airplane is white with blue accents on the tail and engines. The runway is dark with white and yellow markings.

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FEATURED SPEAKERS | SAMPE 2019 CHARLOTTE, NC

TUESDAY, MAY 21 | 1:00PM - 2:00PM

Room: 203B

Challenges and Opportunities in Structural Bonding and Joining

Featured Speaker: Dr. Kay Youngdahl Blohowiak, The Boeing Company

Carbon fiber-reinforced polymer composites transformed aircraft structures design considerably (lighter, simpler, more efficient, reduced maintenance and better fuel consumption). CFRP aircraft designs apply to critical primary structures: fuselage, wings, and critical joints. Joining parts requires discussions including: certification criteria/requirements, robust materials/processes, effective process monitoring and inspection, and, development of efficient design, analysis, and substantiation tools.



TUESDAY, MAY 21 | 1:00PM - 2:00PM

Room: 208B

Advances in Composite Materials and Design Tools

Featured Speaker: Dr. Jan Vandenbrande, DARPA Defense Sciences Office

Carbon fiber reinforced polymer composites are the DoD material of choice for systems where minimizing structural weight is critical. This presentation provides high-level overviews of two key DARPA programs: (a) Tailorable Feedstock and Forming (TFF) program and (b) the Transformative Design (TRADES) program. One looks at developing feedstock materials while the other addresses design tool shortcomings.



WEDNESDAY, MAY 22 | 1:00PM - 2:00PM

Room: 203B

Composite Material Handbook 17: History, Improvements & Advancements in Technology Transfer

Featured Speaker: Dr. Larry Ilcewicz, Federal Aviation Administration

Composite Materials Handbook 17 (CMH-17) replaced older MIL-HDBK-17). That assured practical content representing best industry practices, while providing affordable industry approaches which currently do not appear in other published documents thus becoming public. That also insures that safety considerations required for military & civil applications remain a priority. Several new revisions are discussed.



WEDNESDAY, MAY 22 | 4:00PM - 5:00PM

Room: 203B

Air Force Responsive Composite Technology Development for the Future

Featured Speakers: Andrea Helbach, AFRL/RXMS and Dr. Hilmar Koerner, AFRL/RXCC



In the fall of 2018, the Air Force Research Laboratory (AFRL) invited experts from industry, academia, and government to a workshop to develop the strategic direction of AFRL composite materials and manufacturing investments. This presentation will discuss the workshop details and the conclusions drawn from it to develop the investment strategy with time for discussions and feedback.

THURSDAY, MAY 23 | 9:30AM - 10:30AM

Room: 203B

Design to Cost Concept for Thermoplastic Laminates

Featured Speaker: Eric Forest, BGF/PORCHER Group

The thermoplastic semi-products deliver excellent performance/weight ratio for structural parts, a key factor in aerospace industry applications. The objective of the work summarized in this presentation is to also improve the performance/cost ratio of thermoplastic composites. Two key innovations will be highlighted: (a) development of a new interface optimization and also (b) a specific weaving technology for heavier 12K tow with low crimp.

Thanks to these technical breakthroughs, it was demonstrated that 12K carbon/PEKK laminates exhibit the same mechanical performance level as with the standard 3K carbon/PEKK laminates. The influence of these parameters and innovations on the mechanical, thermal and ageing properties of laminates will be presented.



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SAMPE 2019 CONFERENCE COMMITTEE

The 2019 Conference Committee is comprised of an impressive group of industry leaders committed to presenting a technically topic-relevant program, a forum for exchange and debate, quality tutorials and inspirational featured presentations led by esteemed researchers and thought leaders.

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Douglas Smith, *Baylor University*

Steve Violette, *Fiber Materials, Inc.*

Amit Vyas, *Spirit AeroSystems, Inc.*

Paul Weinhold, *Johns Hopkins University Applied Physics Laboratory*

Hao Wu, *The University of Texas at Austin*

Shridhar Yarlagadda, *University of Delaware*

Patrick Zimmerman, *3M*

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MONDAY

May 20

START YOUR CONFERENCE EXPERIENCE ON THE RIGHT NOTE

SAMPE 2019 tutorials are the key to a strong start to your conference experience, by providing valuable and useful information on an assortment of topics. Designed for both technical and non-technical staff, these highly rated courses are a popular feature of the SAMPE 2019 Conference Program.

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- ▶ Tutorials are included with Premium Registration - **Best Value!**
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MORNING TUTORIALS | 9:00 AM – 12:00 PM

Room: 208B

Sandwich Structure Design, Manufacturing, and Fabrication Issues

Dr. Rik Heslehurst, Heslehurst & Associates

Room: 208A

CMH-17 Civil Aircraft Certification (Part 1): Certification Basics, Application Challenges & Importance of Material and Process Control

Dr. Larry Ilcewicz and Cynthia Ashforth, Federal Aviation Administration

Room: 202B

Graphene Technology: From A-to-G

Steve Rodgers, EmergenTek

Room: 207A

Adhesive Bonding: Techniques and Controls for Ensuring Quality

Lou Dorworth, Abaris Training Resources

AFTERNOON TUTORIALS | 1:00 PM – 4:00 PM

Room: 208A

CMH-17 Civil Aircraft Certification (Part 2): Advanced Material & Process Considerations, Structural Substantiation and Other Considerations

Dr. Larry Ilcewicz and Cynthia Ashforth, Federal Aviation Administration

Room: 208B

Obtaining Composite Parts: From Concept-to-Reality

Ronda Coguill, Highland Point, Inc. and Brianna Clark, HDR Engineering

Room: 202B

Composite Failure Criteria: What Do I Use?

Dr. Rik Heslehurst, Heslehurst & Associates

Room: 207A

High Performance Thermoplastic Composites

Mike Favaloro, CompositeTechs

TUESDAY May 21

Keynote Presentation

8:30 AM - 9:30 AM
Room: Ballroom A

YOU WILL CHANGE THE WORLD

Dr. Greg Hyslop, The Boeing Company, Chief Technology Officer



Professionals working in advanced materials and processes find themselves at a pivotal moment in history, just as SAMPE's founders did 75 years ago. The application of advancements in the coming decade will have a transformative effect on societies around the globe – fundamental changes in transportation infrastructure, new breeds of air vehicles, and new frontiers in space that previously were unthinkable. Opportunities abound across virtually all disciplines for the advanced materials and processes community – and some

may surprise you. Dr. Hyslop will share his perspectives on how the community can maximize its world-changing impact in the coming years.

All badged attendees are welcome to this event.

Congratulations, to Our Outstanding Paper Winners!

1st Place

“Multiscale Approaches to Formation of Thermoplastic Prepreg Short Carbon Fiber” by Zachary R. Hinton, Joy Baxter, Charleine Ngantsan, Maria M. Diaz-Acevedo, Simge Uzun, Prem D. Patel, Lavénia Thursch, Giuseppe R. Palmese, and Nicolas J. Alvarez

2nd Place

“Reliable Optimized Structures with High Performance Continuous Fiber Thermoplastic Composites From Additive Manufacturing (AM)” by Danning Zhang, Natalie Rudolph, Peter Woytowicz

3rd Place

“Spring Frame Press Fabrication of Aerospace Production Components” by Timothy J. Luchini, Alejandro J. Rodriguez, Scott A. Rogers, Aurele Bras, Adam Whysall, Richard Russell, Scott Lucas, and Gail L. Hahn

1:00 PM - 2:00 PM
Room: 203B

Featured Speaker

Challenges and Opportunities in Structural Bonding and Joining

Dr. Kay Youngdahl Blohowiak, The Boeing Company

2:00 PM - 5:00 PM
Room: 203B

Panel

Advancements Toward Achieving Bonded Structural Applications- An Expert Panel Discussion

Panel Moderator: Dr. Kay Youngdahl Blohowiak, The Boeing Company

Panelists:

- *James J. (Jim) Mazza, AFRL*
- *Giles Dillingham, Brighton Technologies LLC*
- *Chris Praggastis, 3M*
- *Richard H. Bossi, Boeing (retired)*
- *Cynthia Ashforth, Federal Aviation Administration*

MATERIAL FORECAST FORUM

This MFF Track will present a lively and interesting perspective on many different technology sectors most relevant to future advanced materials and processing technology development within the next 75 years.

Room: 207A

1:00 PM - 2:00 PM

Material Forecast Forum

Karin Anderson, SAMPE North America, President

2:00 PM - 3:00 PM

Trends and Uncertainties in Materials Technology

Moderator: Karin Anderson, SAMPE North America, President

Panelists:

- *Gary Fischman, Ph.D, Future Strategy Solutions*
- *Sanford Moskowitz, Ph.D, Department of Global Business, St. John's University*



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ADDITIVE MANUFACTURING

Room: 207D

Category Chairs: Bo Jin, University of Southern California; Vlastimil Kunc, ORNL; Hao Wu, KAI LLC

1:00 PM - 1:25 PM

Application

Large-scale Additive Manufacturing of Highly Exothermic Reactive Polymer Systems

Stian Romberg, Oak Ridge National Laboratory (ORNL) Manufacturing Demonstration Facility (MDF). University of Tennessee, Knoxville

1:30 PM - 1:55 PM

Design and Analysis

Topology Optimization of Coupled Thermomechanical Analysis for Additive Manufacturing

Jack Ramsey, Baylor University

2:00 PM - 2:25 PM

Design and Analysis

Multi-scale Material Modeling and Print Simulation for "First Time Right" Additive Manufacturing

Robert Cook, e-Xstream engineering

2:30 PM - 2:55 PM

Design and Analysis

Characterizing Thermal Expansion of Large-scale 3D Printed Parts

Dylan Hoskins, University of Tennessee Knoxville



3:00 PM - 3:25 PM

Materials/Processing

Reliable Optimized Structures with High Performance Continuous Fiber Thermoplastic Composites From Additive Manufacturing (AM)

Danning Zhang, AREVO Inc.

Continued on page 18.

TUESDAY

May 21



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TUESDAY May 21

3:30 PM - 3:55 PM

Materials/Processing

Investigating the Machinability of 3D Printed Recycled Carbon Fiber

Peng Hao Wang, Purdue University

4:00 PM - 4:25 PM

Materials/Processing

Printable Epoxy Carbon Fiber Composites and Their Mechanical Properties

Jeffery Baur, Air Force Research Laboratory

4:30 PM - 4:55 PM

Materials/Processing

Feasibility Study of Novel Magnetic Compaction Force Assisted Additive Manufacturing (MCFA-AM) Methodology for Continuous Carbon Fiber Reinforced Polymer (C-CFRP) Composites

Kuang-ting Hsiao, University of South Alabama

ADVANCES IN COMPOSITE MANUFACTURING TECHNOLOGIES

Room: 207C

Category Chairs: Landon Grace, North Carolina State University; Daniel J. Kim, NASA Johnson Space Center; Amit Vyas, Spirit AeroSystems, Inc.

1:00 PM - 1:25 PM

Characterization

Processing of Hollow Glass Sphere/Polyester/Glass Fiber Sheet Molding Composites

Edward DiLoreto, Georgia Institute of Technology

1:30 PM - 1:55 PM

Composite Machining

Investigation of Influence of Different Piercing Methods of Abrasive Waterjet on Delamination of Fiber Reinforced Composite Laminate

Garam Kim, Purdue University

2:00 PM - 2:25 PM

Composite Machining

Manufacture and Compression Testing of a Machined Composite Mechanical System

Thomas Rohrbach, California Polytechnic State University, San Luis Obispo

2:30 PM - 2:55 PM

Defects

In-situ Characterization of Composite Ply-Movement and Manufacturing Defects

Sandeep Chava, Embry-Riddle Aeronautical University

3:00 PM - 3:25 PM

Manufacturing Efficiency

Technical Cost Modeling Methodology for Novel Manufacturing

Robin Glebes, Purdue University

3:30 PM - 3:55 PM

Manufacturing Efficiency

Assessment of Automated Fiber Placement for the Fabrication of Composite Wind Tunnel Blades

Ray Grenoble, NASA

4:00 PM - 4:25 PM

Non-Polymer Matrices

Pyrolyzed Polydopamine (py-PDA) Functionalized Carbon Nanotubes and their Carbon/Carbon Composite with Improved Mechanical and Electrical Properties

Songlin Zhang, Florida State University

4:30 PM - 4:55 PM

Out-of-Autoclave (OOA)

Out-of-Autoclave Process and Automation: A Successful Path to Highly Integrated and Cost Efficient Composite Wing Moveables

Thibault De Lumley, SONACA GROUP



BOEING PANELS & PRESENTATIONS

Please stop by the Boeing-sponsored conference room (219 A&B) on Tuesday, 5/21. As part of Boeing's new sponsorship agreement with SAMPE North America, Boeing will host sessions that will be open to all SAMPE 2019 attendees.

Check the poster outside the conference room to join discussions including Boeing's new sponsorship of SAMPE and a panel with early career Boeing employees.

ADVANCES IN THERMOPLASTICS

Room: 209A

Category Chairs: David Leach, ATC Manufacturing; Kristin Hardin, NEG; Jim Pratte, Solvay

1:00 PM - 1:25 PM

Manufacturing

Effect of Graphene Nanoplatelets on Morphology and Property Enhancement of Immiscible Polycarbonate/poly(lactic Acid) Blends

Zaheeruddin Mohammed, Tuskegee University

1:30 PM - 1:55 PM

Manufacturing

Continuous Manufacturing Technology of Stampable Thick Organo-Sheet Using Fixed Rollers Double Belt Press

Osuke Ishida, Kanazawa Institute of Technology

2:00 PM - 2:25 PM

Manufacturing

Process Modeling and Manufacturing of Thermoplastic Prepreg Tape

Alex Reichanadter, Purdue University

2:30 PM - 2:55 PM

Manufacturing

Automated Fiber Placement of Thermoplastic Materials: Pursuit of Low Porosity Without the Autoclave

Frédéric Challos, Coriolis Composites

3:00 PM - 3:25 PM

Materials

Assessment of a High Temperature Resistance Polyimide as a Self-Sizing Polymer Matrix for Carbon Fiber-Based Composites

Sagar Kanhere, Department of chemical Engineering, Clemson University

3:30 PM - 3:55 PM

Materials

High Throughput Carbon Fiber Surface Modification

Zachary Hinton, Drexel University



4:00 PM - 4:25 PM

Materials

Multiscale Approaches to Formation of Thermoplastic Prepreg Short Carbon Fiber

Nicolas Alvarez, Drexel University

4:30 PM - 4:55 PM

Materials

Advancement in the Study of 3D Printable Flame Retardant Polyamide 11 Nanocomposites

William Fahy, KAI Inc.

TUESDAY

May 21

DESIGN, ANALYSIS, AND TESTING

Room: 207A

Category Chairs: Steve Violette, Fiber Materials, Inc.; Sthanu Mahadev, California Polytechnic State University, SLO; Bazle Haque, University of Delaware

3:00 PM - 3:25 PM

Ballistic Testing

Effect of Resin Viscoelastic Behavior on High Strain Rate Impact Performance of Fiber Reinforced Composites

Brendan Patterson, U.S. Army Research Laboratory

3:30 PM - 3:55 PM

Ballistic Testing

Ballistic Properties of Polypropylene and Epoxy Based Glass Fiber Reinforced Composites: Experiments and Modeling

Saikanth Paruchuru, University of Michigan-Dearborn

4:00 PM - 4:25 PM

Damage and Failure Analysis

Nano-Ceramic Modified Polymer Matrix Glass Composites for Impact Applications

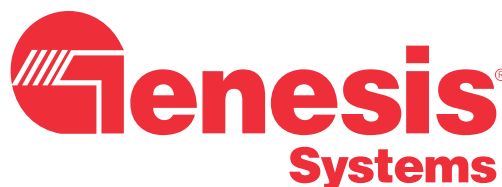
Harish Kallagunta, Texas State University

4:30 PM - 4:55 PM

Design and Analysis: Testing

Development of Carbon Composite/Aluminum Liner Hybrid Rocket Motor Case

Yakup Erturan, Roketsan A.S.



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TUESDAY

May 21

EMERGENT MATERIALS AND TECHNOLOGIES

Room: 202B

Category Chairs: Filippo Cellini, New York University; Mark Janney, Carbon Conversions; Joe Koo, The University of Texas at Austin

1:00 PM - 1:25 PM

Multi-Functional Materials

Wafer Scale-Up and Emergence of Ferromagnetism in Superhard Q-Carbon Coatings By Nanosecond Pulsed Laser Irradiation

Siddharth Gupta, North Carolina State University

1:30 PM - 1:55 PM

Multi-Functional Materials

Fabrication and Characterization of Q-Carbon Field Emission Device

Ariful Haque, North Carolina State University

2:00 PM - 2:25 PM

Multi-Functional Materials

Mechanical and Electrical Characteristics of 3D Printed Multi-Material Polymer Composites

Debes Bhattacharyya, Department of Mechanical Engineering, The University of Auckland, New Zealand

2:30 PM - 2:55 PM

Nanomaterials

Fiberglass Composite Reinforcement with Nanocellulose Fiber Sizing

Ejaz Haque, Georgia Institute of Technology

3:00 PM - 3:25 PM

Nanomaterials

Mechanical and Electrical Properties of Carbon Nanotubes Based Acrylonitrile Butadiene Styrene Nanocomposite Fabricated Using Fused Deposition Method

Dattaji Shinde, Veermata Jijabai Technological Institute

3:30 PM - 3:55 PM

Nanomaterials

Effects of Carbon Nanofiber Z-Threads on the Longitudinal Compressive Strength of Unidirectional CFRP Laminates

Kuang-ting Hsiao, University of South Alabama

4:00 PM - 4:25 PM

Nanomaterials

Ultra-Hard Diamene Films on Silicon Carbide for Mechanical Applications

Filippo Cellini, New York University

4:30 PM - 4:55 PM

Nanomaterials

Evaluation of a Modified Fused Filament Fabrication Material for Use As Thermal Protection

Steven Kim, The University of Texas at Austin

NASA/ACP

Room: 208A

Category Chairs: Sayata Ghose, The Boeing Company; Brian Grimsley, NASA

1:00 PM - 1:25 PM

[ITAR] Processing Parameters Affecting Core Crush in Honeycomb Panels

Marta Elleby, The Boeing Company

1:30 PM - 1:55 PM

[ITAR] Effects of Material and Processing Parameters on Bond-line Quality in Co-curing Honeycomb Sandwich Composites

Wenping Zhao, United Technologies Research Center (UTRC)

2:00 PM - 2:25 PM

[ITAR] Design and Control of an Arrayed Infrared (AIR) Heater for Accurate Heating Control During Automated Fiber Placement

Ramy Harik, University of South Carolina

2:30 PM - 2:55 PM

[ITAR] Cure Process Defects in Composite Laminates

Kevin Malik, Boeing Research & Technology

3:00 PM - 3:25 PM

Cure Process Defects in Composite Structures with Sharp Radii

Justin Alms, United Technologies Research Ctr

3:30 PM - 3:55 PM

A Numerical and Experimental Approach for Modeling Porosity Due to Entrapped Air and Volatiles Off-gassing During Manufacturing of Composite Structures

Curtis Hickmott, Convergent Manufacturing Technologies US

[ITAR] This category includes ITAR Restricted papers, see page 42 for details.

Continued on page 21.

4:00 PM - 4:25 PM

Design of an Automated Ultrasonic Scanning System for In-situ Composite Cure Monitoring and Defect Detection

Tyler Hudson, NASA Langley Research Center

4:30 PM - 4:55 PM

Evaluation of an Alternate Method for Determining Yield Strength Offset Values for Selective Laser Sintered Polymeric Materials

Chelsey Henry, Boeing Research & Technology

1:00 PM - 2:00 PM

Room: 208B

Featured Speaker

Advances in Composite Materials and Design Tools

Dr. Jan Vandenbrande, DARPA Defense Sciences Office

TAILORABLE FEEDSTOCK AND FORMING

Room: 208B

Category Chairs: Gail Hahn, The Boeing Company; Shridhar Yarlagadda, University of Delaware

2:00 PM - 2:25 PM

Tailorable Universal Feedstock for Forming (TUFF): Overview and Performance

Shridhar Yarlagadda, University of Delaware Center for Composite Materials

2:30 PM - 2:55 PM

Microstructural Evaluation of Aligned, Short Fiber TUFF Material

Dirk Heider, UD-CCM

3:00 PM - 3:25 PM

Formability of TUFF Composite Blanks

Shridhar Yarlagadda, University of Delaware Center for Composite Materials

3:30 PM - 3:55 PM

Closed Loop Recycling of CFRP Into Highly Aligned High Performance Short Fiber Composites Using the TUFF Process

Dirk Heider, UD-CCM

4:00 PM - 4:25 PM

Fiber Alignment Evaluation Through X-Ray Computed Tomography

Jennifer Sietins, U.S. Army Research Laboratory

4:30 PM - 4:55 PM

Nondestructive, Noncontact Quantification of Carbon Fiber Alignment and Orientation By High-speed Microwave Ellipsometry

Nathan Orloff, NIST

TUESDAY

May 21



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May 21, 2019

1:00 - 2:00 PM

Room 203A

The Times are Changing: Leveraging Generations, Lifecycles and Lifestyles

Cynthia Mills, FASAE, CAE, CMC, CPC, CRRRC

Founder, President & CEO of The Leaders' Haven™, LLC

Examine your engagement style, your openness to change and partnership with multiple generations. You'll also examine generational myths, language choices that create cultural barriers, and develop a recipe to flourish together.

May 21, 2019

2:00 - 3:00 PM

Room 203A

Transformative Leadership

Panel moderated by Heidi Scott Giusto, Ph.D., ACRW, CPRW, CEIP, CEMC

Owner, Career Path Writing Solutions

Learn about the key tenets of transformative leadership and what it looks like in practice. Panel members will share the values this type of leadership brings to the workplace and explore how the ubiquity of social media affects leadership in and outside of the workplace. This panel discussion is intended to inform and inspire both emerging and established leaders.

May 21, 2019

3:00 - 4:00 PM

Room 203A

How to Proactively Manage your Career

Heidi Scott Giusto, PhD, ACRW, CPRW, CEIP, CEMC

Owner, Career Path Writing Solutions

Learn strategic and actionable tips so you can proactively manage your career. By adopting these simple habits, engineers at all stages of their careers can be ready for their next opportunity:

- Create a foundation and prepare for opportunities to come to you
- Distinguish yourself from other engineers who have similar technical qualifications
- Update and tailor your resume in a methodical, step-by-step way

May 22, 2019

11:00 AM - 1:00 PM

Room 210AB

Women in SAMPE Forum

The Women in SAMPE Forum provides a space to discuss topics that are relevant to women's professional development, ranging from negotiation to how to plan your career and future family. At the same time, the forum provides the opportunity to network with other women in engineering and technology careers, and industry professionals.

- Cindy Ashforth – Senior Technical Specialist for Composites, FAA Aircraft Certification Service
- Genevieve Palardy – Assistant Professor, Louisiana State University
- Keran Dhillon – Senior Account Manager, Cytec Solvay Group
- Tresha Lacaux, Chief Engineer, BCA Structures Analysis, The Boeing Company
- Isabelle Paris, PhD – Senior Engineering Specialist, Composite Materials, Bombardier Aerospace

May 22, 2019

2:30 - 3:30 PM

Room 210AB

Future Leaders of SAMPE: Opportunities to Expand your Career

SAMPE Committee Leaders Panel

Hear from passionate and inspirational SAMPE leaders who will share their personal experiences, and provide insight into how they have been able to advance their careers, grow their networks and advance innovation by being a valued member, volunteer, mentor and leader of SAMPE. Join this session to learn about leadership opportunities and how to become part of a community that values:

- Knowledge transfer
- Creativity and innovation
- Professional engagement and inclusion
- Absolute integrity

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MATERIAL FORECAST FORUM

This MFF Track will present a lively and interesting perspective on many different technology sectors most relevant to future advanced materials and processing technology development within the next 75 years.

Room: 207A

8:00 AM - 9:00 AM

Future Mechanisms for R&D Funding

Moderator: *Sam Tucker, Ph.D., The Boeing Co.*

Panelists:

- * *Marty Green, Ph.D, Materials Measurement Laboratory, National Institute of Standards and Technology (NIST)*
- * *Linda Sapochak, Ph.D, Materials Research, National Science Foundation*
- * *Sanford Moskowitz, Ph.D, Department of Global Business, St. John's University*
- * *Michael vanTooren, Ph.D, SmartState Ctr for Multifunctional Materials & Structures (MFMS), University of South Carolina*

NASA/ACP

Room: 208A

Category Chairs: *Sayata Ghose, The Boeing Company; Brian Grimsley, NASA*

8:00 AM - 8:25 AM

Integrated Design and Manufacturing Analysis for Automated Fiber Placement Structures

August Noever, Collier Research Corporation

8:30 AM - 8:55 AM

Automation of AFP Process Planning Functions: Importance and Ranking

Ramy Harik, University of South Carolina

9:00 AM - 9:25 AM

Design for Manufacturing: Laminate Focused Design and Analysis Tools for Automated Composites Manufacturing

Jeron Moore, Boeing

9:30 AM - 9:55 AM

A Validation Study of a Physics-based Tack Model for an Automated Fiber Placement Process Simulation

Victoria Hutten, Convergent Manufacturing Technologies US

10:00 AM - 10:25 AM

Understanding and Modeling the Co-cure of Honeycomb Core Sandwich Structures

Mark Anders, University of Southern California

10:30 AM - 10:55 AM

A Simple Analysis Tool to Simulate the Co-cure of Honeycomb Core Composite Sandwich Structures

Navid Niknafs Kermani, University of Delaware

WEDNESDAY

May 22

HIGH TEMPERATURE MATERIALS

Room: 209A

Category Chairs: *Dan McCray, University of Dayton Research Institute; Sachin Patil, Karma Automotive*

8:00 AM - 8:25 AM

Degradation

[ITAR] High Temperature Creep of RM-1100/QISO/T650-35: Experiments & Real-Time FEA

Jonathan Spowart, Air Force Research Laboratory, Materials and Manufacturing Directorate

8:30 AM - 8:55 AM

Processing

[ITAR] Lightweight High Temperature Composite Mortar System

Andrew Littlefield, US Army RDECOM-ARDEC Benét Labs

9:00 AM - 9:25 AM

Processing

[ITAR] ICME Approach for High Temperature Polyimide Composites with Sharp Radii Features

Xiaomei Fang, Pratt & Whitney

9:30 AM - 9:55 AM

Advances in Thermal Protection Materials

Effect of Graphene on the Flammability Behavior of Polyimide-graphene Composites

Caroline Akinyi, University of Cincinnati

10:00 AM - 10:25 AM

Degradation

Molecular Weight Effects on the Processing, Thermal, and Mechanical Properties of Oligomeric Bisphenol A Phthalonitrile Resins

Tristan Butler, Naval Research Laboratory

10:30 AM - 10:55 AM

Degradation

Evaluation of Silicon-containing Phthalonitrile Polymers- Properties, and Degradations

William Monzel, Virginia Tech

[ITAR] This category includes ITAR Restricted papers, see page 42 for details.

WEDNESDAY May 22

BONDING AND ADHESIVE TECHNOLOGY

Room: 207D

Category Chairs: Tony Belcher, The Boeing Company; John Connell, NASA; Patrick Zimmerman, 3M

8:00 AM - 8:25 AM

Certifications

[ITAR] Advanced Surface Treatment Techniques for Removal of Contaminants in Composite Adhesive Bonding

Wenping Zhao, United Technologies Research Center (UTRC)

8:30 AM - 8:55 AM

Other

An Investigation of Dissimilar Material Joining Via Adhesive for Clear Coat to SMC

Saeil Jeon, Volvo Group Trucks Technology - NA

9:00 AM - 9:25 AM

Certifications

Optically Enhanced Bonding Workstation for Robust Bonding

Eileen Kutscha, Boeing

9:30 AM - 9:55 AM

Certifications

Reliable Bonding of Composite Laminates Using Reflowable Epoxy Resins

Frank Palmieri, NASA

10:00 AM - 10:25 AM

Certifications

Uncovering Non-Obvious Variables in Surface Preparation Processes for Bonding and Coating

Giles Dillingham, BTG Labs LLC

10:30 AM - 10:55 AM

Certifications

Effect of Strain Rate on Adhesively Bonded Single Lap Joints

Sree Sruthi Modala, University of Michigan, Dearborn

SIMULATION AND COMPUTATIONAL MODELING (ICME)

Room: 207C

Category Chairs: Venkata Bheem Reddy, MiaSole Hi-Tech Corp.; David Jack, Baylor University; Douglas Smith, Baylor University

8:00 AM - 8:25 AM

CFD and Process Simulation

Three-Dimensional Modeling of Ablative Materials Exposed to Oxy-Acetylene Test Bed
Ozen Atak, University of Texas at Austin

8:30 AM - 8:55 AM

Structural Analysis

Computing Methodology for SMC Structures Reinforced By Continuous Fiber Reinforcements

Eugen Musienko, Helmut-Schmidt- University/ University of the German Army

9:00 AM - 9:25 AM

Multiscale Modeling

The Effect of Shape and Orientation on the Barrier Properties of Flake-filled Composites: A 3D Approach

Thanasis Papathanasiou, Nazarbayev University

9:30 AM - 9:55 AM

Multiscale Modeling

Multiscale Simulation of Unidirectional Carbon Fiber Reinforced Polymer Strength
Hayden Cornwell, MultiMechanics

10:00 AM - 10:25 AM

Multiscale Modeling

Computational Multiscale Analysis for Interlaminar Reinforcement of Composite Laminates with Radially Grown Carbon Nanotube Architecture

Karthik Rajan Venkatesan, Arizona State University

10:30 AM - 10:55 AM

Property Predictions

A Model for Predicting the Cured Part Thickness of Automated Fiber Placed Composites

Matthew Kirby, Southwest Research Institute



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[ITAR] This category includes ITAR Restricted papers, see page 42 for details.

SEA-BASED AVIATION STRUCTURAL MATERIALS

Room: 202B

Category Chair: William Nickerson, US Navy

8:00 AM - 8:25 AM

[ITAR] Feedback-Assisted Laser Surface Processing

Halina Tran, Intellisense Systems Inc.

8:30 AM - 8:55 AM

Multifunctional Hybrid Composite for Thermal Protection of Carbon Fiber Reinforced Polymers (CFRPs) in Aerospace Applications

Cheryl Xu, NC State University

9:00 AM - 9:25 AM

Microstructure-Sensitive ICME Workflows for Fatigue Critical Applications

David Mcdowell, Georgia Institute of Technology

9:30 AM - 9:55 AM

Heat Treatment of AA2024 Powders for Enhanced Solid State Structural Repairs Via Cold Spray Deposition

Luke Brewer, The University of Alabama

10:00 AM - 10:25 AM

Approaches for Efficient Modeling of the Mechanical Response of Complex Periodic Truss Architectures

Carlos Portela, California Institute of Technology

10:30 AM - 10:55 AM

Prediction of Fatigue Failure in Fibrous Composites Using the Reduced-Order Multiscale Discrete Damage Theory

Caglar Oskay, Vanderbilt University

WEDNESDAY

May 22

[ITAR] This category includes ITAR Restricted papers, see page 42 for details.

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WEDNESDAY May 22

DESIGN, ANALYSIS, AND TESTING

Room: 208B

Category Chairs: Steve Violette, Fiber Materials, Inc.; Sthanu Mahadev, California Polytechnic State University, SLO; Bazle Haque, University of Delaware

8:00 AM - 8:25 AM

Design and Analysis: Testing

Mechanical Characterization of Core Shell Rubber Particles Modified Vinyl Ester and Glass Fiber Reinforced Composites

Swayam Shree, Texas State University

8:30 AM - 8:55 AM

Design and Analysis: Testing

The Mechanical Performance of Carbon Fibres- Addressing the Role of Microstructure

Peter Lynch, Deakin University, Australia

9:00 AM - 9:25 AM

Design and Analysis: Testing

Low Velocity Impact Response of Hybrid Pseudo-Woven Fiber-Reinforced Composite Laminates

Cyrus Vakili Rad, University of South Carolina

9:30 AM - 9:55 AM

Design and Analysis: Testing

Experimental Investigation of Spring-back Behavior of Composite Sandwich Structures: Part One

Tien Vo, Spirit AeroSystems

10:00 AM - 10:25 AM

Design and Analysis: Testing

Experimental Validation of an Ultraviolet Imaging Cube Satellite

Jason Grillo, Cal Poly San Luis Obispo

10:30 AM - 10:55 AM

Design and Analysis: Testing

A Fully Distributed Strain Rosette Using High Definition Fiber Optic Sensing

Elias Bearinger, Luna Innovations Incorporated

MATERIAL FORECAST FORUM

This MFF Track will present a lively and interesting perspective on many different technology sectors most relevant to future advanced materials and processing technology development within the next 75 years.

Room: 207A

9:00 AM - 10:00 AM

Future Engineering Workforce Development

Moderator: Sam Tucker, Ph.D., The Boeing Company

Panelists:

- * *Gary Fischman, Ph.D, Future Strategy Solutions*
- * *Brian Grady, Ph.D, SPE; Douglas & Hilda Bourne Chair in Chemical Eng, Director, School of Chemical, Biological & Matls Eng*
- *Linda Cadwell Stancin, Lockheed Martin*
- * *Michael vanTooren, Ph.D, SmartState Center for Multifunctional Materials and Structures (MFMS), University of South Carolina*
- * *Linda Sapochak, Ph.D, National Science Foundation*

9:00 AM - 11:00 AM

Room: 203B

Panel

Policy to Practice: Federal Government Investment in Advanced Materials Research and Development

Panel Moderator: Mick Maher, Maher & Associates, President

Panelists:

- *Dr. James Warren, NIST*
- *Julie Christodoulou, ONR*
- *Steve McKnight, Virginia Tech*

SPACE STRUCTURES AND MATERIALS

Room: 207A

Category Chairs: Monica Rommel, Harris in Rochester; Paul Wienhold, Johns Hopkins University Applied Physics Laboratory

10:00 AM - 10:25 AM

Recent Developments in Boron Fiber-Reinforced Composite Materials

Tom Foltz, Specialty Materials, Inc.

10:30 AM - 10:55 AM

Automated Fiber Placement Manufactured Composites for Science Applications

Kenneth Segal, NASA / Goddard Space Flight Center

1:00 PM - 2:00 PM
Room: 203B

Featured Speaker

Composite Material Handbook 17: History, Improvements & Advancements in Technology Transfer

Dr. Larry Ilcewicz, Federal Aviation Administration

INSPIRATIONS FOR MATERIALS RESEARCH: AN HONORARY SESSION FOR KATIE THORP

Room: 208A

Session Moderator: Dr. Timothy Pruyn, AFRL/RXCC



The focus of this session is to honor Dr. Katie Thorp as a researcher, technical leader, community leader and friend. Katie's contribution to the scientific and engineering materials community was substantial. She was a

technical leader in high temperature polymers, composites, metamaterials, biomaterials and processing science. She was also a community leader in these fields and helped shape not just the technical work that was done, but the people as well. This session will also focus on her leadership for this community, SAMPE and as an educational outreach advocate. In addition, this session will show how Katie's philosophy, passion, and hard work towards advancing technical progress is still being felt today and impacting the scientific and engineering community.

1:00PM - 1:20PM

Spectral Imaging and Enhanced Sensing with Metasurfaces

Dr. Augustine Urbas, AFRL

1:20PM - 1:40PM

High Temperature Polymer Development

Dr. Don Klosterman and Charlie Browning, University of Dayton

1:40 PM - 2:00 PM

Reflections on the Service of Katie Thorp

Brent Strong, SAMPE

2:00 PM - 2:20 PM

SEMEDs Summa

Kara Storage, AFRL

2:20 PM - 2:40 PM

Contributions to Biodegradation: From the Bench to Leadership

Dr. Caitlin Bojanowski, AFRL

WEDNESDAY

May 22

2:40 PM - 3:00 PM

Tour D'Horizon of Composite Processing Science

Tara Storage, AFRL

3:00 PM - 3:20 PM

Process Modeling to Improve Tool Design

Dr. Thomas Tsotsis, The Boeing Company

3:20 PM - 3:40 PM

Novel Prepreg System for Compression Molding

Dr. Timothy Luchini, The Boeing Company

3:40 PM - 4:00 PM

Evolution of High Performance AF Resins. What's Next?

Dr. Hilmar Koerner, AFRL/RXCC

MATERIAL FORECAST FORUM

This MFF Track will present a lively and interesting perspective on many different technology sectors most relevant to future advanced materials and processing technology development within the next 75 years.

Room: 207A

1:00 PM - 2:00 PM

Materials Genome Initiative

Marty Green, Ph.D, Materials Measurement Laboratory, National Institute of Standards and Technology (NIST)

2:00 PM - 3:00 PM

Materials Lifecycles

Moderator: German Reyes-Villanueva, Ph.D., University of Michigan-Dearborn

Panelists:

- * *Sam Tucker, Ph.D, The Boeing Company*
- * *Linda Cadwell Stancin, Ph.D, Lockheed Martin*
- * *Brian Grady, Ph.D, SPE; Douglas & Hilda Bourne Chair in Chemical Eng, Director, School of Chemical, Biological & Matls Eng*
- * *Deborah Whitis, Ph.D, GE Additive*

WEDNESDAY May 22

ADDITIVE MANUFACTURING

Room: 207D

Category Chairs: Bo Jin, University of Southern California; Vlastimil Kunc, ORNL; Hao Wu, KAI LLC

1:00 PM - 1:25 PM

[Materials/Processing](#)

Investigation of Process Variation Effects Via a Homogeneous 3-Dimensional Tensile Test Coupon in Polyjet 3D Additive Printing

Ravi Pratap Singh Tomar, NC A&T

1:30 PM - 1:55 PM

[Materials/Processing](#)

Production of Low Coefficient of Thermal Expansion Composite Tooling Manufactured Via 3D Printing

Pedro Cortes, Youngstown State University

2:00 PM - 2:25 PM

[Materials/Processing](#)

Stiffness Prediction and Validation of Large Volume 3D Printed, Short-Fiber-Filled Polymer Composites

Timothy Russell, Baylor University

2:30 PM - 2:55 PM

[Materials/Processing](#)

Additive Manufacturing of Flame-retardant Polyamide 6 Nanocomposites Via Fused Filament Fabrication (FFF)

Hao Wu, KAI LLC

3:00 PM - 3:25 PM

[Materials/Processing](#)

Effect of Post-processing Annealing on Crystallinity Development and Mechanical Properties of Polyphenylene Sulfide Composites Printed on Large-format Extrusion Deposition System

Vidya Kishore, University of Tennessee, Knoxville

3:30 PM - 3:55 PM

[Materials/Processing](#)

Polyetherketoneketone (PEKK), A Versatile Ultra-polymer for Additive Manufacturing

Roderick Reber, Arkema, Inc.

4:00 PM - 4:25 PM

[Materials/Processing](#)

Z-pinning Approach for Improving Interlayer Strength of 3D Printed Parts

Chad Duty, University of Tennessee

4:30 PM - 4:55 PM

[Materials/Processing](#)

Extrusion Deposition Additive Manufacturing Utilizing High Glass Transition Temperature Latent Cured Epoxy Systems

John Lindahl, Oak Ridge National Laboratory

ADVANCES IN COMPOSITE MANUFACTURING TECHNOLOGIES

Room: 207C

Category Chairs: Landon Grace, North Carolina State University; Daniel J. Kim, NASA Johnson Space Center; Amit Vyas, Spirit AeroSystems, Inc.

1:00 PM - 1:25 PM

[Quality Assurance](#)

Self-regulated Production of an Automotive Composite Floor Pan

Sebastian Stender, Aachen Center for Integrative Lightweight Production

1:30 PM - 1:55 PM

[Quality Assurance](#)

Establishment of an Inline Quality Assurance Method for Fiber Sprayed Preforms

Nadine Magura, Institute of Plastics Processing (IKV) at RWTH Aachen University

2:00 PM - 2:25 PM

[Resin Infusion](#)

In-situ Measurement of Resin Shrinkage in Epoxy Composite

Samarth Motagi, Embry-Riddle Aeronautical Univ

2:30 PM - 2:55 PM

[Resin Infusion](#)

The Effect of Fabric Architecture on the Processing and Properties of Composites Made By Vacuum Assisted Resin Transfer Molding (VARTM)

Donald Klosterman, University of Dayton

3:00 PM - 3:25 PM

[Simulation & Modeling](#)

Process Modelling of Induction Welding for Thermoplastic Composite Materials by Neural Networks

Hao Guo, University of South Carolina

Continued on page 31.

3:30 PM - 3:55 PM

Simulation & Modeling

Core Movement During Processing of Sandwich Panels

Duncan Pawson, University of British Columbia

4:00 PM - 4:25 PM

Simulation & Modeling

Analysis and Fabrication of Thick Co-Cured Composite Structures

Jessica Rader, General Atomics Aeronautical Systems Inc.

4:30 PM - 4:55 PM

Simulation & Modeling

A Mathematical Approach to Manufacturing Process and Systems Modeling Using Geometric Programming

Scott Nill, MIT

ADVANCES IN THERMOPLASTICS

Room: 209A

Category Chairs: David Leach, ATC Manufacturing; Kristin Hardin, NEG; Jim Pratte, Solvay

1:00 PM - 1:25 PM

Materials

Low Melt Paek (LM PAEK) Prepreg for Improved Processing of Thermoplastic Composites

D. Dewayne Howell, TenCate Advanced Composites

1:30 PM - 1:55 PM

Thermoplastics - Recycling

Design, Manufacturing and Testing of a Rotorcraft Access Panel Door From Recycled Carbon Fiber Reinforced Polyphenylenesulfide

Thomas De Bruijn, ThermoPlastic Composites Application Center, Saxion University of Applied Sciences

WEDNESDAY
May 22

SEA-BASED AVIATION STRUCTURAL MATERIALS

Room: 202B

Category Chair: William Nickerson, US Navy

1:00 PM - 1:25 PM

Overview and Status of “Composite Joints with Inherent Disbond Arrest Capability (COJAC)” Program

Jonathan Bartley-cho, Northrop Grumman Corporation

1:30 PM - 1:55 PM

A Discrete Approach for Predicting Void Formation During Vacuum Consolidation of Autoclave Composites

Guillaume Seon, University of Texas at Arlington

2:00 PM - 2:25 PM

Multi-Functional Nano-Porous Ceramics

Namiko Yamamoto, The Pennsylvania State University

2:30 PM - 2:55 PM

Cold Spray Technology for Structural Restoration of Sea-Based Aviation Structural Materials

Sarah Galyon Dorman, SAFE Inc.

3:00 PM - 3:25 PM

Innovations in Washout Tooling to Lower Cost, Shorten Lead Times, and Improve Properties

Linda Clements, Nevada Composites, Inc.

3:30 PM - 3:55 PM

Properties for AA7050 Deposits Produced By the Cold Spray Process

Timothy Eden, The Applied Research Laboratory, The Pennsylvania State University

4:00 PM - 4:25 PM

Adhesively Bonded Composite Durability (ABCD) Phase 3

Jason Action, Lockheed Martin Aeronautics



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WEDNESDAY May 22

TAILORABLE FEEDSTOCK AND FORMING

Room: 208B

Category Chairs: Gail Hahn, The Boeing Company; Shridhar Yarlagadda, University of Delaware

1:00 PM - 1:25 PM

Surface Treatment of TUFF Pitch-Based Carbon Fiber for Adhesion Promotion in High TG Thermoplastic Composites

Joseph Deitzel, University of Delaware Center for Composite Materials

1:30 PM - 1:55 PM

Rapid High-Performance Molding (RAPM) for Small Parts

Gail Hahn, The Boeing Company

2:00 PM - 2:25 PM

Fabrication of a Complex Part with Deep-Draw Sections By Resin Transfer Molding

Thomas Tsotsis, The Boeing Company



2:30 PM - 2:55 PM

Spring Frame Press Fabrication of Aerospace Production Components

Timothy Luchini, The Boeing Company

3:00 PM - 3:25 PM

Development of Scalable Dynamic Control Architectures for Flexible Composites Manufacturing Work Cells

Steven Shewchuk, The Boeing Company

3:30 PM - 3:55 PM

[ITAR] Rapid High Performance Molding of Structural Thermoplastic Composite Parts

Gail Hahn, The Boeing Company

4:00 PM - 4:25 PM

[ITAR] Agile Analysis of Manufacturing Cell Costs for Molding of Small Composite Parts

Daniel Charles, The Boeing Company

2:00 PM - 4:00 PM

Room: 203B

Panel

Advancements in Textile Engineering- An Expert Panel Discussion

Panel Moderator: Ted Lynch, Strategic Marketing Innovations (SMI)

Panelists:

- Mary Shafer, Fabric Development
- Steve Clarke, T.E.A.M. Inc.
- Katharina Davies, Saertex
- Brian Laufenberg, Chomarat
- Jon Goering, Albany Engineered Composites
- Joseph Coughlin, Hexcel

NDE & STRUCTURAL HEALTH MONITORING

Room: 209A

Category Chairs: Ayou Hao, Florida State Univ; Rassel Raihan, The Univ of Texas at Austin

2:00 PM - 2:25 PM

Automated Inspection

Machine Learning Based AFP Inspection: A Tool for Characterization and Integration

Christopher Sacco, University of South Carolina

2:30 PM - 2:55 PM

In Situ Sensors

Cyclic Response of Smart Sensing Layer for In Situ Structural Health Monitoring of Composite Materials

Zaffar Khan, Institute of Space Technology

3:00 PM - 3:25 PM

In Situ Sensors

Structural Health Monitoring of Fiber-Reinforced Composite Using Wireless Magnetostrictive Sensors

Relebohile George Qhobosheane, The University of Texas at Arlington

COMPOSITE FABRICATION AUTOMATION

Room: 207A

Category Chairs: Ramy Harik, USC McNAIR; Jessica Hughes, The Boeing Company

3:00 PM - 3:25 PM

Other

Elements and Mechanisms for Applying Artificial Intelligence to Composites Fabrication

Scott Blake, Aligned Vision

3:30 PM - 3:55 PM

Automated Fiber Placement

Virtual Commissioning of Manufacturing System Intelligent Control

Kaishu Xia, University of South Carolina

[ITAR] This category includes ITAR Restricted papers, see page 42 for details.

Continued on page 33.

4:00 PM - 4:25 PM

[Automated Fiber Placement](#)

Automated Fiber Placement of Composite Wind Tunnel Blades: Process Planning and Manufacturing

Ramy Harik, University of South Carolina

4:30 PM - 4:55 PM

[Automated Fiber Placement](#)

Fiber Tow Deformations During Layup of Steered Paths Using Automated Fiber Placement Process

Roudy Wehbe, University of South Carolina

SUSTAINABLE TECHNOLOGIES

Room: 209A

Category Chairs: Hardik Dalal, The Boeing Company; Srikanth Pilla, Clemson University

3:30 PM - 3:55 PM

[Bio-Derived Resins](#)

Bio-Based Thermosets Prepared Using Michael Addition of Furan and Isosorbide Building Blocks

Xi Chu, Drexel University

4:00 PM - 4:25 PM

[Other](#)

Surface Treatment of Pitch-Based Discontinuous Carbon Fibers

Daniel Knorr, U.S. Army Research Laboratory

4:30 PM - 4:55 PM

[Other](#)

Composites Workforce, The Next Generation Outreach Through the Composite Materials Merit Badge

David Stone, Boy Scouts of America

4:00 PM - 5:00 PM

Room: 203B

Featured Speakers

Air Force Responsive Composite Technology Development for the Future

*Dr. Hilmar Koerner, AFRL/RXCC
Andrea Helbach, AFRL/RXMS*

WEDNESDAY

May 22

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THURSDAY May 23

Awards Breakfast and Presentation

8:00 AM - 9:15 AM
Room: Ballroom A

NASCAR'S EVOLUTION AND PROGRESSION RELATED TO COMPOSITES

Jeff Andrews, Hendrick Motorsports



A brief summary of how a wreck in 2001 at the Daytona 500 led to rapid composite innovations regarding driver safety first, and then performance. How and where composite materials are being utilized in today's current NASCAR race cars to enhance the performance, safety, cost and time management associated with operating a CUP team in the modern era.

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9:30 AM - 10:30 AM
Room: 203B

Featured Speaker

Design to Cost Concept for Thermoplastic Laminates

Eric Forest, BGF/PORCHER Group

MATERIAL FORECAST FORUM

This MFF Track will present a lively and interesting perspective on many different technology sectors most relevant to future advanced materials and processing technology development within the next 75 years.

Room: 207A

10:30 AM - 11:30 AM

Materials for Environment, Renewable Energy and Increased Efficiency

Moderator: Sanford Moskowitz, Ph.D., Department of Global Business, St. John's Univ.

Panelists:

- * *Sam Tucker, Ph.D., The Boeing Company*
- * *Linda Sapochack, Ph.D., National Science Foundation*
- * *Marty Green, Ph.D. National Institute of Standards and Technology (NIST)*
- * *Deborah Whitis, Ph.D., GE Additive*

10:30 AM - 12:00 PM

Room: 203B

Panel

Composites 4.0: Digitally Transforming the World of Composites

Panel Moderator: Avner Ben-Bassat, Plataine

Panelists:

- *Dave Atkins, Siemens PLM*
- *Shachar Fine, Kanfit*
- *Mick Maher, Maher & Associates*
- *Paul Oldroyd, Bell Flight / Textron Inc.*

BONDING AND ADHESIVE TECHNOLOGY

Room: 207D

Category Chairs: Tony Belcher, The Boeing Company; John Connell, NASA; Patrick Zimmerman, 3M

9:30 AM - 9:55 AM

Certifications

Plasma Surface Functionalization of AFP Manufactured Composites for Improved Adhesive Bond Performance

Ramy Harik, University of South Carolina

10:00 AM - 10:25 AM

Thermoplastics

Effect of Surface Contamination with Mitigation Methods on Adhesive Composite Bond Integrity and Durability

Brian Hernandez, FIU Continued on page 37.

10:30 AM - 10:55 AM

Thermoplastics

Characterization of Adhesion Between Dissimilar Polymer-Matrix Composites

Diana Heflin, Purdue University

11:00 AM - 11:25 AM

Thermoplastics

A New Tailored UV Based Surface Activation Method for Bonding to Thermoplastics

Kaspar Schaerer, Henkel Corporation

DESIGN, ANALYSIS, AND TESTING

Room: 208B

Category Chairs: Steve Violette, Fiber Materials, Inc.; Sthanu Mahadev, California Polytechnic State University, SLO; Bazle Haque, University of Delaware

9:30 AM - 9:55 AM

Design and Analysis: Testing

Characterizing Thermoset Curing Using Rheology

Tianhong Chen, TA Instruments - Waters LLC

10:00 AM - 10:25 AM

Design/Structural Analysis

Design of Variable Stiffness Cylinder with Holes Under Bending for Maximum Buckling Load Using Lamination Parameters

Mazen Albazzan, University of South Carolina

10:30 AM - 10:55 AM

Design/Structural Analysis

Geometric Constraints for the Topology Optimization of Structures Made of Primitives

Hollis Smith, University of Connecticut

11:00 AM - 11:25 AM

Modelling and Prediction

Supported Punch Shear Behaviour of Polycarbonate: Test, Analysis and Numerical Simulation

Yunfa Zhang, National Research Council Canada

EMERGENT MATERIALS AND TECHNOLOGIES

Room: 209A

Category Chairs: Filippo Cellini, New York University; Mark Janney, Carbon Conversions; Joe Koo, The University of Texas at Austin

9:30 AM - 9:55 AM

Resin Systems

Novel Ultra Low Viscosity Epoxy for Enhancing the Tg and Processability of Multifunctional Thermosets

Huifeng Qian, Olin



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THURSDAY

May 23

10:00 AM - 10:25 AM

Resin Systems

Fast Vs Tough; the Effect of Faster Cure Cycles on the Fracture Properties of Toughened Epoxies

Alexander Fergusson, FAC Technology/Imperial College

10:30 AM - 10:55 AM

Resin Systems

Controlled Topology Toughening Epoxy Via Incorporation of Partially Reacted Substructures

Jian Gao, Drexel University

Continued on page 38.

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THURSDAY May 23

11:00 AM - 11:25 AM

Resin Systems

Desmocomp® – Raw Materials for Pultruded Composites with Excellent Chemical and Weathering Resistance

Liang Chen, Covestro LLC

11:30 AM - 11:55 AM

Resin Systems

Novel FST Thermoset Solution for Lightweight Composite Aerospace Interior Applications

George Guo, Huntsman Advanced Materials

SIMULATION AND COMPUTATIONAL MODELING (ICME)

Room: 202B

Category Chairs: Venkata Bheem Reddy, MiaSole Hi-Tech Corp.; David Jack, Baylor University; Douglas Smith, Baylor University

9:30 AM - 9:55 AM

Property Predictions

Temperature-Dependent Mechanical Response of Carbon Nanotube Reinforced Epoxy Nanocomposites: An Atomistic Simulation Study

Jacob Schichtel, Arizona State University

10:00 AM - 10:25 AM

Property Predictions

Using Molecular Simulation with High-temperature Composites Resins

Mohammad Afzal, Schrödinger, Inc.

10:30 AM - 10:55 AM

Residual Stresses

Experimental and Numerical Investigation of Effects of Cure Cycle on Process-induced-distortions of Carbon Fibre Reinforced Composites

Kamyar Gordnian, Convergent Manufacturing Technologies

11:00 AM - 11:25 AM

Structural Analysis

Approximations By Reduced-Order Models for Nonlinear Flutter of Variable Stiffness Composite Plates

Hamed Akhavan, University of Porto

SMART FABRICS AND STRUCTURES

Room: 208A

Category Chairs: Philip Bradford, North Carolina State University; Amanda Myers, North Carolina State University

9:30 AM - 9:55 AM

Adaptive Materials/Structures

Improved Interyarn Friction and Impact Response of Surface Fibrilized Aramid Fabric

Henry Sodano, Univ of Michigan, Ann Arbor

10:00 AM - 10:25 AM

Sensors

New Method of Interfacial and Micro-damage Sensing of Composites Via Pencil Lead Drawing Paper Sensor (PLDPS) and Electrical Resistance (ER) Mapping

Joung-Man Park, Gyeongsang National University

10:30 AM - 10:55 AM

Sensors

Carbon Nanotube Coated Fabric-Based Thin and Flexible Pressure Sensors with Ultra-Wide Sensing Range

Sagar Doshi, University of Delaware

11:00 AM - 11:25 AM

Sensors

Highly-Sensitive Carbon Nanotube Based Sensors Using Everyday Fabrics for Human Motion Analysis

Amit Chaudhari, University of Delaware

11:30 AM - 11:55 AM

Sensors

Smart Composite Using Optic Fiber Sensor Embedded in Three Dimensional Woven Preform

Elizabeth Claunch, NC State University

TEXTILES AND REINFORCEMENTS

Room: 207C

Category Chairs: Trevor Gundberg, VectorPly Corp.; Kelvin (Kun) Fu, University of Delaware

9:30 AM - 9:55 AM

Other

Micro-Waxes Study of Structural Heterogeneity in Single Pan-Precursor and Subsequent Carbon Fiber

Claudia Creighton, Carbon Nexus, IFM, Deakin University

10:00 AM - 10:25 AM

Braid Tech/3D Structures

Carbon Fibers Derived From Mesophase Pitch: Effect of Axial Crystallite Size and Properties

Victor Bermudez, Clemson University

10:30 AM - 10:55 AM

New Materials

Using Z-Axis Milled Fibers to Toughen Carbon Fiber Composites

Anvesh Gurijala, Boston Materials

11:00 AM - 11:25 AM

New Materials

Hybridization of Carbon Nanotube-Glass Fiber Based Hierarchical Composites Using Electrophoretic Deposition

Dae Han Sung, Center for Composite Materials, University of Delaware

11:30 AM - 11:55 AM

Braid Tech/3D Structures

An Experimental Study of the Creep Behavior of Braided Composites

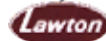
Ahmed Ead, University of Alberta

THURSDAY

May 23

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Charlotte Convention Center
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501 S College St, Charlotte, NC 28202

SPEAKER READY ROOM

The Speaker Ready Room is located in room 206 A/B.

RECOMMENDED ATTIRE

Recommended attire for all events is business casual.

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REGISTRATION HOURS

Monday, May 20	7:00 AM - 5:00 PM
Tuesday, May 21	7:00 AM - 5:00 PM
Wednesday, May 22	7:00 AM - 5:00 PM
Thursday, May 23	7:00 AM - 1:00 PM

CANCELLATION/REFUND/SUBSTITUTION POLICIES

All registrations are subject to the following policies.

Cancellations: Cancellations must have been made in writing or by email by May 2, 2019.

Refunds: Refunds must have been requested by May 2, 2019. Refunds are not given for failure to attend, late arrival, unattended events, or early departure from the meeting. Refunds are processed approximately 60 days after the meeting.

Substitutions: Substitutions can be made at any time, by letter, email, or fax. The appropriate member/non-member rate will apply to attending substitutions. There is no charge for making a substitution.

CONFERENCE PROGRAM

Technical Paper Sessions are the only programs in which a full-length technical paper will be published in our proceedings. Conference registration is required for admittance to sessions & panels. Tutorial registration is required for admission into tutorials. NOTICE: The presentations listed in this Final Program are subject to change & cancellation due to circumstances beyond our control.

ITAR (See page 42 for Clearance Information)

Several sessions taking place at SAMPE are restricted papers governed by ITAR (International Traffic in Arms Regulations). To attend any of these sessions restricted by ITAR, attendees must bring proof of citizenship PLUS the other verification documents as shown below. All restricted session attendees (including speakers and session chairs/moderators for these sessions) MUST abide by the procedures and submittal of verification documents as noted below. Please note that only U.S. citizens and U.S. Resident Aliens can be considered for attendance at these restricted presentations.

Admission to restricted sessions and access to restricted technical papers is implemented and controlled by U.S. International Traffic in Arms Regulations (ITAR).

EXHIBIT HALL HOURS

Tuesday, May 21	9:30 AM - 5:00 PM
Wednesday, May 22	9:00 AM - 4:00 PM
Wednesday, May 22	4:00 - 8:00 PM Exhibitor Move-out
Thursday, May 23	Exhibit Hall Closed

RULES FOR ATTENDEES

No children under the age of 13 are permitted in the Exhibit Hall.

All participants agree to wear their badge at all times during the event and may not "share" their badge with other attendees.

No photography or video is permitted without the consent of booth personnel.

SAMPE LOUNGES, WIFI, & CHARGING STATIONS

Free WiFi is available in the Exhibit Hall.

FOOD AND BEVERAGE

Concessions are located in the back of the Exhibit Hall A & B and on Concourse A Lobby. Meal tickets included with registration can be redeemed at any concession in the Exhibition Hall, during exhibit hours.

SAFETY AND SECURITY

REPORTING AN EMERGENCY

Convention Center Security (staffed 24/7):

+1 704-339-6090

Convention Center Security (by house phone):
6090

Charlotte Emergency Services (Fire, Police, Medic):
911

Charlotte Information: 311

CLOSEST MEDICAL FACILITIES

Atrium Health, 1000 Blythe Blvd, Charlotte, NC
28203 • +1 704-355-2000

Distance: 2 Miles • 24-Hour Trauma Center

Novant Health, 200 Hawthorne Lane, Charlotte,
NC 28204 • +1 704-384-4000

Distance: 2 Miles • 24-Hour Trauma Center

CLOSEST PHARMACIES

Rite Aid Pharmacy, 316 South Tryon St, Charlotte,
NC 28202 • +1 704-377-0215

Distance: 2 Blocks • Travel West on MLK Blvd, then
North on South Tryon Street

CVS Pharmacy, 210 East Trade St, Charlotte, NC
28202 • +1 704-971-1254

Distance: 3 Blocks • Travel North on South College
Street, located in The EpiCentre

FIRST AID OFFICE LOCATIONS

Convention Center Ballroom - Meeting Room Level
by Food Court • +1 704-339-6006

Loading Dock - Exhibit Hall Level by Gate 5 •
+1 704-339-6005

Crown Ballroom - Parking Level P4 in P10/P11
Elevator Lobby • +1 704-339-6008

AUTOMATED EXTERNAL DEFIBRILLATOR (AED) LOCATIONS

Convention Center Ballroom:

Behind Einstein's bagel

Registration Concourse: Street Level by Starbucks

Administration Hall: Bathroom Alcove

West Meeting Rooms: On each of the red walls

East Meeting Rooms: On each of the red walls

Exhibition Halls: Hall A/B Lobby

Exhibition Halls: Hall C Lobby

Crown Ballroom: Near elevators P10 & P11

PHOTOGRAPHIC IMAGES AND VIDEO POLICIES

Photos and video during Conference Programs is strictly prohibited. Only the approved SAMPE 2019 photographer and videographer may photograph Conference Programs.

Registration and attendance at, or participation in, SAMPE Meetings and other activities constitutes an agreement by the registrant to SAMPE's use and distribution (both now and in the future) of the registrant or attendee's image or voice in photographs, videos, electronic reproductions, and audiotapes of such events and activities.

NON-DISCRIMINATION POLICY

SAMPE prohibits discrimination, harassment, and bullying against any person for any reason—for example, because of age, ancestry, color, disability or handicap, national origin, race, religion, gender, sexual or affectional orientation, gender identity, appearance, matriculation, political affiliation, marital status, veteran status, or any other characteristic protected by law.

CONTACT SAMPE

21680 Gateway Center Drive, Suite 300

Diamond Bar, CA 91765

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To report any security or safety issues, please visit the Registration Desk, or for immediate attention call Rosemary Loggia at +1 626-533-5453.



WHAT ARE ITAR SESSIONS? SAMPE 2019 CHARLOTTE, NC

SAMPE Restricted Papers—*ITAR* Regulations Session Admittance

Several sessions taking place at SAMPE are restricted papers governed by ITAR (International Traffic in Arms Regulations). To attend any of these sessions restricted by ITAR, attendees must bring proof of citizenship PLUS the other verification documents as shown below. All restricted session attendees (including speakers and session chairs/moderators for these sessions) MUST abide by the procedures and submittal of verification documents as noted below. Please note that only U.S. citizens and U.S. Resident Aliens can be considered for attendance at these restricted presentations.

Admission to restricted sessions and access to restricted technical papers is implemented and controlled by U.S. International Traffic in Arms Regulations (ITAR).

Where can I get ITAR clearance at SAMPE?

Bring all necessary verification documents to the ITAR counter in the SAMPE Registration area. Your documents will be verified and you will receive a special ITAR badge, which will have your picture on it. This badge indicates your ITAR clearance. Only individuals who have ITAR clearance from the SAMPE Registration Desk may enter an ITAR session. Please be advised that all policies and procedures MUST be followed or admittance to restricted sessions will not be permitted.

U.S. Government Employees

- Proof of Citizenship (for example, passport, birth certificate, voter registration card, naturalization papers) AND,
- Personal photographic identification (passport, driver's license, etc.) AND,
- Proof of current employment
- All documents must be current. Expired documents will not be accepted.

U.S. Citizens

- Proof of Citizenship (for example, passport, birth certificate, voter registration card, naturalization papers) AND,
- Personal photographic identification (passport, driver's license, corporate ID, etc.) AND,
- Proof of current employment AND,
- Certification credentials based on DD Form 2345 (see below for details).
- All documents must be current. Expired documents will not be accepted.

Resident Aliens (U.S.)

- Resident Alien Card AND,
- Personal photographic identification (passport, driver's license, corporate ID, etc.) AND,
- Proof of current employment AND,
- Certification credentials based on DD Form 2345 (see below for details).
- All documents must be current. Expired documents will not be accepted.

The following items are not accepted for ITAR admission:

- Government or sub-contractor "CAQ Cards",
- Global Entry or TSA Pre-Check cards or documents AND,
- Expired required documents.

Which sessions are ITAR restricted?

All ITAR restricted sessions will be listed throughout the Conference Program [ITAR].

About the DD Form 2345

DD Form 2345 individual certification credentials (required for U.S. & Resident Aliens) must be from one of the following:

- Copy of an approved and active DD Form 2345 for the individual, OR,
- Copy of an approved and active DD Form 2345 for the individual's employer PLUS evidence of current employment status with that employer (corporate ID, business card, etc.), OR
- A listing of the individual's employer in the most recent DoD quarterly Qualified U.S. Contractor Access List PLUS evidence of current employment status with that employer (corporate ID, business card, etc.).

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2019 Technical Review Meeting

FAA Joint Advanced Materials & Structures Center of Excellence (JAMS)

Program reviews from:

COE for Composites and Advanced Materials (CECAM), Wichita State University AND
COE for Advanced Materials in Transport Aircraft Structures (AMTAS), University of Washington
in conjunction with SAMPE 2019.

WEDNESDAY, MAY 22

7:00 AM

Registration & Continental Breakfast

8:00 AM

Opening Remarks, Welcome

*Ahmet Oztekin, JAMS Program Manager;
John Tomblin, CECAM Director*

8:30 AM

**Effect of Surface Contamination on
Composite Bond Integrity & Durability,**

*Brian Hernandez, Florida International
University*

9:00 AM

**Improving Adhesive Bonding of Composites
through Surface Characterization,**

Brian Flinn, University of Washington

9:30 AM

Inspection and Teardown of Aged

In-Service Bonded Repairs, *Brandon
Saathoff, Wichita State University*

10:00 AM

Durability of Bonded Aerospace Structure,

Lloyd Smith, Washington State University

10:30 AM

**Fatigue Damage Growth Analysis of
Composites under Variable Amplitude**

Fatigue, *Waruna Seneviratne, Wichita
State University*

11:00 AM

**Guidelines for Formulating and Writing
Process Control Documents (PCD) and**

**Process Specifications for Advanced
Materials,** *Royal Lovingfoss, Wichita State
University*

11:30 AM

Break for Lunch

1:00 PM

Environmental Durability Test Method Development for

Composite Bonded Joints, *Zachary Sievert, University of Utah*

1:30 PM

Guidelines for Characterization of Repair Materials, *Jeff Gilchrist,*

Wichita State University

2:00 PM

Standardization of Incandescent Ignition Source Detection

Methodology for Composite Structure Lightning Testing,

Billy Martin and Alyssa Gonzalez, Wichita State University

2:30 PM

Non-destructive Evaluation methods for Detecting Major

Damage in Internal Composite Structures, *Francesco Lanza di*

Scalea, University of California-San Diego

3:00 PM

Damage Tolerance and Notch Sensitivity of Composite

Sandwich Structures, *Dan Adams, University of Utah*

3:30 PM

Effects of Moisture Diffusion in Sandwich Composites,

Rohith Jayaram, University of Washington

4:00 PM

An Engineering Approach for Damage Growth Analysis of

Sandwich Structures Subjected to Combined Compression and

Pressure Loading, *Dr. Vishnu Saseendran, Wichita State University*

4:30 PM

Advanced Fiber Reinforced Polymer Materials Guidelines for

Aircraft Design Certification Process, *Rachael Andrulonis,*

Wichita State University

5:00 PM

Safety and Certification of Discontinuous Fiber Composite

Structures, *Marco Salviato, University of Washington*

5:30 PM

Adhesive Bond Process Qualification Protocol, *Upul Palliyaguru,*

Wichita State University

THURSDAY MAY 23

8:00 AM

SAMPE Awards Breakfast

9:30 AM

Evaluation of Parameters used in Progressive Damage Models, David Plechaty and John Parmigiani, Oregon State University

10:00 AM

Impact Damage Formation on Composite Aircraft Structures, Hyonny Kim, University of California-San Diego

10:30 AM

Polymer-Based Additive Manufacturing Guidelines for Aircraft Design and Certification, Rachael Andrulonis, Wichita State University

11:00 AM

A Building Block Approach for Crashworthiness Testing of Composites, Dalton Ostler, University of Utah

11:30 AM

Certification by Analysis – Full Scale Ditching Analysis, Gerardo Olivares/ Luis Gomez, Wichita State University

12:00 PM

Ceramic Matrix Composite Materials Guidelines for Aircraft Design and Certification, Matt Opliger, Wichita State University

12:30 PM

JAMS-only Discussion, (Pls, project participants, cost-share partners, AVS Sponsors, and FAA TC focals should attend)

1:00 PM

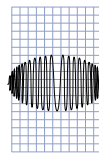
END



BOEING PANELS & PRESENTATIONS

Please stop by the Boeing-sponsored conference room (219 A&B) on Tuesday, 5/21. As part of Boeing's new sponsorship agreement with SAMPE North America, Boeing will host sessions that will be open to all SAMPE 2019 attendees.

Check the poster outside the conference room to join discussions including Boeing's new sponsorship of SAMPE and a panel with early career Boeing employees.



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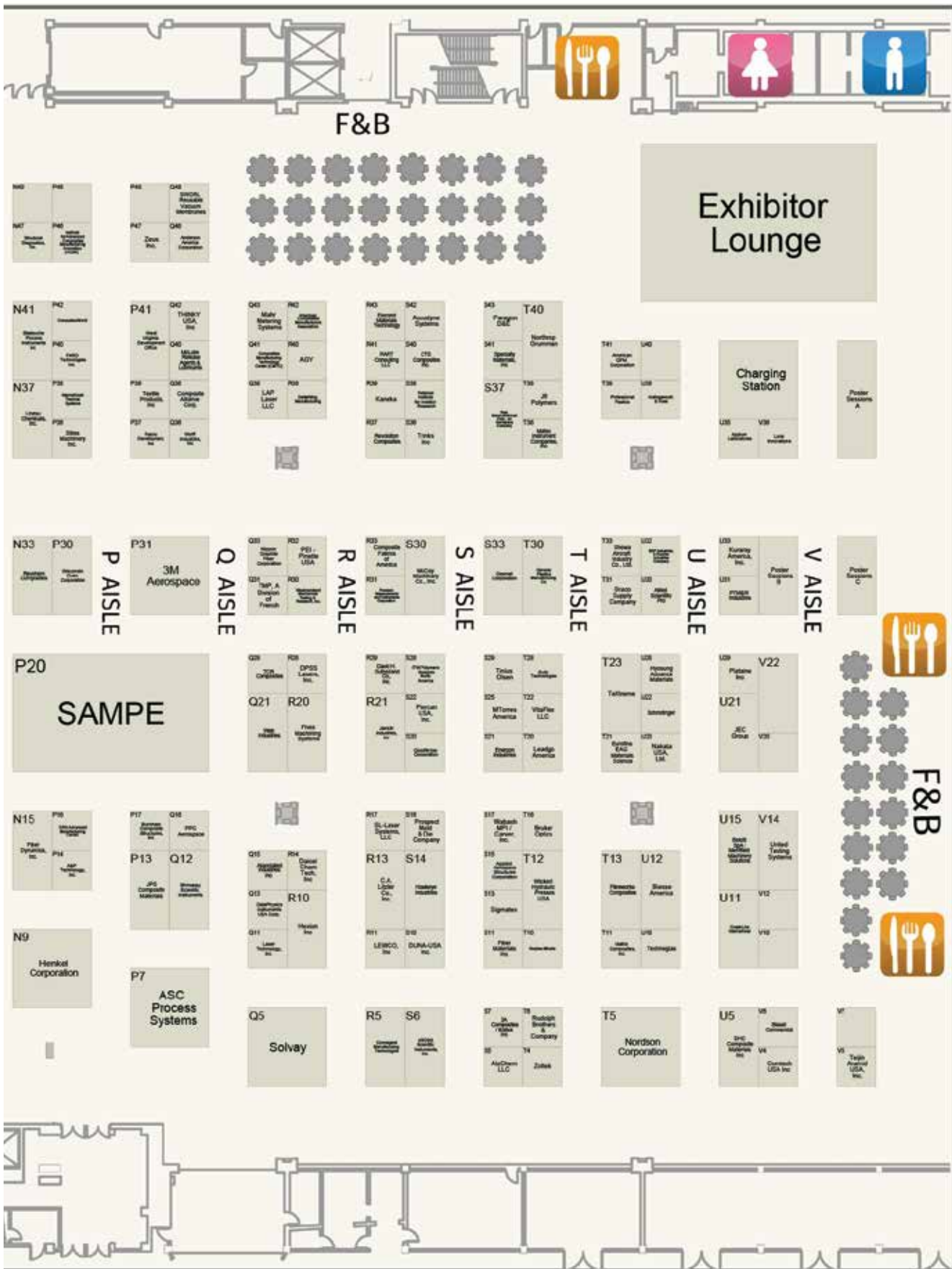
EXHIBITORS | SAMPE 2019 CHARLOTTE, NC

3A Composites / Baltek Inc.	S7	Cincinnati Testing Labs	J33	Hexcel Corporation	L22
3M Aerospace	P31	CMS North America, Inc.	K15	Hexion Inc.	R10
A&P Technology, Inc.	P14	Coast-Line International	U11	High Performance Composites	M43
A.B. Carter, Inc.	N40	Composite Alliance Corp.	Q38	Highland Composites	L46
A.P.C.M. Manufacturing LLC	M33	Composite Fabrics of America	R33	Hollingsworth & Vose	U38
Abaris Training Resources Inc.	L29	Composite Motorsports Technologies	G33	HOS-Technik GmbH	H20
Accudyne Systems	S42	Composites Horizons	J29	Huntsman Advanced Materials	K12
Adapt Laser Systems LLC	L28	Composites Manufacturing Technology Center (CMTC)	Q41	Hyosung Advance Materials	U28
Additive Engineering Solutions LLC	F17	Composites One	J7	HyperSizer - Collier Research	M42
Advanced Ceramics Manufacturing	F10	CompositesWorld	P42	IKONICS Advanced Material Solutions	J41
Advanced Composites, Inc.	K28	CompuDAS	F29	Ingersoll Machine Tools	L40
Advanced Processing Technology, Inc. (AvPro)	K40	Comtech USA Inc.	V4	Innegra Technologies	H31
Advanced Textile Composites	H38	Convergent Manufacturing Technologies	R5	Innovative Composite Engineering (ICE)	J15
AGY	R40	CoreHog	J31	Institute for Advanced Composites Manufacturing Innovation (IACMI)	P46
Airtech Advanced Materials Grp.	M9	CRG Advanced Manufacturing Center	P16	International Thermal Systems	P38
Aligned Vision	K16	CTS Composites Inc.	S40	Intertek	G4
Allied Scientific Pro	U30	Daicel Chem Tech, Inc.	R14	ITW Sealants / Tacky Tape	S28
Altair Engineering, Inc.	K39	DataPhysics Instruments USA	Q13	Izumi International, Inc.	G20
AlzChem LLC	S5	David H. Sutherland Co., Inc.	R29	J6 Polymers	T38
American Composites Manufacturers Association	R42	DeltaWing Manufacturing	R38	Janicki Industries, Inc.	R21
American GFM Corporation	T41	Dexmet Corporation	S33	JEC Group	U21
Anderson America Corporation	Q46	DIAB Americas LP	K29	JPS Composite Materials	P13
Applied Aerospace Structures Corporation	S15	Diatex SAS	F33	Kaneka	R39
Applied Composites	M29	DPSS Lasers, Inc.	R28	Krayden	F21
Applus+ Laboratories	U35	DUNA-USA Inc.	S10	KRÜSS Scientific Instruments	S6
ASC Process Systems	P7	Dunstone Company, Inc.	L14	Kuraray America, Inc.	U33
Ascent Aerospace	G16	Element Materials Technology	R43	LANXESS Corporation	K47
Associated Industries Inc.	Q15	Endurance Technologies	K43	LAP Laser LLC	Q39
Astroseal Products Mfg. Corp.	J32	Enercon Industries	S21	Laser Technology, Inc.	Q11
Axiom Materials, Inc.	M47	Euro-Composites Corp.	L36	Leadgo America	T20
Belotti SpA / Merrifield Machinery Solutions	U15	Eurofins EAG Materials Science	T21	LEWCO, Inc.	R11
BGF Industries, A Porcher Industries Company	U32	Evonik Corporation	J13	Lindau Chemicals, Inc.	N37
Biesse America	U12	Fabric Development, Inc.	P37	Linseis	L43
Bissell Commercial	V6	FARO Technologies Inc.	P40	Lintech International	H28
Bondtech Corporation	H15	Fiber Dynamics, Inc.	N15	LMI Aerospace	H30
Bruker Optics	T16	Fiber Materials Inc.	S11	Lucas Industries A PCM Innovation Company	H16
BTG Labs	L39	Fibreworks Composites	T13	Luna Innovations	V36
Burnham Composite Structures, Inc.	P17	Fives Machining Systems	R20	M&Q Packaging LLC	M41
C.A. Litzler Co., Inc.	R13	FlackTek, Inc.	L32	Macrodyne Technologies Inc.	F28
C.R. Onsrud Inc.	J37	General Plastics Manufacturing	T30	Mafic	F31
Carbon Conversions Inc.	F7	Genesis Systems, IPG Photonics Company	N30	Magnolia Advanced Materials	K21
Chem-Trend, LP	H10	Goodfellow Corporation	S20	Magnum Venus Products	G5
Chomar North America	G17	Graco Supply Company	T31	Mahr Metering Systems	Q43
		Hawkeye Industries	S14	Marietta Nondestructive Testing LLC	G15
		HEATCON Composite Systems	L21		
		Henkel Corporation	N9	Master Appliance Corp.	G28

SAMPE 2019 CHARLOTTE, NC | EXHIBITORS

Matec Instrument Companies	T36	SAMPE	P20		
Matrix Composites, Inc.	T11	Schrodinger	U22		
MB Superabrasives	F30	SGL Carbon, LLC	G31		
McCoy Machinery Co., Inc.	S30	SHD Composite Materials Inc.	U5		
McLube Release Agents & Lubricants	Q40	Shimadzu Scientific Instruments	Q12		
METYX	G30	Showa Aircraft Industry Co., Ltd.	T33		
Miki Sangyo (USA) Inc.	H21	Sigmatex	S13		
Mitsubishi Chemical Carbon Fiber and Composites, Inc.	K30	Siltech Corporation	K20		
Momentive Performance Materials	F14	Simulations, LLC	F37		
		SL-Laser Systems, LLC	R17		
		Smart Tooling division of Spintech, LLC	L31		
MTorres America	S25	Smartech International LP	G21	Trelleborg Offshore Boston	K41
MTS Systems Corporation	G6	Solvay	Q5	Trilion Quality Systems	M38
Multiax America	N38	Specialty Materials, Inc.	S41	Trinks Inc.	S36
MultiMechanics	F5	StateMix Ltd.	H36	United Testing Systems	V14
Nakata USA, Ltd.	U20	Statesville Process Instruments	N41	University of Delaware Center for Composite Materials	N42
National Institute for Aviation Research	S38	Stiles Machinery Inc.	P36	Univ. of Southern Mississippi	H22
NETZSCH Instruments North America, LLC	H33	Stratasys	J10	V2 Composites, Inc.	L41
Nippon Graphite Fiber Corp.	Q33	Structural Diagnostics, Inc.	N47	Vectorply Corporation	G29
Nordson Corporation	T5	Surface Generation America	K36	Venango Machine Company	H23
Norplex-Micarta	T10	SurfaceTreat a.s.	M40	Ventilation Solutions	G36
Northern Composites	M32	Surfx Technologies	T28	VitaFlex LLC	T22
Northrop Grumman	T40	SWORL Reusable Vacuum Membranes	Q48	Wabash MPI / Carver, Inc.	S17
Pacific Coast Composites	N20	Symmetrix Composite Tooling	G10	Walton Process Technologies	G37
Paragon D&E	S43	TA Instruments	K31	Web Industries	Q21
Park Electrochemical Corp., an Aerospace Company	S37	Taricco Corporation	N28	Weber Manufacturing Technologies Inc.	J20
PART Consulting LLC	R41	TCR Composites	Q29	West Virginia Development Office	P41
PCM Innovation	H14	TE Wire & Cable	J28		
PEI - Pinette USA	R32	Techmer PM	G11	Westmoreland Mechanical Testing & Research, Inc.	R30
Piercan USA, Inc.	S22	Techneglas	U10	Wickert Hydraulic Presses USA	T12
Plascore, Inc.	J43	Technical Fibre Products, Inc.	M22	Wisconsin Oven Corporation	P30
Plataine Inc.	U29	Technical Tooling - Composite Tooling and Workholding Solutions	H32	Wolff Industries, Inc.	Q36
Polymer Machinery Company	K37	Technology Marketing, Inc.	H4	WTU Systems	J39
PPG Aerospace	Q16	Teijin Aramid USA, Inc.	V5	ZEISS Microscopy	L30
Precision Measurements and Instruments Corporation	R31	Teijin Carbon America, Inc.	F4	Zeus Inc.	P47
Professional Plastics	T39	Textile Products, Inc.	P39	Zoltek	T4
PRO-SET Inc.	F8	TeXtreme	T23		
Prospect Mold & Die Company	S16	Thermal Equipment Corp. (TEC)	L9		
PTM&W Industries	U31	Thermal Wave Imaging, Inc.	K33		
Radius Engineering Inc.	H39	Thermo Fisher Scientific	J38		
Reinhold Industries Inc.	J30	Thermwood Corporation	H11		
Renegade Materials - Maverick	J21	THINKY USA, Inc.	Q42		
Revchem Composites	N33	Tinius Olsen	S29		
Revolution Composites	R37	TMP, A Division of French	Q31		
Rudolph Brothers & Co.	T6	Toray Advanced Composites	K9		
SAERTEX USA, LLC	M39	Toray Composite Materials America, Inc.	H5		

Current as of 4/26/2019



CATEGORY LISTINGS | SAMPE 2019 CHARLOTTE, NC

ADDITIVE MANUFACTURING

Additive Engineering Solutions LLC	F17
Daicel Chem Tech, Inc.	R14
Marietta Nondestructive Testing LLC	G15
Multiax America	N38
Professional Plastics	T39
Stratasys	J10
Techmer PM	G11
Thermo Fisher Scientific	J38
Thermwood Corporation	H11
Toray Composite Materials America, Inc.	H5
Westmoreland Mechanical Testing & Research, Inc.	R30

ADDITIVE MANUFACTURING - COMPOSITES

Fives Machining Systems	R20
Hexcel Corporation	L22
Kaneka	R39
Stratasys	J10
Thermwood Corporation	H11
University of Delaware Center for Composite Materials	N42

ADDITIVE MANUFACTURING - METAL

Weber Manufacturing Technologies Inc.	J20
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ADDITIVE MANUFACTURING - POLYMERS

KRÜSS Scientific Instruments, Inc.	S6
Stratasys	J10
Thermwood Corporation	H11

ADDITIVES/FIRE RETARDANTS/FILLERS

Lintech International	H28
Siltech Corporation	K20
Teijin Aramid USA, Inc.	V5

ADHESIVES

A.P.C.M. Manufacturing LLC	M33
AlzChem LLC	S5
Associated Industries Inc.	Q15
David H. Sutherland Co., Inc.	R29
Endurance Technologies	K43
Graco Supply Company	T31
HEATCON Composite Systems	L21
Henkel Corporation	N9
Hexion Inc.	R10
Huntsman Advanced Materials	K12
Kaneka	R39
Krayden	F21
Lintech International	H28
Magnolia Advanced Materials, Inc.	K21
Mahr Metering Systems	Q43
Miki Sangyo (USA) Inc.	H21
Mitsubishi Chemical Carbon Fiber and Composites, Inc.	K30

Northern Composites	M32
Pacific Coast Composites	N20
PTM&W Industries	U31
Renegade Materials - Maverick Corp	J21
Rudolph Brothers & Company	T6
Toray Advanced Composites	K9

ADHESIVES, BONDING, & BONDED JOINT CERTIFICATION

Coast-Line International	U11
Kaneka	R39
Momentive Performance Materials	F14
Nakata USA, Ltd.	U20
Nordson Corporation	T5

ADVANCED MANUFACTURING

Advanced Composites, Inc.	K28
Applied Composites	M29
Biesse America	U12
Composites Manufacturing Technology Center (CMTC)	Q41
CRG Advanced Manufacturing Center	P16
DeltaWing Manufacturing	R38
High Performance Composites	M43
Northrop Grumman	T40
Technical Fibre Products, Inc.	M22
Technical Tooling - Composite Tooling and Workholding Solutions	H32
Thermo Fisher Scientific	J38
Vectorply Corporation	G29

ADVANCED MANUFACTURING METHODS

Adapt Laser Systems LLC	L28
Radius Engineering Inc.	H39
Smart Tooling division of Spintech, LLC	L31

ADVANCED PROCESSING

Hollingsworth & Vose	U38
Technology Marketing, Inc.	H4

ADVANCES IN MANUFACTURING AUTOMATION

Accudyne Systems	S42
CompuDAS	F29
KRÜSS Scientific Instruments, Inc.	S6
PEI - Pinette USA	R32
Plataine Inc.	U29

AEROSPACE VEHICLE PROTECTION

3M Aerospace	P31
AGY	R40
Astroseal Products Mfg. Corp.	J32
BGF Industries, A Porcher Industries Co.	U32
Dexmet Corporation	S33
JPS Composite Materials	P13
Nakata USA, Ltd.	U20
Technical Fibre Products, Inc.	M22

ARMOR/BALLISTIC MATERIALS

AGY	R40
BGF Industries, A Porcher Industries Co.	U32
David H. Sutherland Co., Inc.	R29
Fabric Development, Inc.	P37
JPS Composite Materials	P13
PEI - Pinette USA	R32
Teijin Aramid USA, Inc.	V5

ASSEMBLY/BONDING EQUIPMENT

Ascent Aerospace	G16
Enercon Industries	S21
LAP Laser LLC	Q39
Master Appliance Corp.	G28
MTorres America	S25
Nordson Corporation	T5
OEM Press Systems	L36
Surfx Technologies	T28
Wickert Hydraulic Presses USA	T12

ASSOCIATION, TRADE OR CIVIC

American Composites Manufacturers Association	R42
SAMPE	P20

AUTOCLAVES & AUTOCLAVE EQUIPMENT

ASC Process Systems	P7
Bondtech Corporation	H15
DeltaWing Manufacturing	R38
Taricco Corporation	N28
TE Wire & Cable	J28
Thermal Equipment Corporation (TEC)	L9
Walton Process Technologies, Inc.	G37

AUTOMATED EQUIPMENT

Accudyne Systems	S42
Bondtech Corporation	H15
Genesis Systems, IPG Photonics Company	N30
Ingersoll Machine Tools	L40
Izumi International, Inc.	G20
Mahr Metering Systems	Q43
OEM Press Systems	L36
Polymer Machinery Company	K37
StateMix Ltd.	H36
Trinks Inc.	S36
Wickert Hydraulic Presses USA	T12

AUTOMOTIVE AND INDUSTRIAL ENGINEERING

Nordson Corporation	T5
Plataine Inc.	U29

AUXILIARY PROCESSING EQUIPMENT

Trinks Inc.	S36
Wisconsin Oven Corporation	P30

CAD, 3D

CMS North America, Inc.	K15
FARO Technologies Inc.	P40
Thermwood Corporation	H11

CERAMIC MATERIALS/COMPOSITES

Advanced Ceramics Manufacturing	F10
Fabric Development, Inc.	P37
Fiber Materials Inc.	S11
MTS Systems Corporation	G6
Pacific Coast Composites	N20
Precision Measurements and Instruments Corporation	R31
Professional Plastics	T39
Specialty Materials, Inc.	S41
Textile Products, Inc.	P39
Westmoreland Mechanical Testing & Research, Inc.	R30

CLEANING PRODUCTS

Adapt Laser Systems LLC	L28
Bissell Commercial	V6
Chem-Trend, LP	H10

CNC MACHINING EQUIPMENT

American GFM Corporation	T41
Anderson America Corporation	Q46
Belotti SpA / Merrifield Machinery Solutions	U15
Biesse America	U12
C.R. Onsrud Inc.	J37
CMS North America, Inc.	K15
CoreHog	J31
DeltaWing Manufacturing	R38
Fives Machining Systems	R20
LAP Laser LLC	Q39
Lucas Industries A PCM Innovation Company	H16
MB Superabrasives	F30
Multiax America	N38
PCM Innovation	H14
Stiles Machinery Inc.	P36
Thermwood Corporation	H11



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COATING/COATING REMOVAL

Adapt Laser Systems LLC	L28
Chem-Trend, LP	H10
Hawkeye Industries	S14
Krayden	F21
Magnolia Advanced Materials, Inc.	K21
Nakata USA, Ltd.	U20

COMPOSITE STRUCTURAL ELEMENTS

Advanced Ceramics Manufacturing	F10
BGF Industries, A Porcher Industries Co.	U32
Composites Horizons	J29
Composites Manufacturing Technology Center (CMTC)	Q41
CRG Advanced Manufacturing Center	P16
CTS Composites Inc.	S40
David H. Sutherland Co., Inc.	R29
DeltaWing Manufacturing	R38
Euro-Composites Corp	Q13
Graco Supply Company	T31
Henkel Corporation	N9
High Performance Composites	M43
Highland Composites	L46
Hollingsworth & Vose	U38
IKONICS Advanced Material Solutions	J41
Innovative Composite Engineering (ICE)	J15
J6 Polymers	T38
Janicki Industries, Inc.	R21
LANXESS Corporation	K47
LAP Laser LLC	Q39
LMI Aerospace	H30
Matrix Composites, Inc.	T11
MTorres America	S25
Northrop Grumman	T40
Plascore, Inc.	J43
Precision Measurements and Instruments Corporation	R31
Reinhold Industries Inc.	J30
Revolution Composites	R37
Showa Aircraft Industry Co., Ltd.	T33
Technical Fibre Products, Inc.	M22

COMPUTER HARDWARE/SOFTWARE

Advanced Processing Technology, Inc. (AvPro)	K40
Convergent Manufacturing Technologies	R5
HyperSizer - Collier Research	M42
MultiMechanics	F5
Thermal Equipment Corporation (TEC)	L9
Thermo Fisher Scientific	J38

CONDUCTIVE MATERIALS

A.P.C.M. Manufacturing LLC	M33
Dexmet Corporation	S33
Henkel Corporation	N9
Momentive Performance Materials	F14

CONSULTING SERVICES

Abaris Training Resources Inc.	L29
Advanced Composites, Inc.	K28
Convergent Manufacturing Technologies	R5
DIAB Americas LP	K29
Element Materials Technology	R43
MTS Systems Corporation	G6
PART Consulting LLC	R41
WTU Systems	J39

CORE MATERIALS

3A Composites / Baltek Inc.	S7
Dexmet Corporation	S33
DIAB Americas LP	K29
DUNA-USA Inc.	S10
Euro-Composites Corp.	Q13
Evonik Corporation	J13
General Plastics Manufacturing Co.	T30
J6 Polymers	T38
METYX	G30
Plascore, Inc.	J43
Professional Plastics	T39
Revchem Composites	N33
Showa Aircraft Industry Co., Ltd.	T33

CURING EQUIPMENT

ASC Process Systems	P7
Bondtech Corporation	H15
LEWCO, Inc.	R11
Wisconsin Oven Corporation	P30

CUTTING EQUIPMENT

American GFM Corporation	T41
Belotti SpA / Merrifield Machinery Solutions	U15
CMS North America, Inc.	K15
CoreHog	J31
MB Superabrasives	F30
MultiAx America	N38
Technology Marketing, Inc.	H4

CUTTING, WATER JET

DeltaWing Manufacturing	R38
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CORE MATERIALS

PCM Innovation	H14
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DESIGN

Techmer PM	G11
METYX	G30

DESIGN AND STRESS ANALYSIS

Simulations, LLC	F37
Trillion Quality Systems	M38
Westmoreland Mechanical Testing & Research, Inc.	R30

DESIGN/PRODUCT DEVELOPMENT SERVICES

Applied Aerospace Structures Corporation	S15
Convergent Manufacturing Technologies	R5
Fiber Dynamics, Inc.	N15
High Performance Composites	M43
Innovative Composite Engineering (ICE)	J15
METYX	G30

DUST, ODOR CONTROL & VENTILATING EQUIPMENT

Ventilation Solutions	G36
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EDUCATION/TRAINING/ASSOCIATIONS

Abaris Training Resources Inc.	L29
National Institute for Aviation Research	S38
SAMPE	P20

EMERGING MATERIAL

Fiber Materials Inc.	S11
Technical Fibre Products, Inc.	M22

FABRICATING SERVICES

Advanced Composites, Inc.	K28
Applied Aerospace Structures Corporation	S15
Burnham Composite Structures, Inc.	P17
DeltaWing Manufacturing	R38
Fiber Dynamics, Inc.	N15
Innovative Composite Engineering (ICE)	J15
Janicki Industries, Inc.	R21
Lucas Industries A PCM Innovation Company	H16
Matrix Composites, Inc.	T11
Professional Plastics	T39
Reinhold Industries Inc.	J30
Revolution Composites	R37
Simulations, LLC	F37

FABRICATING SUPPLIES (BREATHERS, VACUUM BAGS, ETC.)

Airtech Advanced Materials Group	M9
Associated Industries Inc.	Q15
Coast-Line International	U11
Diatex SAS	F33
Leadgo America	T20
M&Q Packaging LLC	M41
Northern Composites	M32
Piercan USA, Inc.	S22
SWORL Reusable Vacuum Membranes	Q48
Technology Marketing, Inc.	H4

FABRICS, UNIMPREGNATED (WOVEN, NONWOVEN, KNIT, BRAIDED)

A&P Technology, Inc.	P14
Advanced Textile Composites	H38
Astroseal Products Mfg. Corp.	J32
Composite Fabrics of America	R33
Diatex SAS	F33
Fabric Development, Inc.	P37
Graco Supply Company	T31
Highland Composites	L46
Hollingsworth & Vose	U38
JPS Composite Materials	P13
METYX	G30
Nippon Graphite Fiber Corporation	Q33
SAERTEX USA, LLC	M39
Textile Products, Inc.	P39
TeXtreme	T23
Toray Composite Materials America, Inc.	H5
Vectorply Corporation	G29

FIBER HANDLING/MFG. EQUIPMENT

C.A. Litzler Co., Inc.	R13
Izumi International, Inc.	G20

FIBER, CARBON

Carbon Conversions Inc.	F7
Coast-Line International	U11
Composites One	J7
DeltaWing Manufacturing	R38
Graco Supply Company	T31
Hexcel Corporation	L22
Hyosung Advance Materials	U28
LMI Aerospace	H30
Nippon Graphite Fiber Corporation	Q33
Pacific Coast Composites	N20
SGL Carbon, LLC	G31
Specialty Materials, Inc.	S41
Symmetrix Composite Tooling	G10
Teijin Carbon America, Inc.	F4
Toray Composite Materials America, Inc.	H5
Web Industries	Q21
Zoltek	T4

FIBER, GLASS

AGY	R40
Graco Supply Company	T31
Symmetrix Composite Tooling	G10
Toray Composite Materials America, Inc.	H5

FIBER, OTHER

Innegra Technologies	H31
Kuraray America, Inc.	U33
Mafic	F31
Specialty Materials, Inc.	S41
Teijin Aramid USA, Inc.	V5
Zeus Inc.	P47

CATEGORY LISTINGS | SAMPE 2019 CHARLOTTE, NC

FILAMENT WINDING EQUIPMENT & SERVICES

Advanced Composites, Inc. K28
Magnum Venus Products G5

HEATERS/HEATING ELEMENTS

Venango Machine Company H23
TMP, A Division of French Q31
Master Appliance Corp. G28

HIGH TEMPERATURE MATERIALS & PROCESSING

Daicel Chem Tech, Inc. R14
Hawkeye Industries S14
Henkel Corporation N9
HOS-Technik GmbH H20
Lindau Chemicals, Inc. N37
MB Superabrasives F30
Momentive Performance Materials F14
Norplex-Micarta T10
PEI - Pinette USA R32
Piercan USA, Inc. S22
Technoglas U10
Toray Advanced Composites K9
Westmoreland Mechanical Testing & Research, Inc. R30
Zeus Inc. P47

INFUSION TECHNOLOGY

CRG Advanced Manufacturing Center P16
DIAB Americas LP K29
Endurance Technologies K43
SWORL Reusable Vacuum Membranes Q48
Symmetrix Composite Tooling G10
Vectorply Corporation G29

INSPECTION SYSTEMS, NDT

Aligned Vision K16
Applus+ Laboratories U35
BTG Labs L39
FARO Technologies Inc. P40
Genesis Systems, IPG Photonics Company N30
Laser Technology, Inc. Q11
Matec Instrument Companies, Inc. T36
Thermal Wave Imaging, Inc. K33

LASER PROJECTION EQUIPMENT

Aligned Vision K16
FARO Technologies Inc. P40
SL-Laser Systems, LLC R17

MANUFACTURING PROCESS DEVELOPMENT

Advanced Composites, Inc. K28
Advanced Processing Technology, Inc. (AvPro) K40
Applied Aerospace Structures Corporation S15
Applus+ Laboratories U35
Bruker Optics T16
Enercon Industries S21
Fiber Dynamics, Inc. N15
Matrix Composites, Inc. T11
Plataine Inc. U29
Radius Engineering Inc. H39
Reinhold Industries Inc. J30
Revolution Composites R37
Surface Generation America K36
SurfaceTreat a.s. M40
Surfx Technologies T28
University of Delaware Center for Composite Materials N42
Web Industries Q21

MATERIALS RESEARCH AND DEVELOPMENT

Convergent Manufacturing Technologies R5
Element Materials Technology R43
Enercon Industries S21
Eurofins EAG Materials Science T21
Goodfellow Corporation S20
HOS-Technik GmbH H20
Intertek G4
KRÜSS Scientific Instruments, Inc. S6
LANXESS Corporation K47
MTS Systems Corporation G6
MultiMechanics F5
National Institute for Aviation Research S38
PART Consulting LLC R41
Precision Measurements and Instruments Corporation R31
Schrodinger U22
Shimadzu Scientific Instruments Q12
Surfx Technologies T28
Technoglas U10
Trillion Quality Systems M38
University of Delaware Center for Composite Materials N42
University of Southern Mississippi H22

MATRIX MATERIALS (CARBON, CERAMIC, METALLIC)

DeltaWing Manufacturing R38
Hollingsworth & Vose U38
Textile Products, Inc. P39



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METER/MIX/DISPENSE EQUIPMENT

FlackTek, Inc.	L32
Mahr Metering Systems	Q43
StateMix Ltd.	H36
THINKY USA, Inc.	Q42

MICROSCOPE SYSTEMS

Bruker Optics	T16
ZEISS Microscopy	L30

MODELING AND MECHANICAL PROPERTIES

Applus+ Laboratories	U35
MultiMechanics	F5
Schrodinger	U22
Simulations, LLC	F37

MOLD DESIGN/MANUFACTURING

Additive Engineering Solutions LLC	F17
Ascent Aerospace	G16
Burnham Composite Structures, Inc.	P17
Composite Alliance Corp.	Q38
DeltaWing Manufacturing	R38
DUNA-USA Inc.	S10
Lucas Industries A PCM Innovation Company	H16
Paragon D&E	S43
PCM Innovation	H14
Prospect Mold & Die Company	S16
Smart Tooling division of Spintech, LLC	L31
Symmetrix Composite Tooling	G10
Technical Tooling - Composite Tooling and Workholding Solutions	H32
Weber Manufacturing Technologies Inc.	J20

MOLD RELEASE SYSTEMS

Chem-Trend, LP	H10
Henkel Corporation	N9
McLube Release Agents & Lubricants	Q40
Rudolph Brothers & Company	T6
Siltech Corporation	K20
Technology Marketing, Inc.	H4

MRO - MAINTENANCE, REPAIR, OPERATIONS

Applied Composites	M29
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NANO EQUIPMENT (MATERIALS/MACHINES)

Bruker Optics	T16
THINKY USA, Inc.	Q42

NDE, NDT/NDI TESTING METHODS AND TOOLS

Genesis Systems, IPG Photonics Company	N30
Structural Diagnostics, Inc.	N47
Trillion Quality Systems	M38

OIL, GAS, AND OFFSHORE TECHNOLOGY

Norplex-Micarta	T10
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OPTIMIZATION AND SIMULATION

KRÜSS Scientific Instruments, Inc.	S6
Schrodinger	U22
TeXTreme	T23

OUT-OF-AUTOCLAVE TECHNOLOGY

HEATCON Composite Systems	L21
Hexcel Corporation	L22
Park Electrochemical Corp., an Aerospace Company	S37
PEI - Pinette USA	R32
Radius Engineering Inc.	H39
SHD Composite Materials Inc.	U5
Smartech International LP	G21
Surface Generation America	K36
Toray Advanced Composites	K9

OVENS/DRYERS/FURNACES

ASC Process Systems	P7
C.A. Litzler Co., Inc.	R13
International Thermal Systems	P38
LEWCO, Inc.	R11
StateMix Ltd.	H36
Taricco Corporation	N28
TE Wire & Cable	J28
Walton Process Technologies, Inc.	G37
Wisconsin Oven Corporation	P30

PREPREG MANUFACTURING/HANDLING EQUIPMENT

C.A. Litzler Co., Inc.	R13
Izumi International, Inc.	G20
Master Appliance Corp.	G28
Mitsubishi Chemical Carbon Fiber and Composites, Inc.	K30
THINKY USA, Inc.	Q42

PREPREGS, THERMOPLASTIC

A&P Technology, Inc.	P14
Composites One	J7
Evonik Corporation	J13
MTorres America	S25
SGL Carbon, LLC	G31
Solvay	Q5
Teijin Carbon America, Inc.	F4
Toray Composite Materials America, Inc.	H5
Web Industries	Q21

CATEGORY LISTINGS | SAMPE 2019 CHARLOTTE, NC

PREPREGS, THERMOSET

A&P Technology, Inc.
 A.P.C.M. Manufacturing LLC
 AlzChem LLC
 Associated Industries Inc.
 Composites One
 Evonik Corporation
 Hexcel Corporation
 Hexion Inc.
 Mitsubishi Chemical Carbon Fiber and Composites, Inc.
 Norplex-Micarta
 Northern Composites
 Park Electrochemical Corp., an Aerospace Company
 Renegade Materials - Maverick Corp
 Revchem Composites
 SGL Carbon, LLC
 SHD Composite Materials Inc.
 Solvay
 TCR Composites
 Technology Marketing, Inc.
 University of Southern Mississippi
 Web Industries

P14
 M33
 S5
 Q15
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 J13
 L22
 R10
 K30
 T10
 M32
 S37
 J21
 N33
 G31
 U5
 Q5
 Q29
 H4
 H22
 Q21

PRESSES, COMPRESSION/LAMINATING

Composite Alliance Corp.
 Macrodyne Technologies Inc.
 Norplex-Micarta
 OEM Press Systems
 PEI - Pinette USA
 Polymer Machinery Company
 Taricco Corporation
 TMP, A Division of French
 Trinks Inc.
 Venango Machine Company
 Wabash MPI / Carver, Inc.
 Walton Process Technologies, Inc.
 Wickert Hydraulic Presses USA

Q38
 F28
 T10
 L36
 R32
 K37
 N28
 Q31
 S36
 H23
 S17
 G37
 T12

PUBLICATIONS, TRADES

CompositesWorld
 JEC Group
 SAMPE

P42
 U21
 P20

RAPID PROTOTYPING

CTS Composites Inc.
 General Plastics Manufacturing Co.
 Highland Composites
 Paragon D&E
 Park Electrochemical Corp., an Aerospace Company
 Stratasys

S40
 T30
 L46
 S43
 S37
 J10

RELEASE LINERS

McLube Release Agents & Lubricants Q40
 Zeus Inc. P47

REPAIR MATERIALS/EQUIPMENT/SERVICES

Abaris Training Resources Inc. L29
 HEATCON Composite Systems L21
 Macrodyne Technologies Inc. F28
 Park Electrochemical Corp., an Aerospace Company S37
 Thermal Equipment Corporation (TEC) L9

RESIN TRANSFER MOLDING EQUIPMENT

Composite Alliance Corp. Q38
 Magnum Venus Products G5
 Wabash MPI / Carver, Inc. S17

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 Endurance Technologies K43
 Hexion Inc. R10
 HOS-Technik GmbH H20
 Huntsman Advanced Materials K12
 J6 Polymers T38
 Krayden F21
 Lindau Chemicals, Inc. N37
 Lintech International H28
 Magnolia Advanced Materials, Inc. K21
 Miki Sangyo (USA) Inc. H21
 PART Consulting LLC R41
 PRO-SET Inc. F8
 PTM&W Industries U31
 Renegade Materials - Maverick Corp J21
 Revchem Composites N33
 Rudolph Brothers & Company T6
 Siltech Corporation K20
 TCR Composites Q29
 Techneglas U10
 Toray Advanced Composites K9
 University of Southern Mississippi H22

REUSABLE VACUUM BAGS

Diatex SAS F33
 Leadgo America T20
 Piercan USA, Inc. S22
 Smartech International LP G21
 Solvay Q5
 SWORL Reusable Vacuum Membranes Q48

RUBBER/ELASTOMERS

Airtech Advanced Materials Group M9

SAFETY EQUIPMENT & SUPPLIES

VitaFlex LLC T22

SPACE TECHNOLOGY AND APPLICATIONS

Fiber Materials Inc.	S11
Nippon Graphite Fiber Corporation	Q33
Norpflex-Micarta	T10
Park Electrochemical Corp., an Aerospace Company	S37

TAPE LAYING/FIBER PLACEMENT EQUIPMENT

American GFM Corporation	T41
Fives Machining Systems	R20
Ingersoll Machine Tools	L40
Magnum Venus Products	G5
PCM Innovation	H14

TESTING, MATERIALS CHARACTERIZATION, AND QUALIFICATION

A.B. Carter, Inc.	N40
Cincinnati Testing Labs	J33
Element Materials Technology	R43
KRÜSS Scientific Instruments, Inc.	S6
LMI Aerospace	H30
Luna Innovations	V36
MultiMechanics	F5
National Institute for Aviation Research	S38
Tinius Olsen	S29
United Testing Systems	V14
Ventilation Solutions	G36
Westmoreland Mechanical Testing & Research, Inc.	R30

TEXTILES: WEAVING AND BRAIDING, FIBER INNOVATIONS

Advanced Textile Composites	H38
Composite Fabrics of America	R33
Hexcel Corporation	L22
Kuraray America, Inc.	U33
METYX	G30
TeXtreme	T23

THERMOPLASTICS

Kuraray America, Inc.	U33
LANXESS Corporation	K47
Professional Plastics	T39
Stratasys	J10
Techmer PM	G11
Technical Fibre Products, Inc.	M22
Teijin Carbon America, Inc.	F4
Toray Advanced Composites	K9
Web Industries	Q21

TOOLING TECHNOLOGIES

A.B. Carter, Inc.	N40
Additive Engineering Solutions LLC	F17
Airtech Advanced Materials Group	M9
Applied Composites	M29
Ascent Aerospace	G16
CoreHog	J31
CTS Composites Inc.	S40
DeltaWing Manufacturing	R38
DUNA-USA Inc.	S10
General Plastics Manufacturing Co.	T30
Hawkeye Industries	S14
Janicki Industries, Inc.	R21
PTM&W Industries	U31
SHD Composite Materials Inc.	U5
Smart Tooling division of Spintech, LLC	L31
Surface Generation America	K36
Symmetrix Composite Tooling	G10
Technical Tooling - Composite Tooling and Workholding Solutions	H32
Weber Manufacturing Technologies Inc.	J20

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A.P.C.M. Manufacturing LLC Booth M33
Plainfield, CT 06374 USA
www.prepregs.com

Manufacturer of thermo-set epoxy prepregs with service temperatures of 180 degrees F to 400 degrees F. Film adhesives and two part epoxies with a specialty of Lightning strike prepregs for the composite aircrafts and drones.

Abaris Training Resources Inc. Booth L29
Reno, NV 89511 USA
www.abaris.com



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Accudyne Systems Booth S42
Newark, DE 19702 USA
www.accudyne.com

Custom automation equipment for producing composite intermediaries, preforms, and parts. Machines for AFT, ATL, forming, debuilding, cross-ply lamination, pick-and-place, kitting, bladder wrapping and others.

Adapt Laser Systems LLC Booth L28
Kansas City, MO 64120 USA
www.adapt-laser.com

The leading expert for all your laser cleaning needs, specializing in non-damaging, fast, and reliable production solutions.

Additive Engineering Solutions LLC Booth F17
Akron, OH 44305 USA
www.additiveeng.com

Additive Engineering Solutions (AES) was founded in 2016 as the world's first contract manufacturer to offer Large Scale 3D Printing Services. Utilizing Cincinnati's BAAM Additive Manufacturing Technology, AES has positioned themselves as a leader in their field while working with some of the largest manufacturing companies in the world. Technology improvement and application development is at

3A Composites / Baltek Inc. Booth S7
Colfax, NC 27235 USA
www.airexbaltekbanova.com

3A Composites provides sustainable, lightweight, & high-quality core materials (broadest portfolio in the industry) to enable the production of lighter, more energy efficient end products.

3M Aerospace Booth P31
St. Paul, MN 55144 USA
www.mmm.com/aerospace

At 3M Company, we apply science in collaborative ways to improve lives daily. 3M offers a broad portfolio of adhesives and tape.

A&P Technology, Inc. Booth P14
Cincinnati, OH 45245 USA
www.braider.com

A&P Technology is a seventh generation, family-owned, world-leading producer of precision braided fabrics. A&P Technology's product line includes: QISO™, a single layer balanced fabric with equal properties in every direction, Bimax™, an off-the-shelf +/-45° fabric, ZERO™, a unidirectional fabric with no crimp and Sharx™ braided sleeveings available in carbon, aramid, fiberglass or hybrids. All products can be tailored to specific widths & weights.

A.B. Carter, Inc. Booth N40
Gastonia, NC 28052 USA
www.abcarter.com

Complete line of air splicing system for composite and technical yarns, including MesdanLab line of laboratory testing equipment.

the forefront of what AES does as this industry continues to grow by leaps and bounds. Our core focus is on the complete fabrication of tooling & molds for a variety of industries as well as unique large scale mock ups and prototypes.

Advanced Ceramics Manufacturing Booth F10
Tucson, AZ 85756 USA
www.acmtucson.com

ACM manufactures unique high performance ceramics including water soluble mandrel tooling materials for composite structures with trapped geometries. Our standard products are autoclave capable. We offer a self-pressurizing material (ClaveCore) for OOA processing of OML driven geometries. Our materials are available as DIY raw materials and finished mandrels ready for composite layup.

Advanced Composites, Inc.
Salt Lake City, UT 84119 USA
www.advancedcomposites.com

Booth K28

From filament winding to molding and lay-up, Advanced Composites, Inc. uses a variety of processes to produce sophisticated composite structures to meet the specific cost, performance and weight criteria of a very diverse customer base. ACI has a registered AS9100 Rev. D Quality Program for composite design and manufacturing.

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Aligned Vision
Chelmsford, MA 01824 USA
www.aligned-vision.com

Booth K16

Aligned Vision provides automated guidance and automatic inspection solutions to optimize composite fabrication performance. Best-in-class laser templating features automatic steering to targets and comprehensive process control. The composites industry's only large-field automatic inspection system provides FOD prevention; early, actionable detection of out-of-tolerance features; comprehensive electronic documentation; and smart manufacturing gateway.

Advanced Processing Technology, Inc. (AvPro)
Booth K40
Norman, OK 73070 USA
www.avproinc.com

Process control software system, CSS300, uses the principles of Material State Management™ to measure and manage the part properties at all stages, and tracks legacy parameters - equipment, pressure, temperature and vacuum levels.

ThermoPulse Microwire offers real-time temperature feedback from within a composite interior or bond line.

Advanced Textile Composites
Scranton, PA 18509 USA
www.advtextile.com **Booth H38**

AGY
Aiken, SC 29801 USA
www.agy.com **Booth R40**

Airtech Advanced Materials Group **Booth M9**
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www.airtechonline.com **See Our Ad on Page 3!**



Airtech is the largest privately owned manufacturer of vacuum bagging and tooling materials. Airtech's product line consists of: vacuum bagging films, release films, pressure sensitive tapes, peel plies, breathers, bleeders, vacuum bag sealant tapes, vacuum bag connectors, hoses, rubber, tooling materials, carbon and fiber reinforcements.

Allied Scientific Pro
Gatineau, QC J8Y 6T4 Canada
www.alliedscientificpro.com **Booth U30**

LaserAero Cleaning System, (1000W, 500W, 200W, 100W) Applications: Surface preparation and texturing for composite layer adhesion, paint-removal, grease-cleaning, aluminum mold cleaning, tool cleaning and 3D-printing resurfacing.

Altair Engineering, Inc. **Booth K39**
Troy, MI 48083 USA | www.altair.com

AlzChem LLC **Booth S5**
Marietta, GA 30067 USA | www.alzchem.com

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American Composites Manufacturers Association **Booth R42**
Arlington, VA 22201 USA | www.acmanet.org

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The American Composites Manufacturers Association (ACMA) serves as the center of expertise and competence and an essential driver of industry growth and prosperity. ACMA provides invaluable education & events, market intelligence, & regulatory & legislative support. Our membership represents manufacturers, suppliers, distributors, and affiliates—from every market segment across the globe.

American GFM Corporation Booth T41
Chesapeake, VA 23323 USA
www.agfm.com

Machine tool builder of 3 and 6 axis ultrasonic cutters and routers that are capable of cutting prepreg, cured composite materials, honeycomb core sculpting in a dust-free high precision environment with American GFM supplied Nesting Software. In addition, American GFM offers the Compform preforming process.

Anderson America Corporation Booth Q46
Pineville, NC 28134 USA
www.andersonamerica.com

The company offers experience and expertise in the manufacturing of CNC machinery that few other companies can match. In the near future, the company will continue to expand its operations to offer fast, efficient sales and service in markets throughout the world. Beyond that, the group is working to develop strategic agreements with key players in the global market.

Applied Aerospace Structures Corporation Booth S15
Stockton, CA 95206 USA
www.aascworld.com

AASC has over 50 years' experience providing advanced composite and metal bonded aerospace structures. Specializing in design, fabrication and testing of lightweight, high performance engineered structures. Serving military and commercial customers for space, aircraft and ground systems. Advanced engineering and manufacturing capabilities including CATIA, Pro-E, FiberSim, Virtek, CompositePro, NASTRAN.

Applied Composites Booth M29
Lake Forest, CA 92630 USA
www.appliedcomposites.com

Applied Composites is a leading provider of complex composite components, assemblies, engineering, and tooling to the aerospace, defense, and space systems markets. Vertically integrated with four strategic locations, we have widespread capabilities to serve expanding industry needs in many high-growth aerospace and defense platforms.

Applus+ Laboratories Booth U35
Bellaterra Barcelona 08193 Spain
www.appluslaboratories.com

Provides customized testing & engineering solutions for materials & their applications: Materials & structures testing, material parameters for CAE simulation, digitalized solutions for materials data management, bespoke test rigs & benches, automated NDT/NDI equipment, & innovative stringer manufacturing processes. Our expertise covers advanced composite, metallic & polymeric materials.

ASC Process Systems Booth P7
Valencia, CA 91355 USA
www.aschome.com

ASC Process Systems, since 1988, has become the world's leading manufacturer of composite curing autoclave and oven systems for the aerospace, ballistic armor, and glass laminating industries. Come to our booth and see why the ASC Econoclave is the most popular and energy efficient composite bonding autoclave in the world.

Ascent Aerospace Booth G16
Macomb Township, MI 48042 USA
www.ascentaerospace.com

Ascent Aerospace, including Coast Composites, designs and builds layup molds, bond jigs, trim and drill fixtures, mandrels and other composite tools for nacelles, wings, helicopter cabins and blades, fuselage mandrels, and detail parts including spars, stringers and frames. We specialize in tools made of Invar, composite, and graphite.

Associated Industries Inc. Booth Q15
Wichita, KS 67214 USA
www.associatedindustriesinc.com

Associated Industries Inc. is a stocking distributor for the composites industry and is ISO 9001 and AS9120 approved. Our product lines are, but not limited to: vacuum bagging materials, aircraft sealants, sealant dispensing equipment, fiberglass/carbon, core materials, adhesives, polyester/epoxy resins, and tooling materials. Our partners are Henkel Aerospace, CYTEC Process Materials, 3A Composites, Hexcel, PRC, Axson, Endurance and many more leading manufactures.

Astroseal Products Mfg. Corp. Booth J32
Chester, CT 06412 USA
www.astrosealproducts.com

Axiom Materials, Inc. Booth M47
Santa Ana, CA 92705 USA
www.axiommaterials.com

Axiom Materials, Inc., is a progressive composite materials manufacturer founded with the intention of combining a quality prepreg, adhesive, and ancillary composite products platform with customer-focused service and forward-thinking design.

Belotti SpA / Merrifield Machinery Solutions Booth U15
Pontiac, MI 48340 USA | www.belotti.com

Belotti SpA has been manufacturing 3 & 5 axis CNC Machining Centers for more than 30 years; specializing in cutting composites, advanced materials, alloys & aluminum. Merrifield Machinery Solutions provides a fully staffed service & parts department to support your machine tool needs. MMS knows service is what matters.

BGF Industries, A Porcher Industries Company Booth U32
Danville, VA 24540 USA • www.bgf.com

BGF Industries Inc., a Porcher Industries Company, manufacturer of innovative technical fiber materials for global markets. Delivering excellence in every product, every process, every time.

Biesse America Booth U12
Charlotte, NC 28208 USA
www.biesseamerica.com

Bissell Commercial Booth V6
Plymouth, MA 02360 USA
www.bissellcommercial.com

Bondtech Corporation Booth H15
Somerset, KY 42503 USA
www.bondtech.net

Bondtech specializes in the designing, engineering, manufacturing, and sales of autoclave vessels and complete systems for aerospace composites and bonding. Bondtech Corporation manufactures the most reliable autoclaves in the market, providing you with many years of safe service. Bondtech will work with you to meet your complete composite autoclave requirements.

Bruker Optics Booth T16
Billerica, MA 01821 USA
www.bruker.com/optics

Bruker's high-performance scientific instruments and high-value analytical and diagnostic solutions enable scientists to explore life and materials at molecular, cellular and microscopic levels. Bruker is enabling innovation in life science molecular research, applied and pharma applications, microscopy, industrial applications, and many other important applications.

BTG Labs Booth L39
Cincinnati, OH 45217 USA • btglabs.com

BTG Labs manufactures the Surface Analyst™, a fast, easy, accurate, & non-destructive instrument that allows manufacturers the ability to achieve total surface quality control. This handheld instrument takes quantitative measurements directly on the factory floor to ensure adhesion during processes such as bonding, coating, printing, painting or cleaning.

Burnham Composite Structures, Inc.

Booth P17

Wichita, KS 67215 USA | www.burnhamcs.com

Burnham is a composites parts, assemblies, & tooling supplier. Capabilities include design & fabrication of composite bond tools, prototype tooling, Fiber-Lok reinforcement materials & eggcrate kits. We can support your tool string with Catia V5, 5-axis milling, autoclave, laser inspection capabilities. Burnham is registered ISO 9001:2008, AS9100C & NADCAP AC7118c.

C.A. Litzler Co., Inc.

Cleveland, OH 44135 USA

www.calitzler.com

Litzler designs & builds continuous process equipment for structural composites, carbon fiber production, & industrial textiles. Litzler designs oxidation ovens & hot melt, solution & thermoplastic systems & tape lines including ovens, unwinds, metering rolls, compaction stations, winders, accumulators, & drive & control systems.

Booth R13

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Howell, MI 48843 USA
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Booth H10

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Booth G17

Cincinnati Testing Labs
Cincinnati, OH USA
www.metcutctl.com

Booth J33

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 Page 21!**

Cincinnati Testing Laboratories (CTL) provides high quality, independent testing services to the aerospace, power generation, automotive and medical industries. Our professional team specializes in the machining, conditioning, and testing of composite, metallic and advanced composite materials.



Stop by and see us at booth J33 to discuss your testing needs.

CMS North America, Inc. **Booth K15**
Caledonia, MI 49316 USA • www.cmsna.com

CMS North America, located in Grand Rapids, Michigan, and incorporated in 1987, is a subsidiary of its parent company, CMS SpA with worldwide operations based in Zogno, Italy, & dedicated to the sales, support & service of its customers, their CMS machines, staff training, & long term interests for the efficient usage of that technology and CMS' continuing communication of its technological developments.

Coast-Line International
Amityville, NY 11701 USA
www.coast-lineintl.com

Booth U11

Composite Alliance Corp.
Dallas, TX 75247 USA
www.compositealliance.com

Booth Q38

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Composite Fabrics of America **Booth R33**
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Composite Fabrics of America (CFA) is a technical weaving company based in Taylorsville, NC which produces fabrics for the composites industry. Primarily weaving carbon fiber, we also have the ability to produce aramid, fiberglass and hybrid fabrics. CFA is a custom weaving operation.

Composite Motorsports Technologies

Booth G33

Phelan, CA 92371 USA
www.cmtwaterhousings.com

Composites Horizons **Booth J29**
Covina, CA 91722 USA • www.chi-covina.com

Composites Horizons (CHI) is a leading provider of both polymeric and ceramic matrix composite parts for aerospace, gas turbine and medical applications. Focus is on specialty and high temperature materials and fabrications, including ducts, acoustic panels, turbine exhaust components, nozzles, etc.

Composites Manufacturing Technology Center (CMTC) Booth Q41
Summerville, SC 29486 USA
<https://cmtc.ati.org/>

The Composites Manufacturing Technology Center (CMTC) serves as a technology resource to ONR under the Navy Manufacturing Technology Program (Navy ManTech) to develop advanced composites manufacturing processes with reduce acquisition & life-cycle costs, reduce weight & improve performance for key Navy ship, submarine, aircraft, land vehicle and missile acquisition programs.

Composites One Booth J7
Arlington Heights, IL 60005 USA
www.compositesone.com

Composites One is the leading distributor of composites materials in North America. With over 41 locations nationwide & our own fleet of trucks, you can always count on Composites One for reliable, on-time service. We are ISO9001:2008 with AS9120:2009 Rev A Standard & capable of handling all your composites needs.

CompositesWorld Booth P42
Cincinnati, OH 45244 USA
www.compositesworld.com

Composites World - the industry's leading technical information resource. CompositesWorld publishes: CompositesWorld monthly magazine, SourceBook annual directory, CompositesWorld.com, CompositesWorld Weekly and CompositesWorld Extra e-newsletters, & CompositesWorld conferences.

CompuDAS Booth F29
Olympia, WA 98501 USA

CompuDAS produces Control and Data Acquisition systems for composite curing ovens, autoclaves, and presses. We will be happy to discuss how we can upgrade your systems to automate your processes.

Comtech USA Inc. Booth V4
Gahanna, OH 43230 USA
www.comispa.it

Convergent Manufacturing Technologies Booth R5
Vancouver BC V6T 1Z3 Canada
www.convergent.ca

Convergent offers customers dimensional control with in-depth understanding of thermal management and its effect on process and tooling design. The company's software/hardware (COMPRO, RAVEN, CPA-TA, COHO) and services are designed to yield robust, cost-effective processes via computer simulation, process monitoring during air evacuation, and manufacturing risk evaluation for complex structures.

CoreHog Booth J31
Valencia, CA 91355 USA
www.corehog.com

CRG Advanced Manufacturing Center Booth P16
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www.crgp.com/amc

We deliver processes and parts for agile, affordable, innovative, trusted, high value aerospace and defense systems. We are experts in many types of common and uncommon composite and bonding fabrication methods and use these within our AS9100 D quality system to deliver excellence to our customers.

CTS Composites Inc. Booth S40
Mississauga, Canada
www.ctscomposites.com



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Daicel Chem Tech, Inc. Booth 14
Fort Lee, NJ 07024 USA | www.daicel.com

Daicel USA, Inc. is a wholly owned subsidiary of Daicel Corporation in Japan. DUI's main function is to sell and market DC's products. These being the complete Epoxy line Celloxide as well as the Caprolactones Placcels. Celloxide 2021P is an epoxy resin manufactured by Daicel's very own technique achieved by an oxidation reaction with paracetic acid. The Caprolactone series consist of Placel M Caprolactone monomer, Polycaprolactone-diol-Placel200 series, Polycaprolactone-triol-Placel300 series.

David H. Sutherland Co., Inc. Booth R29
Beaverton, OR 97005 USA
www.sutherland-pdx.com



David H. Sutherland & Co., Inc., founded in 1951 is a global supplier of composite & specialty products for the aerospace and high performance industries. We are a full service international trade organization certified to: ISO 9001:2015, AS9120 Rev B and FAA AC No: 00-56B.

DeltaWing Manufacturing Booth R38
Braselton, GA 30517 USA | www.deltawing.com

DeltaWing Manufacturing is a full-service design, engineering, fabrication, and composite manufacturing leader, providing solutions to industries including aerospace, automotive, defense, industrial to name a few.

Composites is our flagship division. From an idea, to build to print, we can help you with our in-house engineering and assembly teams.

Dexmet Corporation Booth S33
Wallingford, CT 06492 USA
www.dexmet.com

Dexmet offers MicroGrid® foil gauge precision expanded metals to manufacturers of composite and carbon fiber materials for lightning strike protection. Dexmet is the preferred vendor and supplier of lightning strike protection material to most major aircraft manufacturers today and is joint AS9100C and ISO 9001:2008 certified.

DIAB Americas LP Booth K29
DeSoto, TX 75115 USA • www.diabgroup.com

Diab is a global supplier of core materials and composite solutions, serving marine, wind, transportation, aerospace, architectural and industrial markets. Diab's Divinycell polymer foam cores and Pro-Balsa are designed to make customer products stronger, lighter, smarter. Diab's Composite Consulting Group services include engineering, analysis, material testing, training, and complex kitting.

Diatex SAS Booth F33
Saint Genis Laval 69230 France
www.diatex.com

Specialized in technical fabrics, DIATEX supplies all types of bagging materials used in vacuum moulding, vacuum infusion, RTM and RTM Light processes in composite-parts production.

DPSS Lasers, Inc. Booth R28
Santa Clara, CA 95051 USA
www.dpss-lasers.com

DPSS specializes in manufacturing ultraviolet (UV 355nm) laser markers and low-cost UV lasers with high peak powers and repetition rates - ideal for marking and engraving materials, such as plastics and metals. Applications for our Samurai UV laser marker are product coding, micromachining, marking, semiconductor, and medical packaging.

DUNA-USA Inc. Booth S10
Baytown, TX 77523 USA
www.dunagroup.com/dunausa

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Dunstone Company, Inc. Booth L14
Charlotte NC 28227 USA
www.shrinktape.com

From Hi-Shrink Tape, to Hi-Shrink Tubing, to shrinkable and non-shrink release films, Dunstone has a focused product line, designed to make your composite processing easier. Our Hi-Shrink Tapes are used to apply external compaction to a curing composite part. Hi-Shrink Tubing can be made from FEP, ETFE, or PET for tool sealing and compacting. If your need is ply compaction, release, bondable surface finish, or something else, visit booth L14 and talk to us about your material concerns.

EAG Laboratories Booth T21
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Element Materials Technology Booth R43
Duarte, CA 91010 USA
www.element.com

Testing and laboratory services, including mechanical, electrical, physical and flammability testing of composite materials.

Endurance Technologies Booth K43
South St. Paul, MN 55075 USA
www.epoxi.com

Endurance Technologies is the manufacturer of three reputable thermoset resin brands, CPD, MAS Epoxies and Bristol Finish. Visit our booth to learn what Custom Polymer Designs can do for your process.

Enercon Industries Booth S21
Menomonee Falls, WI 53051 USA
www.enerconind.com

Enercon offers atmospheric plasma and flame surface treating to improve surface adhesion of plastics, composites, glass and metals. Applications for plasma treaters include assembly, coating, potting and bonding. Plasma treatment cleans, etches and functionalizes surfaces to remove contamination, create bonding sites and activate the surface to promote adhesion.

Euro-Composites Corp. Booth Q13
Elkwood, VA 22718 USA
www.euro-composites.com

ECC is a global player in the field of advanced composite products. ECC stands for optimum solutions with advanced composites. We offer thermal forming 5 axis CNC core detail machining, honeycomb core kit & panel part kit production. ECC is one of the leading producers of complex composites parts.

Evonik Corporation
Parsippany, NJ 07054 USA
www.evonik.com/composites

Booth J13

Evonik, a global specialty chemical company supplies core materials for sandwich construction, thermoplastic and thermosetting resin matrices, essential components for matrices such as crosslinkers, catalysts, impact strength modifiers or processing and process additives. Products are used in sizings for glass or carbon fibers, and in adhesives for joining fiber-reinforced composites.

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www.fabricdevelopment.com

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www.fiberdynamics.net

Booth N15

Fiber Dynamics is a leading provider of out-of-autoclave processed components, specializing in RTM, for over 20 years. Our capabilities include turn-key production solutions with design, tooling, machining, fabrication and assembly processes. These capabilities, plus world-class operational management, AS9100 / NADCAP accreditation make FDI an outstanding solutions partner for our customers.

Fiber Materials Inc.
Biddeford, ME 04005 USA
www.fibermaterialsinc.com

Booth S11

FMI designs, develops, and manufactures composite materials and components that perform in the most demanding applications and the most extreme environments. Our products enable the most difficult missions, survive at the most extreme temperatures, and provide the greatest reliability to our customers.

Fibreworks Composites
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www.fibreworkscposites.com

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Fives Machining Systems
Hebron, KY 41048 USA | www.fivesgroup.com

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Designs, builds & support tailor-made machine tools and composite systems for global manufacturers in aerospace, defense, energy, industrial equipment and transportation.

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Landrum, SC 29356 USA | www.speedmixer.com

Booth L32

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Booth T30

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www.generalplastics.com

General Plastics' LAST-A-FOAM® rigid and flexible polyurethane foams are developed with you in mind. Known for its strength, stability and uniformity, our foam is used in diverse commercial aerospace, industrial, military and composite-manufacturing applications. We also mold, machine, fabricate and construct parts and assemblies.

Genesis Systems Group
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www.genesis-systems.com

Booth N30

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Genesis Systems Group, Advanced Materials Processing (AMP) division will be conducting live demonstrations of CFRP Processing Systems for Robotic Non-Destructive Inspection (NSpect™) & Abrasive Water Jet Cutting (RazorJet™). Our approach to processing CFRP parts improves thruput & quality while reducing overall cost per part, reducing labor & defects. Genesis Systems Group is recognized as one of North America's leading robotics system integrators with over 4,300 systems installed worldwide.

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www.goodfellowusa.com

Booth S20

A global supplier of metals, ceramics, polymers, compounds, composites & other materials to meet the research, development & specialist production requirements of science & industry. In addition to our 70,000 catalogue products in multiple forms available off the shelf, we offer a comprehensive range of custom processing services.

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Booth T31

Hawkeye Industries
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www.duratec1.com

Booth S14

Hawkeye markets Duratec® polyester and vinyl ester products, Aqua-Buff® polishing compounds and Styrosafe® resin. Proven chemistry, exacting quality control, a hands-on technical sales team, and responsive customer support set the Hawkeye product line apart from competitive products and alternative manufacturing processes. Manufactured in the USA and distributed worldwide.

HEATCON Composite Systems
Seattle, WA 98188 USA • www.heatcon.com



A leading global manufacturer & supplier of aerospace composite repair equipment, providing a full range of hot bonders, accessories, technical and training services, & materials for the repair of composite structures.

Henkel Corporation
Bay Point, CA 94565 USA
<https://www.henkel-adhesives.com/us/en.html/>

Booth N9

Henkel is a leader in structural adhesives and surface treatments for the aerospace industry. Under the BONDERITE & LOCTITE brands, our product portfolio includes composite resins, mold releases, film and paste adhesives, potting materials, liquid shims, peel plies & coatings. Available globally to meet efficiency, sustainability and lightweighting needs.



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High Performance Composites Booth M43
North Charleston, SC 29405 USA
www.hpcompositesLTD.com

HPC is the parent company for Crawford Composites of Charlotte, NC and General Composites from upstate New York. Together we offer a wide range of design build composite engineering and manufacturing services. Industries include: architecture, automotive, aviation, defense, Industrial, medical, motor sports and recreation. We welcome all introductions.

Hexcel Corporation
Stamford, CT 06901 USA
www.hexcel.com

Booth L22

Hexcel Corporation is a leading advanced composites company. It develops, manufactures and markets lightweight, high-performance structural materials, including carbon fibers, reinforcements for composites, prepregs, honeycomb, matrix systems, adhesives, additive manufacturing and composites structures, used in commercial aerospace, space and defense and industrial applications.

Hexion Inc.
Columbus, OH 43215 USA
www.hexion.com

Booth R10

The Epoxy, Phenolic and Coating Resins Division of Hexion is a leading global producer of epoxy specialty resins, modifiers and curing agents serving the automotive, oilfield, electronics, architectural and industrial coatings, wind energy, paint, packaging, power generation and distribution, aerospace, rail, marine and construction industries.

Highland Composites
Statesville, NC 28677 USA
www.highlandcomposites.com

Booth L46

Highland Composites specializes in the delivery of high-performance structural products for aerospace, automotive, industrial, energy, medical and other applications. As a full-service provider of composite structures, we can apply our braiding technology, engineering expertise, and complementary processes to deliver exceptional results. We operate from a state-of-the-art 64,000 sq. ft. facility.

Hollingsworth & Vose Booth U38
East Wapole, MA 02032 USA • www.hovo.com

The AFN (Advanced Fiber Nonwovens) Group of Hollingsworth & Vose Company manufactures surfacing veils composed of high performance fibers such as aramid, carbon, nickel/carbon, glass, polyester, blends. AFN nonwovens are preferred for composites applications requiring corrosion resistance, surface smoothness, impact resistance, static dissipation, lightning strike protection, stealth technology, EMI Shielding.

HOS-Technik GmbH
St. Stefan 9431 Austria
www.hos-tec.com

Booth H20

HOS-Technik is a chemical company operating in the composite materials and rubber sectors. The product range comprises maleimides and its derivatives, thermoset/thermoplastic resins, microbeads on polyurethane and -acrylate basis and metal-organic catalysts. R&D and quality control are carried out in a modern laboratory.

Huntsman Advanced Materials Booth K12
The Woodlands, TX 77380 USA
www.aralditematerials.com

Huntsman Advanced Materials has a long heritage of providing engineered solutions for our customers using high-performance thermoset chemistries and formulations. We work with designers and engineers to help bring lightweight, high-strength products to market. Our products serve the aerospace, automotive, coatings, electronics, energy and industrial composite markets.

Hyosung Advance Materials Booth U28
Charlotte, NC 28277 USA
www.hyosungadvancematerials.com

HyperSizer - Collier Research Booth M42
Newport News, VA 23606 USA
www.hypersizer.com

IKONICS Advanced Material Solutions Booth J41
Duluth, MN 55807 USA
www.ikonicsams.com

IKONICS Advanced Material Solutions uses Precision Abrasive Machining® (PAM), a non-traditional machining process. PAM advantages include perforations in any shape, high precision repeat-ability, complex curve capabilities, flexible & rapid design changes, no secondary machining processes needed & perforations have clean edges. PAM also provides acoustical sound & weight reduction benefits.

Ingersoll Machine Tools Booth L40
Rockford, IL 61103 USA
www.ingersoll.com

Ingersoll Machine Tools, Inc. produces Automated Fiber Placement (AFP) machines, Automated Tape Laying (ATL) modules and machining centers for the composites industry. Ingersoll's Mongoose & Lynx machines layup simple to very complex male & female structures. Turn-key solutions provide Ingersoll's customers with guaranteed success & support.

Innegra Technologies Booth H31
Greenville, SC 29615 USA
www.innegratech.com

Innegra™ fiber (HMPP), a high modulus polypropylene fiber, is used in composite and textile applications to increase toughness, durability, damping, and improve signal transmission. The Innegra S fiber technology, commercialized in 2012, continues the expansion of technology in these fields through hybridizing with other high performance fibers.

Innovative Composite Engineering (ICE) Booth J15

White Salmon, WA 98672 USA
www.innovativecomposite.com

Design/Manufacture a wide variety of structural composite tubes and shapes for the aerospace, Industrial, automotive, recreational, defense and oil & gas Industries. Specializing in out-of-autoclave processing of a wide range of prepreg materials with cure temps to 500°F. ICE takes complex engineering problems and turns them into manufacturing realities.

Institute for Advanced Composites Manufacturing Innovation (IACMI) Booth P46
Knoxville, TN 37932 USA | www.iacmi.org

International Thermal Systems Booth P38
Milwaukee, WI 53214 USA
www.internationalthermalsystems.com

International Thermal Systems manufactures composite curing ovens with complete out of autoclave systems. ITS offers standard and custom engineered batch ovens for all carbon fiber applications. Our ovens are designed with Three5 Air Flow technology which delivers the best air flow in the industry.

Intertek Booth G4
Pittsfield, MA 01201 USA
www.intertek.com/composites

Independent test laboratory dedicated to advanced materials: polymers, composites and constituents. Accredited: IEC/ISO 17025:05, NADCAP AC7122/1. Laboratory services range from testing specifications (ASTM, ISO, SACMA, other) to R&D, quality control, failure analysis, regulatory support, product optimization and more in the Intertek global network.

ITW Sealants / Tacky Tape **Booth S28**
Irving, TX 75060 USA • www.tacky-tape.com

Izumi International Inc. **Booth G20**
Greenville, SC 29615 USA
www.izumiinternational.com

Supplies creels, carbonization furnaces and take-up winders for carbon fiber production lines. Also lab-scale pilot lines and equipment for weaving, pultrusion and prepregging.

J6 Polymers **Booth T38**
Genoa, IL 60135 USA • www.j6polymers.com

J6 Polymers manufactures specialty two-component polyurethane and polyisocyanurate systems and kits with 40 years of proven performance in aerospace, defense, and other specialty markets. All JFoam™ products leave our facility with conformance to our extensive internal testing as well as our customers' specifications. J6 Polymers is ISO 9001:2008 certified.

Janicki Industries, Inc. **Booth R21**
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www.janicki.com

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Janicki Industries is a full-service engineering and manufacturing company specializing in composite and metal tooling, prototypes and fly-away parts. Janicki is capable of tackling large-scale projects utilizing precise Five-axis CNC Mills, Non-Destructive Inspection, Core Sculpting, Ovens, Annealing Furnace and more. This 100% in-house capability enables a one-stop shop for customers.

JEC Group **Booth U21**
Atlanta, GA 30326 USA
www.jeccomposites.com

JEC Group is the largest composite organization in the world. It represents, promotes and helps develop composite markets by providing global and local networking and information services. JEC Group's policy is to systematically invest its profits in the creation of new services to benefit the industry.

JPS Composite Materials **Booth P13**
Anderson, SC 29624 USA
www.jpocompositematerials.com

JPS is a leading producer of mechanically formed substrates for composite applications. Our E-glass, S-glass, quartz, UHMWPE, aramid, carbon and thermoplastic substrates provide design opportunities for existing products and/or the development of new ones. Our fabrics are used in radomes, aircraft, missiles, circuit boards, construction, surf/boat, ballistics and personal protection.

Kaneka **Booth R39**
Pasadena, TX 77507 USA
www.kaneka.com

Manufactures additives comprised of core shell rubber particles (CSR) designed to toughen thermosetting resin. The CSR particles are per-dispersed into a variety of thermosetting resins.

Krayden **Booth F21**
Denver, CO 80234 USA
www.krayden.com

Krayden is a technical problem solving distributor specializing in adhesives, sealants, coatings, solvents, solder, and various other chemicals. Krayden carries Dow Corning Henkel, 3M, Huntsman, Bostik, Royal, LORD, Vantage, and more.

KRÜSS Scientific Instruments, Inc. **Booth S6**
Matthews, NC 28105 USA
www.kruss-scientific.com

As specialists in interfacial chemistry and the world's leading supplier of measuring instruments for surface and interfacial tension, we not only provide high quality product solutions – our offer is a combination of technology and scientific consulting.

Kuraray America, Inc. **Booth U33**
Fort Mill, SC 29708 USA
www.kuraray.us.com

LANXESS Corporation **Booth K47**
Pittsburgh, PA 15275 USA
www.lanxess.us

LAP Laser LLC **Booth Q39**
Erlanger, KY 41018 USA
www.lap-laser.com

LAP Laser manufactures high quality laser projectors. When installed, these projectors can project any dimensional feature of a CAD drawing right onto the work surface to augment and facilitate the manufacturing process. Thereby reducing or eliminating scrap, reducing labor hours, and improving product quality, manufacturing efficiencies, & overall profitability

Laser Technology, Inc. **Booth Q11**
Norristown, PA 19403 USA
www.laserndt.com

Laser Technology, Inc. has over 40 years of experience as the premier manufacturer of Nondestructive digital Shearography and Holography testing equipment. Shearography is non-contact NDT inspection method used for the detection of subsurface defects. The laser shearography NDT method offers a unique engineering solution for advanced materials and processes.

Leadgo America **Booth T20**
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Leadgo-tech is a manufacturer and global supplier of vacuum bagging process materials for the wind, aerospace, marine and other markets. Our product lines include bagging film, peel ply, release film, sealant tape and many others.

LEWCO, Inc. **Booth R11**
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<http://www.lewcoinc.com/>

An ISO 9001:2015 certified company; LEWCO is a world leader in industrial oven design, innovation, and manufacturing. Our product line includes a full range of batch ovens, conveyor ovens, and large field assembled ovens. Focused on providing customer value, we bring quality products to market at a competitive price!

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www.lindau.net

Linseis **Booth L43**
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Lintech International **Booth H28**
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www.lintechinternational.com

Lintech is a leading specialty chemical distributor headquartered in Georgia that has partnered with major chemical manufacturers since 1983. With a complete line of resins, monomers, crosslinkers, pigments, additives and minerals, Lintech can address every need of composite manufacturers. Lintech provides award winning service from 13 warehouses across the country.

LMI Aerospace **Booth H30**
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<http://www.lmiaerospace.com/capabilities/testing/material/>

Intec is now LMI Aerospace! A composites center providing test services and manufacturing to the aerospace industry for full-scale component, material allowables and QA testing.

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www.lucasindustries.com

An ISO 9001:2008/AS9100C certified company, specializing in the design and fabrication of composite & metal tools, molds and production parts. We work with our customers from concept to finish product. Our engineers have unsurpassed expertise in the most advanced levels of Catia and Surfcam. We service aerospace, aircraft & commercial industries.

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M&Q Packaging LLC **Booth M41**
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www.mqplastics.com

M&Q Packaging is a leader in the high temperature plastic packaging industry. With over 50 years of experience, M&Q has the ability to process different types of plastics, and also delivers specific, specially-made solutions for various plastic applications. Quality is our top priority, matched by our commitment to customer satisfaction.

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www.macrodynepress.com

Mafic **Booth F31**
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Mafic manufacturers basalt fiber.

Magnolia Advanced Materials, Inc. **Booth K21**
Atlanta, GA 30340 USA
www.magnolia-adv-mat.com

Custom formulator/manufacturer of high-performance adhesives serving diverse industries including: aerospace, defense, electronics/electrical, communications, civil engineering/roadway, marine, energy, transportation, general industry and recreation. Products include adhesives (aerospace, structural, general purpose), syntactics, liquid shims, composite repair resins, RTM resins, potting/encapsulating epoxies, and tooling/casting resins, pavement markings. AS9100D certified.

Magnum Venus Products **Booth G5**
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www.mvpind.com

Magnum Venus Products (MVP) has been a world leading supplier of composites fabrication equipment for over 50 years. The MVP product line covers composites manufacturing needs from simple Chop/Gelcoat systems to customized, automated, multiple-axis filament winding systems. MVP offers complete solutions with proven customer support to meet your production needs.

Mahr Metering Systems **Booth Q43**
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www.mahrusa.com

Marietta Nondestructive Testing LLC **Booth G15**
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www.marietta-ndt.com

Master Appliance Corp. **Booth G28**
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www.masterappliance.com

Master is North America's leading manufacturer of heat tools for industry. Visit us to see Master's ProHeat STC® Surface Temperature Control Heat Gun. With electronically integrated IR Sensor, laser targeting and lockable controls, Proheat STC senses and controls surface temperatures making it ideal for hand layup of prepreg composite materials.

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A leading ultrasonic systems integrator and machine builder supplying ultrasonic systems for the inspection of bonded structures since 1968. Products offered by Matec include ultrasonic gantries capable of scanning flat to complex contour geometries, immersion tanks, and multi-channel linear or phased array systems. Matec is a leading supplier of these ultrasonic C-scan systems to most major North American aerospace companies.



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www.matrixcomp.com

Booth T11

MatrixComposites, Inc. designs and manufactures a broad range of high performance composite components and assemblies. Founded in 1993, Matrix serves the unique needs of customers engaged in critical applications in the aerospace, defense and commercial/general aviation industries. Full service capabilities include design, development, tooling, fabrication, testing and integration.

MB Superabrasives
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METYX USA Inc.
Gastonia, NC 28054 USA • www.metyx.com

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METYX Composites, a rapidly growing division of Telateks A.S., is a manufacturer of high-performance technical textiles, including: multiaxial reinforcements, carbon reinforcements, RTM reinforcements, woven reinforcements, and vacuum bagging products. Only certified raw materials are used, all manufacturing processes strictly adhere to demanding ISO 9001 standards, ensuring the highest quality reinforcements.

Miki Sangyo (USA) Inc.
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www.mikisangyo.com

Booth H21

A chemicals distribution company headquartered in Japan, supplying high temperature matrix resins and curatives for composites, including epoxy, bismaleimide, and polyimide monomers.

Mitsubishi Chemical Carbon Fiber and Composites, Inc.

Booth K30

Irvine, CA 92614 USA
www.mccfc.com

Mitsubishi Chemical Carbon Fiber and Composites produces an extensive range of carbon fibers, composite prepreg, film adhesives and towpreg products for demanding composite applications. For over 30 years, these products continue to go beyond the demanding requirements of aerospace, medical, industrial and sporting goods customers and their applications.

Momentive Performance Materials **Booth F14**
Waterford, NY 12188 USA
www.momentive.com

MTorres America
Everett, WA 98203 USA
www.mtorres.com

Booth S25

MTORRES designs, manufactures and installs special machine tools for the manufacturing of composite materials components, as well as tooling systems and assembly lines. MTorres has developed over the years the widest range of systems to automate, with the highest flexibility and productivity, the composite components manufacturing process.

MTS Systems Corporation
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www.mts.com

Booth G6

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Multiax America
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www.multiaxamerica.com

Booth N38

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MultiMechanics
Omaha, NE 68106 USA
www.multimechanics.com

Booth F5

MultiMechanics helps companies accelerate innovation and the product development lifecycle by virtually predicting failure in advanced materials at an unprecedented level of speed and accuracy. Our multiscale simulation software allows engineers to zoom into their material microstructure, giving them insight into how, when, and why their material may fail.

NAKATA U.S.A, Ltd.
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www.itro-usa.com

Booth U20

ITRO is a surface treatment system based on a concept by which a Nano-Scale silicon oxide layer is formed on the surface of a coated substrate by oxidizing flame with a flame burner. It improves adhesiveness and creates a hydrophilic surface on various materials such as metal, glass, plastic and silicone.

National Institute for Aviation Research

Booth S38

Wichita, KS 67260 USA
www.niar.wichita.edu

NETZSCH Instruments North America, LLC

Booth H33

Burlington, MA 01803 USA
www.netzsch-thermal-analysis.com

Instruments for thermal analysis & thermal properties measurement plus contract testing services; DSC for heat of curing and glass transition, DEA - Dielectric Analysis for thermoset cure monitoring, DMA - Dynamic Mechanical Analysis, TGA, coupling to MS, FTIR, and GC-MS, thermal conductivity, dilatometers and TMA for CTE / thermal expansion.

Nippon Graphite Fiber Corporation

Booth Q33

Cypress, CA 90630 USA • www.NGFworld.com

NGF: the leading supplier of continuous and discontinuous pitch graphite fibers and lightweight woven fabrics. Several product-lines for designs needing stiffness, strength or thermal conductivity.

Nordson Corporation
Wixom, MI 48393 USA

Booth T5

www.nordson.com/en/divisions/sealant-equipment

Nordson Sealant Equipment manufactures precision dispensing systems for product assembly using adhesives and sealants. Our systems dispense a wide variety of 1- and 2-part materials such as epoxy, polysulfide, urethane, silicone and acrylic. Engineered systems are available for bonding, sealing, encapsulating, gasketing, and potting applications in manual and robotic processes.

Norplex-Micarta
Postville, IA 52162 USA
www.norplex-micarta.com

Booth T10

Norplex-Micarta works with designers to solve challenging problems using thermoset composites in pre-preg, sheet, and shape forms. With applications engineering and product development services in house, Norplex-Micarta engineers new materials and fabrication techniques that are predictable, repeatable, and affordable. Norplex-Micarta welcomes you to visit us at booth T10.

Northern Composites
Hampton, NH 03842 USA
www.northerncomposites.com

Booth M32

Celebrating our 51st year, Northern Composites is your source for premium composite materials & technical expertise. Serving aerospace, marine, metal bonding & tooling industries since 1965 with leading brands including Mitsubishi Rayon Carbon Fiber & Composites; Northern Process Materials; Precision Fabrics Group; Henkel Aerospace Adhesives; BGF; PTM&W, AFF & ITW.

Northrop Grumman
Clearfield, UT 84016 USA

Booth T40

OEM Press Systems
Fullerton, CA 92832 USA
www.oempresssystems.com

OEM Press Systems, Inc. is a leading hydraulic press manufacturer providing application driven, engineered solutions for composite molding and lamination applications. Vacuum enclosed and non-vacuum hydraulic presses designed for even pressure application and uniform temperature distribution across the platen. Reliable and repeatable process control with OEM's "Advantage Next Generation" HMI.

Pacific Coast Composites
Puyallup, WA 98371 USA
www.pccomposites.com

Booth N20

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Pacific Coast Composites enjoys a world-class reputation for advanced composite materials distribution, quality control and unsurpassed customer care. As an approved distributor and repackager for 3M Aerospace and Commercial Transportation Division (ACTD) and Hexcel, we can provide small to large quantities of the composite materials and accessories you need!

Paragon D&E
Grand Rapids, MI 49512 USA
www.paragonde.com

Booth S43

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Park Electrochemical Corp.
Melville, NY 11747 USA • www.parkelectro.com

Booth S37

Park Electrochemical Corp. is a global advanced materials company which develops and manufactures advanced composite materials, primary and secondary structures and assemblies and low-volume tooling for the military/aerospace markets. The company's aerospace manufacturing facilities are located in Kansas. The company also maintains R&D facilities in Arizona, Kansas and Singapore.

PART Consulting LLC **Booth R41**
The Woodlands, TX 77384 USA
www.partconsulting.com

PART Consulting are experts in thermosetting chemistry and their applications for composites and other industrial applications. Our expertise includes epoxy, bismaleimides, benzoxazines, polyurethanes, and other thermosets. With over 60 years of combine expertise in manufacturing, formulation production; We help clients with challenges by providing solutions for business goals and applications.

PCM Innovation **Booth H14**
Sainte-Claire QC G0R 2V0 Canada
www.pcminnovation.com

PCM Innovation offers fully integrated engineering and tooling solutions for the industry. It designs and manufactures assembly lines, jigs & fixtures, advanced composite molds and precision machined parts for customers in the aviation, space and transportation industries.

PEI - Pinette USA **Booth R32**
Chalon sur Saône 71103 France
www.pinetteemidecau.eu

Pinette Emidecau Industries, also called Pinette P.E.I. is an industrial engineering group that designs and supplies forming and testing equipment, automated production lines, customized machines and turnkey plants for the world largest industrial groups including the aerospace, automotive and energy sectors.

Piercan USA, Inc. **Booth S22**
San Marcos, CA 92069 USA
www.piercanusa.com

Piercan is the world leader in manufacturing Natural Rubber soft tooling for bladder molding. We offer custom shape designs for all industry needs. Our bladders allow for precise control in complex carbon parts.

Plascore, Inc. **Booth J43**
Zeeland, MI 49464 USA
www.plascore.com

Manufacturer of metallic, aramid fiber and thermoplastic honeycomb. Custom composite panel manufacturing with value added capability of assembly, machining, forming, powder coating, testing and R&D. ISO 9001:2008, AS9100:2009, ISO 14001:2004 and ISO 9901:2008 certification approvals.

Plataine Inc. **Booth U29**
Waltham, MA 02452 USA
www.plataine.com

Award-winning leading provider of IIoT-enabled Intelligent Automation solutions for advanced manufacturing. Our suite of solutions enable our customers to:

- Increase throughput
- Improve quality
- Reduce re-work and waste
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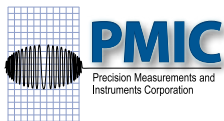
Plataine's patented, context-sensitive technology integrates with existing infrastructure enabling quick deployment, and rapid ROI.

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www.polymermachineryco.com

A premier supplier of molding equipment and accessories for the composite materials industry, serving all of North America.

PPG Aerospace **Booth Q16**
Sylmar, CA 91342 USA
www.ppg.com

Precision Measurements and Instruments Corporation **Booth R31**
Corvallis, OR 97333 USA **See Our Ad on Page 45!**
www.pmiclab.com



PMIC is an independent ISO Accredited Testing Laboratory that specializes in precision measurement of the thermal-physical properties of materials over temperatures from 20K to over 1,600K.

Testing services include:

- Coefficient of Thermal Expansion,
- Coefficient of Moisture Expansion,
- Thermal Conductivity (K).
- Specific Heat
- Thermal Cycling/Thermal Shock
- Long Term Creep
- Density

Professional Plastics **Booth T39**
Orchard Park, NY 14217 USA
www.professionalplastics.com

The global leader for innovative composite materials. 17 locations. ISO 9001. Release and bagging films, perforated, PTFE, sealant and flash tapes, bleeder breather, peel ply.

PRO-SET Inc. **Booth F8**
Bay City, MI 48706 USA
www.prosetepoxy.com

Pro-Set Epoxy systems offer enhanced performance with new laminating, infusion and adhesive formulations based on the latest in epoxy technology and raw materials. These versatile, adaptable resin/hardener combinations accommodate a wide range of processes. Uniform mix ratios provide versatility with resin/hardener combinations.

Prospect Mold & Die Company **Booth S16**
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www.prospectmold.com

Design and build of tight tolerance, complex, five-axis resin transfer, injection and compression molds for composite parts. We also build bond, trim and assembly fixtures as well as machining of tight tolerance composite parts.

PTM&W Industries **Booth U31**
Santa Fe Springs, CA 90670 USA
www.ptm-w.com

PTM&W Industries manufactures epoxy and urethane resin systems for production composites, composite tooling and rapid-prototyping applications. Among the products we make are laminating, infusion, surface coat, casting, and adhesive resin systems. We carry a large inventory for immediate shipping and have attractive pricing. We always answer the phone with a live person and have expert technical help awaiting your phone calls or emails.

Radius Engineering Inc. **Booth H39**
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radiuseng.com

Reinhold Industries Inc. **Booth J30**
Santa Fe Springs, CA 90670 USA
www.reinhold-ind.com

Renegade Materials - Maverick Corp. **Booth J21**
Miamisburg, OH 45342 USA
www.renegadematerials.com

Global leader in development and production of high-temperature composite materials. Prepreg, adhesive & RTM resins including BMI and polyimide capable of withstanding environments over 700°F. NADCAP and AS9100D accredited.



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www.revchem.com

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The West Coast's premier provider of composite materials, supplies, and equipment. 5 locations to provide fast, and flexible delivery. Ship products across the country and worldwide. Our technical expertise, sales support, customer service, and extensive product selection enable us to meet all of your composites needs. Raw Materials- Supplies- Equipment!

Revolution Composites Booth R37
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www.revolutioncomposites.com

Specializing in composite braiding and resin transfer molding. We have extensive experience braiding triaxial carbon and SiC preforms for subsequent densification (thrusters, pintles, valve bodies, etc.). We work with standard, intermediate, and high modulus carbon fiber as well as Tyranno and Nicalon SiC fiber.

Rudolph Brothers & Company Booth T6
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www.rudolphbros.com

Responsive, technically-oriented distributors of high-performance specialty adhesives, coating, potting, compounds and more. Good, old-fashioned customer service meets cutting-edge technology.

SAERTEX USA, LLC Booth M39
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www.saertex.com

The SAERTEX Group is a global market leader in the development and production of composite reinforcement solutions made of glass, carbon, aramid and other fibers. SAERTEX products are used in many market segments including wind energy, aerospace, marine, automotive, sports and leisure, railway systems, pipe relining and civil infrastructure.

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The Society for the Advancement of Material and Process Engineering, SAMPE, an international professional member society, provides information on new materials and processing technologies through publications, conferences and tradeshows. SAMPE provides a unique forum for professionals as the only technical society encompassing all materials and processes fields.

Schrödinger Booth U22
New York, NY 10036 USA
www.schrodinger.com/materials

Schrödinger is a leading provider of advanced molecular simulations and enterprise software solutions and services for its clients, which include all major pharmaceutical and biotechnology companies, as well as leading materials science researchers. Schrödinger also establishes partnerships and collaborations with companies in such fields as biotechnology, pharmaceuticals, chemicals, and electronics.

SGL Carbon Booth G31
Charlotte, NC 28262 USA
www.sglcarbon.com

SHD Composite Materials Inc. Booth U5
Mooreville, NC 28115 USA
www.shdcomposites.com

As world leading manufacturers of advanced composite prepreg materials, SHD Composites is committed to servicing the American prepreg market from Q2 2019 with the same wide range of tooling and component products and industry-leading customer support that have been available throughout the UK and Europe over the last ten years.

Shimadzu Scientific Instruments Booth Q12
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Shimadzu offers an extensive selection of electromechanical and hydraulic universal testers and easy-to-use hardness testers for a variety of QA/QC and R&D applications. In addition, a wide range of accessories accommodate even the most difficult to test materials while intuitive software provides for efficient testing operations.

Showa Aircraft Industry Co., Ltd. Booth T33

Akishima Tokyo 1968522 Japan
<http://www.showa-aircraft.co.jp/en/>

Showa is one of the leading manufacturers of composite and aluminum honeycomb with hexagonal, rectangular and flex-cell configurations. Showa established its facility in the Philippines to manufacture composite and aluminum honeycomb panels suitable for aircraft flooring and interior components. Showa is now Boeing qualified supplier of panel stock for flooring.

Sigmatex Booth S13
Benicia, CA 94051 USA
www.sigmatex.com

Sigmatex develops and manufactures carbon fibre for composite material applications. From global locations Sigmatex serves a range of markets including automotive, aerospace, marine, and construction.

Siltech Corporation Booth K20
Toronto ON M4H 1G5 Canada
www.siltech.com

Siltech® manufactures organo-functional silicone specialties which lower surface tension providing wetting of fibers and release of entrained air. Silmer® reactive silicones are functional polymers which react with resins changing their properties. Flexibility over a broad temperature range, release, and other properties are affected.
 Your Technology – Siltech Chemistry

Simulations, LLC Booth F37
East Granby, CT 06026 USA
www.simulationsllc.com

Simulations-LLC is an end-to-end engineering firm manufacturing a vast assortment of composites. Services include M&S, FEA, structural/aero/thermal analyses, high-temp resin infusion, and a multitude of RTM, VARTM and bladder mold processes, with complete in-house CNC fabrication. In addition to industrial hardware, we specialize in engineering lightweight hypersonic defense launch packages.

SL-Laser Systems, LLC Booth R17
Charlotte, NC 28203 USA
www.sl-laser.com

High accuracy, user friendly, cost effective 2D/3D laser projection systems for advanced manufacturers.

Solvay **Booth Q5**
Heanor Derbyshire DE75 7SP
United Kingdom
www.solvay.com

Solvay Composite Materials is a global provider of technologically advanced lightweighting material solutions that enable our customers to design, develop and efficiently manufacture high-quality, high-performance and complex composite structures. Our portfolio includes prepregs, resin systems, adhesives and surfacing films, carbon fiber, textiles, tooling and vacuum bagging consumables.

Smart Tooling division of Spintech, LLC **Booth L31**
Xenia, OH 45385 USA
www.smarttooling.com

Smart Tooling provides formable, reusable tooling solutions for manufacturing composite parts with complex geometries & trapped shapes that drastically reduce labor hours, increase through-put, and improve quality, including Smart Bladders, Smart Cauls, and Smart Mandrels. Go to smarttooling.com for information about our game changing technology.

Specialty Materials, Inc. **Booth S41**
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www.specmaterials.com

StateMix Ltd. **Booth H36**
Winnipeg MB R2X 1G4 Canada
www.statemix.com

Statesville Process Instruments Inc. **Booth N41**
Statesville, NC 28677 USA
www.statesvilleprocess.com

Smartech International LP **Booth G21**
Charlotte, NC 28211 USA
www.smartechonline.com **See Our Ad on Page 37!**



Established in 1998, Smartech International serves as the North American partner for Steinbach AG of Detmold, Germany. We credit our success as an Insulation Component and Silicone and Rubber Membrane Supplier to committed focus on quality products and superior customer service. Repeat customers expect and appreciate Smartech's personal level of service with each purchase, and know that our quick response times are standard, never the exception.

Stiles Machinery Inc. **Booth P36**
Grand Rapids, MI 49512 USA
www.stilesmachinery.com

North America's leading provider of manufacturing machinery for milling, cutting, sawing, finishing and material handling. Customers of all sizes across automotive, aerospace and other precision industries choose Stiles Machinery for our world-class technology backed by unrivaled service, parts and education programs.

Stratasys **Booth J10**
Eden Prairie, MN 55344 USA
www.stratasys.com

Stratasys is a defining force in additive manufacturing. Whether the application requires layup molds or sacrificial tooling for complex geometries, 3D printing can simplify the fabrication of composite parts. Stratasys' ecosystem includes a range of 3D printers and materials; parts on-demand from Stratasys Direct Manufacturing; consulting and software.

Structural Diagnostics, Inc. Booth N47
Camarillo, CA 93012 USA | www.sdindt.com

Leaders in manufacturing custom, fully-automated Ultrasonic Testing equipment. SDI has been in business for 25 years and has a reputation for building easy-to-use, reliable equipment, while also being cost-effective. No UT job is too big or too small. Please contact us for a quote on your next project.

Surface Generation America Booth K36
Lyndon, Oakham Rutland LE15 8TW
United Kingdom
www.surface-generation.com

Surface-Generation has developed its core PtFS hardware and control software for aerospace, automotive, consumer-electronic, energy-customers in injection and compression moulding. The world-wide market for flexible digital manufacturing is growing, with companies not wanting to be tied to traditional techniques. PtFS has been designed from the outset to meet this demand.

SurfaceTreat a.s. Booth M40
České Budějovice 370 01 Czech Republic
www.surface-treat.cz

Surfx Technologies, LLC Booth T28
Redondo Beach, CA 90278 USA
www.surfxtechnologies.com

Surface preparation is critical to bonding and coating. Surfx atmospheric plasma offer fast, safe, and reliable surface preparation of polymer and metals. With over 15 years of experience, Surfx plasma systems are able to prepare a surface for improved adhesion strengths than conventionally used methods such as mechanical abrasion.

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Symmetrix Composite Tooling Booth G10
Bristol, RI 02809 USA
www.symmetrixcomposites.com

Symmetrix Composite Tooling fabricates high-performing molds, patterns, plugs, and prototypes. Our 5-axis CNC machines allow us to create sophisticated forms quickly and with extreme precision. This state-of-the art technology, combined with the expertise of our people, allows us to shape innovative solutions to your complex molding challenges.

TA Instruments Booth K31
New Castle, DE 19720 USA
www.tainstruments.com

Visit TA Instruments for innovative materials characterization technology in thermal analysis (DSC, TGA, SDT, DMA, TMA), rheology, and calorimetry. Learn about our new complete line of tools for measurements of thermal conductivity and diffusivity and dilatometry for materials from -150°C to 2300°C including unique, non-contact optical measurements.

Taricco Corporation Booth N28
Long Beach, CA 90813 USA
www.taricco.com

With unwavering commitment to our customers, the Taricco family continues to pioneer, engineer and manufacture the most innovative, technically equipped and reliable thermal-pressure processing equipment and systems- autoclaves, ovens and presses (large-r&d size). ASME Section VIII Div. 1 and 2 certs, National Board(NB) registered. Partnering for advancement through innovation.

Technical Fibre Products, Inc. Booth M22
Schenectady, NY 12306 USA
www.tfpglobal.com

TFP is a leading advanced nonwoven manufacturer, offering a broad range of high quality, technical nonwovens for challenging applications. These novel multifunctional materials can be customized to meet specific requirements and provide a wealth of solutions for composites; including enabling a high quality surface finish, imparting functionality and interlaminar toughening.

TCR Composites Booth Q29
Ogden, UT 84404 USA
www.tcrcomposites.com

TCR Composites supplies a unique epoxy prepreg tow/roving for filament winding, fabrics, uni-directional tape and braid. TCR™ prepregs include up to one-year outlife at room temperature (75°F/24°C), without changes in material properties. Refrigerated shipping and storage not required.

TE Wire & Cable Booth J28
Saddle Brook, NJ 07663 USA
www.tewire.com

TE Wire & Cable LLC, a Marmon Wire & Cable/Berkshire Hathaway Company, is a premier thermocouple and specialty wire/cable manufacturer. Since 1941, the company has been manufacturing high-quality wire and cable solutions for the thermo-sensing and temperature measurement markets. For more information, visit the TE Wire website at www.TEWire.com

Techmer PM Booth G11
Clinton, TN 37716 USA
www.techmerpm.com

Techneglas Booth U10
Perrysburg, OH 43551 USA
www.techneglas.com

Manufactures resin polymers used in a variety of applications, including abrasion resistant coatings for plastics, electronics coating, mold release agents and high temperature applications.

Technical Tooling - Composite Tooling and Workholding Solutions Booth H32
Tacoma, WA 98421 USA
www.vacu-grip.com

Composite vacuum fixtures that deliver reduced scrap rates through better holding force and provide rapid part changeover, without breaking the budget. Utilizing a proprietary porous material technology (Vacu-Grip®), structurally supports & simultaneously pulls vacuum across the full 3-dimensional surface of the part. Repair/modification is easy & inexpensive compared to competitors.

Technology Marketing, Inc. Booth H4
Salt Lake City, UT 84107 USA
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Teijin Aramid USA, Inc. Booth V5
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www.tencatecomposites.com

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www.thermwood.com

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Booth S29

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Page 17!**

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Toray Composite Materials America, Inc.

Booth H5

Tacoma, WA 98446 USA
www.toraycma.com

Toray Composite Materials America, is a leading producer of high quality carbon fiber and advanced composite prepreg materials for sporting goods, aircraft and industrial markets.

Trelleborg Offshore Boston
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www.trelleborg.com

Booth K41

Trilion Quality Systems
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Booth M38

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Booth S36

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Trinks Inc. is a company that manufactures high-quality hydraulic, compression, transfer and vacuum molding equipment along with automated turnkey systems. Our presses range anywhere from 3 ton to thousands of tons, the options are almost endless.

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www.v2composites.com

Vectorply Corporation **Booth G29**
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Vectorply Corporation offers a range of reinforcements tailored to many applications. These products are engineered for particular end use such as VectorSports, for the snowboard and wakeboard industry, VectorFusion for infusion specific applications, LaborSaver for applications that demand thicker laminates and low labor content and VectorUltra for advanced composite applications.

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www.webermfg.ca

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West Virginia Development Office Booth P41
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Wisconsin Oven Corporation Booth P30
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www.wisoven.com

Wisconsin Oven manufactures electrically heated, gas fired, and indirect gas fired composite curing batch ovens designed to meet customers' specific process requirements. Available options include data acquisition instruments, vacuum piping, pumps and transducers. Wisconsin Oven also supplies ovens for wide variety of applications including finishing, heat treating, and solution treating.

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WTU Systems
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Booth L30

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Booth P47

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www.zoltek.com

Booth T4

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 Anaheim Convention Center, Anaheim, CA.
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JUNE 6, 2019

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 eventArchive_AS2019.html**

JUNE 11 - 12, 2019

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 (NIAR), Wichita, KS.
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AUGUST 27 - 29, 2019

AM 2019 Additive Manufacturing
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 Austin, TX
www.additiveconference.com/amc19
+1 866-963-9655

SEPTEMBER 2 - 6, 2019

SAMPE Japan | JISSE-16,
 Symposium: Sept. 2-4, The
 University of Tokyo, Hongo Campus,
 Tokyo, Japan.
 Exhibition: Sept. 4-6, 2019
 Pacifico Yokohama, Yokohama, Japan.
http://www.sampejapan.gr.jp

SEPTEMBER 5 - 7, 2019

SPE Automotive Composites
 Conference & Exhibition (ACCE)
 Novi, MI.
**speautomotive.com/acce-
 conference**

SEPTEMBER 17 - 19, 2019

SAMPE Conference 2019 Nantes, La
 Cité des Congres de Nantes, France.
www.sampe-europe.org

OCTOBER 1 - 3, 2019

IBEX 2019, Tampa Convention
 Center, Tampa, FL
www.ibexshow.com

OCTOBER 22-23, 2019

Tooling Technologies Workshop for
 Composites, Oak Ridge National
 Laboratory and University of
 Tennessee-Knoxville, Knoxville, TN
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MAY 4 - 7, 2020

SAMPE 2020, Washington State
 Convention Center, Seattle, WA
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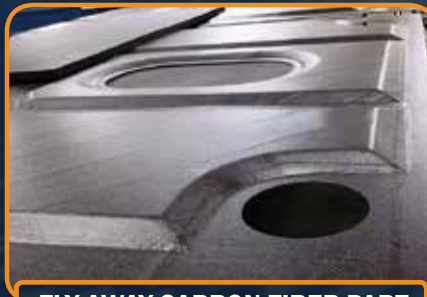
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