

IN ASSOCIATION WITH

ACMA **SAMPE****CW**
CompositesWorld

ShowDaily

Dallas, Texas | Dallas Convention Center theCAMX.org

Conferences Offer Extensive, Timely Coverage

Conferences on more than 250 topics start this morning at 8 a.m. **pg 3**

ACE Nominee Preview

ACMA's Awards for Composites Excellence once again draw best of the best in innovation. **pg 3**

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Getting to and fro. **pg 8**

Exhibit Hall Highlights

New technology, products and services to be found on the CAMX show floor. **pg 9**

Show Floor Map

Your at-a-glance guide to the exhibits. **pg 6**

EVENTS NOT TO MISS

- **Registration Open**
7:00 a.m. – 5:30 p.m.
- **Conference Programs**
8:00 – 8:55 a.m., 2:00 – 4:55 p.m.
- **Opening General Session, Keynote, CAMX Awards**
9:00 – 10:15 a.m.
Omni Hotel: Dallas Ballroom - Level 3
- **Exhibit Hall Open**
10:30 a.m. – 5:00 p.m.
- **ACMA Awards for Composites Excellence (ACE)**
2:00 – 4:00 p.m.
Exhibit Hall - ACE Pavilion
- **Welcome Reception**
5:00 – 6:00 p.m.
Dallas Convention Center
Trinity Ballroom - Level 4

Keynoter to Address Automotive Composites

By Jeff Sloan
CompositesWorld Magazine
compositesworld.com

Gary J. Smyth, Ph.D., executive director, Global R&D Laboratories, GM Global Research & Development, will be the keynote speaker this morning at CAMX 2015, discussing the carmaker's material and manufacturing strategies as it pursues lightweighting in new-car development.



CW: There is much talk in the automotive composites industry about a mixed-material strategy for composites application. How does this fit with GM's materials strategy?

GJS: Lightweighting and mixed materials are key pieces of GM's materials strategy. We want to apply a smart mix of innovative lightweight materials to our vehicles, combined with new joining and manufacturing technologies, to achieve the strength, performance, and efficiency our customers need and want. There is no "one size fits all" for mass reduction. Recently, the term mixed materials has been used specifically in reference to the body structure where materials like high-strength steel, aluminum, magnesium, or composites have been chosen for different vehicles. Composites play a role as a candidate for body and closure applications, but there are technical and financial challenges which must be

overcome for them to see significant introduction into the industry. Today, on average, we use about 300 lb of polymer composites on a vehicle—or just under 10 percent of its mass.

CW: What do you see as the composites industry's greatest strengths and weaknesses in regards to automotive manufacturing?

GJS: Among the strengths are lower mass, the ability to make complex shapes with integrated parts, less corrosion than metals, and styling advantages. The composite body strategy used for the new, seventh-generation Corvette resulted in a 15-25 percent reduction in mass compared with the previous generation, and its doors have surface contours that cannot be stamped out of metals.

Among the biggest challenges is high material and processing costs in terms of dollars per kilogram saved. Other hurdles include cycle time, dimensional tolerances (e.g., fit and finish), longer durations for joining (there is no analog to resistive spot welding of metals), and damage prediction and repair. In addition, constitutive models for all material and process combinations, including joints made with those materials, are required.

Finally, there is need for industry alignment. This is a key commercial challenge. When we try to source a part, we get a mixed bag of materials and processes from different suppliers, so it's difficult to compare apples to apples.

See **KEYNOTE**, continued on page 6

CAMX Social Media



Social media and more specifically, Twitter, is another key outlet to keep an eye on during the show so you don't miss a thing. The CW team will be out in full force covering both the exhibit hall and conference so stay tuned to our Twitter account (@CompositesWrld), which will have all the latest news, photos and videos from the show. Also, on Twitter, check out the hashtag #CAMX15, which is where you will find tweets from exhibitors, attendees, as well as show organizers and the media. 📸

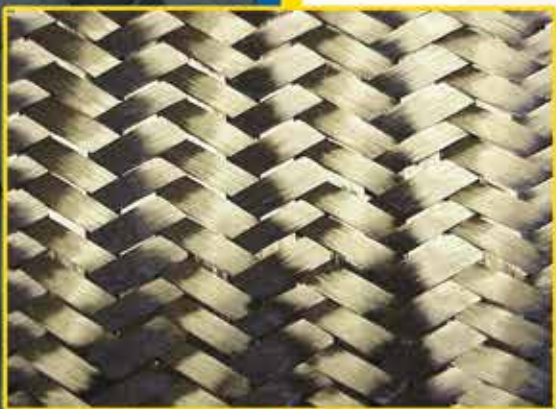
CAMX Award Nominees Span Breadth of Composites Materials and Processes

The CAMX Award recognizes the cutting-edge innovations that will significantly impact composites and advanced materials in the marketplace, with emphasis on concepts and products that show strength through collaboration, while bridging low-cost materials/high-volume applications with high-performance applications/low-volume materials. The winners for the Combined Strength and Unsurpassed Innovation Awards will be presented during the Opening General Session today, 9:00 – 10:15 a.m.

See **CAMX AWARDS**, continued on page 4



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CAMX Booth S66

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CAMX Conference Track Offers Extensive Range of Programming

The CAMX Conference program features timely topics and industry experts from the composites and advanced materials industries. In total, it covers 250 different topics.

Be sure to customize your conference plan using the online MyCAMX planner. There you can find conference sessions by day, track, room and event type. The conferences start at 8 a.m. today—so grab some coffee and find one to sit in on. Morning sessions include: *Fracture Toughness of Carbon Fiber Composites Containing Various Fiber Sizings and Puncture Self-Healing Thermoplastic Matrix*, a technical paper from NASA; *The Era of In-Space Manufacturing Has Begun*, an education session from Made in Space; *Epoxy Resins and Liquid Anhydride Curatives for High Performance Composites*, an education session from Dixie Chemical Co.; *Nanocomposite Sealants for Edge and Hole Treatment of Aircraft Carbon Fiber Composites*, a technical paper from Wichita State University. The morning sessions end at 8:55 a.m. and the conference starts back up at 2:00 p.m. and lasts until 4:55 p.m.

Be sure to check out the keynote address from Gary Smyth, executive director of global research and development at General Motors Co., that takes place today from 9:00 – 10:30 a.m. at the Omni Hotel in the Dallas Ballroom, Level 3. Smyth will provide insights into the future of composites in the automotive market, including lessons learned from Corvette's use of composites. He will also provide a high-level perspective on transformational change now going on in the automotive

Education Sessions, Technical Papers and Featured Sessions

Education Sessions are typically 45 minutes long (some may be longer) and are not accompanied by formal research papers. Instead, they focus more on case studies, best practices, issue reviews, etc. and are presented as lectures, panels and/or discussions.

Technical Papers are 25-minute presentations and include formal written research papers reviewed by industry peers within ACMA and SAMPE. Find presentations that address critical areas important to the composites and advanced materials industry from business, applications and research perspectives.

CAMX Featured Sessions focus on composites innovation, market growth and hot topics associated with advanced materials technologies. Show organizers say that the featured sessions will deliver information you'll use to improve your products and processes, expand your business and plan for the future.

Here are the sessions:

ADVANCES IN TRADITIONAL MATERIALS

- *Structural Parts for Automotive: Why Carbon Fiber Composites? An International Overview*
- *Trends and Future Applications of Thermoplastic Composites*

GREEN & SUSTAINABILITY

- *Bio-Based Materials – Now and Into the Future*
- *LCA for Composites and its Impact on Sustainability*

MANUFACTURING

- *NNMI – National Network for Manufacturing Innovation*
- *High Speed Automation in Automotive*

MARKET APPLICATIONS

(INDUSTRIAL/CONSUMER)

- *Challenges Using Composite Materials Offshore*
- *Opportunities in Architecture*
- *Pressure Vessel Tanks for CNG, LPG and Other Gas/Liquids (Transportation Distribution and Consumer Use)*
- *Processes and Materials for Mass Production Markets*
- *Success Stories on Lighter Weight Applications*

industry. The CAMX Awards for innovative products and applications will also be announced during the general session. All attendees and exhibitors are welcome to attend.

After a long and productive day at the show, come relax at the Welcome Reception that will be held today from 5:00 – 6:00 p.m. at the Fork Ballrooms. 🍷



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ACE Nominees Address Nano, Infrastructure, Corrosion, Consumer and Simulation Applications

ACMA's Awards for Composites Excellence (ACE) recognize outstanding achievement and innovation in technology, manufacturing and product development. ACMA is presenting six awards in three categories: Innovation in Green Composites Design, Most Creative Application, Equipment and Tooling Innovation, Material and Process Innovation, Composites Sustainability, and Infinite Possibility for Market Growth. Winners will be announced today at 2:30 p.m. in the ACE Pavilion. Notable nominees are listed here. Visit the pavilion for a complete run-down on each nominee.

Kenway Corp. designed and manufactured the 255-ft by 23-ft floating span on Sunset Lake in Brookfield, VT. Five foam-filled fiberglass rafts support a timber deck and walkways designed for a 12-ton vehicle. Bolted steel splice plates ensure the floating span mimics a monolithic structure.



Five foam-filled fiberglass rafts support a timber deck and walkways designed for a 12-ton vehicle.

Kenway also designed and built molds used to manufacture the rafts.

N12 Technologies has developed N12 NanoStitch, an interlaminar toughening product based on large-format vertically-aligned carbon nanotube (VACNT) sheets. N12 has pioneered a continuous

See **ACE AWARDS**, continued on page 8

CAMX AWARDS, continued from page 1

Below is a selection of CAMX Award nominees. Visit the CAMX Awards Pavilion to see them all.

Structural Composites Inc. (SCI) has developed an all-composite truck body for the refrigerated market. It includes composite walls and roof systems and features a new all-composite integrated floor that provides significant improvements in weight, thermal efficiency and longevity. SCI's established PRISMA preform technology was combined with the newly developed CoCure strain tunable resin technology to produce the demonstration truck presented at CAMX. PRISMA technology allows for the scaleable integration of thermal properties and mechanical properties.



Structural Composites' all-composite truck body is designed for the refrigerated truck market.

Adesso Advanced Materials has developed novel Cleavamine degradable hardener and Recycloset recyclable resin technology for use in carbon fiber composite sporting goods, marine, automotive and PCB applications. The thermoset polymer matrix of the fiber-reinforced composites made with its recyclable resins can be degraded under benign conditions using weak acid with solvent or without solvent, with a clean recovery of fibers and reclaimed resins. This allows 95% recovery of fibers and reclaimed resins; in addition,

the fiber recycled retains at least of 95% of its virgin fiber strength.

Cincinnati Inc. offers Big Area Additive Manufacturing (BAAM), a new platform for additive manufacturing of polymer and composites structures. BAAM includes a build platform measuring 20 by 8 by 6 ft and uses screw-extrusion technology for deposition of a short fiber-reinforced resin. Cincinnati Inc. and Oak Ridge National



An extrusion screw for Big Area Additive Manufacturing (BAAM) can deposit material 200 times faster than existing systems.

Laboratories (ORNL) designed an extrusion screw specifically for the BAAM system and mounted it on a high-speed, high-resolution gantry system originally developed by Cincinnati Inc. By using the screw-extrusion technique, BAAM is able to deposit material 200 times faster than existing systems, and use a low-cost pelletized feedstock to reduce the price of production by a factor of 20 times.

Continental Structural Plastics' TCA Ultra Lite is a material that offers significant weight- and cost-savings over aluminum in automotive applications. Suitable for Class A body panels or structural components for light vehicles or heavy trucks, design studies have shown that at 1.2 specific gravity, Ultra Lite offers a weight savings of up to 28% over the company's mid-density TCA (1.6 specific gravity), and 43% over



This Ultra Lite material is said to offer significant weight and cost savings over aluminum.

its industry-proven, standard-density TCA material (1.9 specific gravity). Ultra Lite uses treated glass bubbles to replace CaCO_3 , allowing the resin to adhere to the matrix and increase the interfacial strength between the bubble and the resin.

German Aerospace Center has developed the modular shape adaptable cellular high-pressure storage CNG-DLR-Wabentank. It shows potential for



The CNG-DLR Wabentank shows promise for increasing the range of CNG vehicles while reducing CO_2 emissions.

increasing the range of CNG vehicles while reducing CO_2 emissions compared to diesel or petrol vehicles. The innovation is based on the composite winding technology, which offers what is said to be the first ever fully manufactured modular and free-shapeable, high-pressure vessel, offering 30% more available volume in a vehicle.

Lingrove developed a natural fiber-reinforced paddle for use in stand-up paddle boarding (SUP). The Ekoia paddle,



The Ekoia paddle for stand up paddle boarding is made with linen and bio-epoxy prepreg.

made with linen and bio-epoxy prepreg, combines benefits of wood and carbon fiber, providing vibration damping of wood and the light weight of carbon fiber. The paddle is produced using wrap-rolling over a mandrel for the tube section and compression molding with a foam core for the blade and handle. 🏆

Don't Miss CAMX International Exhibits

- The Department of Trade and Industry South Africa hosts over ten companies. Visit Booth W128.
- China Pavilion: Visit with exhibitors from China, (Row W, near the back of the hall).

- COMPOSITES EUROPE: Check out the exhibitors from Germany and the rest of Europe, and talk with the organizer of the COMPOSITES EUROPE Trade Show. (Row V, near the back of the hall).

Save the Date!

CAMX
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CAMX 2016:
September 26-29 • Anaheim, CA

After Hours: What to Eat in Big D

You won't go hungry in Dallas, thanks to an abundance of steakhouses, barbecue and Tex-Mex choices. Adjacent to the Kay Bailey Hutchison Convention Center is the Omni Hotel, which features several restaurants, including **Bob's Steak & Chop House**, the southern style offerings of **Texas Spice**, **The Owners Box Sports Bar & Grill** or the **Uptown Terrace**, a full-service bar and restaurant on the fourth floor of the hotel that overlooks downtown Dallas.

The Adolphus Hotel is located on Commerce Street, which is blocks away from the convention center, has the award-winning upscale **French Room** and the laid-back **Rodeo Bar and Grill**.

Take about a 10-minute walk from the convention center to the Main Street District in Downtown Dallas and you'll find several options including

the seafood spot **Dallas Fish Market** and **CBD Provisions**, a modern Texas brasserie.

For those craving Mexican food, there's **Wild Salsa** or **Iron Cactus Mexican Grill** and **Margarita Bar**. If you prefer a burger, check out **Chop House Burger**, which was started by the same group that owns the **Dallas Chop House**, a steakhouse that is also on Main Street. Can't get enough

steak? Well, locals recommend for the "ultimate" Texas steakhouse experience to check out **Y.O. Ranch Steakhouse** on Ross Ave., a Hill Country-inspired fine dining restaurant featuring elk, bison and more in a Western ambiance. For barbecue, there's **Sonny Bryan's Smokehouse** on North Market Street.

If you do have a car or feel up to taking an Uber or taxi, there are plenty of restaurants in the area of Uptown, which is a little over 3 miles from the convention center.

McKinney Avenue in Uptown is where you'll find lots of food options such as modern American dishes, tapas, pizza and more steakhouses. Get a true Texas night at **The Katy Trail Ice House**, a beer garden and restaurant located in the heart of uptown on the Katy Trail, or visit **The Rustic** for southern cooking and live music. 🍷



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Booth #J60



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KEYNOTE, continued from page 1

CW: The composites industry does not have a history of providing high-volume, JIT manufacturing services. If GM increases composites use, how will it cope with this challenge?

GJS: This is a significant issue and compounded by the complexity of the composites value chain. In the metal world, we buy sheet metal and stamp it into a part or, in some cases, buy a premade assembly. In the composites world, there can be a resin supplier, a fiber supplier, a molder, and then a component assembler or finisher/painter. This makes it very difficult to manage the whole value chain. One approach would be to bring the technology in-house; another is to closely partner in the plant, much as we do for the paint shop today. What is clear is that to enable true high-volume implementation, the right decisions need to be made early in part and process design to optimize material use and minimize manufacturing issues.

CW: What composite and material combinations do you think have the greatest potential for automotive, and why?

GJS: I don't think there is a clear answer

to this question, in part because there is so much development still required from a material and process perspective in the composite, aluminum and steel industries. Composites have challenges being the primary structural load path for vehicles and require a higher ductility metal to

The composite body strategy used for the new, seventh-generation Corvette resulted in a 15-25 percent reduction in mass compared with the previous generation, and its doors have surface contours that cannot be stamped out of metals.

facilitate energy absorption, so bonding composites to high-strength/high-ductility steel and aluminum is an attractive combination from a performance standpoint.

The next big frontier is structural carbon fiber, but many challenges must be addressed, including lower-cost processes

to produce the carbon fiber material as well as lower-cost manufacturing processes, faster cycle times, and predictive modeling. No high-volume application of carbon fiber in the dominant load path has been done to date.

CW: What advice do you have for composites fabricators who seek greater involvement in the automotive supply chain?

GJS: GM would be happy to engage with composites fabricators who can meet automotive requirements. We have a number of partners in this area and are always looking for more opportunities to collaborate on advanced materials that will help take weight out of the vehicle. We also do pre-competitive research on these technologies with the USCAR partners through the Automotive Composites Consortium. I would suggest working with Global Purchasing and Supply Chain to introduce your capability and then become part of the bidding process on future components. You should also reach out to technical leaders so they are aware of your capability. One key to getting GM's attention is to clearly communicate the value or uniqueness that you bring as a supplier and to quantify that value. 📌



SAMPE Inducts 2015 Class of Fellows

SAMPE presented its Global Fellow Awards on Monday night to five recipients. The SAMPE Global Fellow Award recognized SAMPE members for distinguished contributions in the fields of materials and processes. Recipients have demonstrated achievements in production, manufacturing, management, design, development, research or education. In 33 years, 147 members have been recognized as SAMPE Fellows. The ceremony was held at the Omni Dallas Hotel in the Trinity Ballroom, 6 – 8 p.m.

The 2015 Class of Fellows are:

Dr. John W. Gillespie, Jr., director of the Center for Composite Materials at the University of Delaware (Newark, Delaware). Gillespie has made life-long contributions to the advancement of the science and engineering of composite materials through the education of students and development and transition of composite technology to industry.



Sakuya Iwai, president of Tokyo Technologies (Tokyo, Japan). Sakuya Iwai has been a leader for the market development of high performance pitch-based CF, mainly for the space market. He developed



a very lightweight “spread fabric” for application to satellite parts. He led the pitch-based CF to be one of the key materials for advanced composite products. His many contributions

are not only for the SAMPE Japan Chapter. Iwai has contributed to the globalization of SAMPE over the last three years.

Dr. Anoush Poursartip, professor at The University of British Columbia and Director of Research at Convergent Manufacturing Technologies (Vancouver, BC, Canada). Poursartip has been the driving force for the continuous development of simulation tools to meet the needs of DoD, NASA and OEMs/Tier I companies. These tools were specifically for the design, development, manufacturing and interaction of composite materials, tooling and hardware. His work is best illustrated by the use of simulation tools with The Boeing Co. over the entire lifetime of the 787's development. His tools are used to design composite manufacturing simulation technology that models the curing of large composite components of 787 PAX.



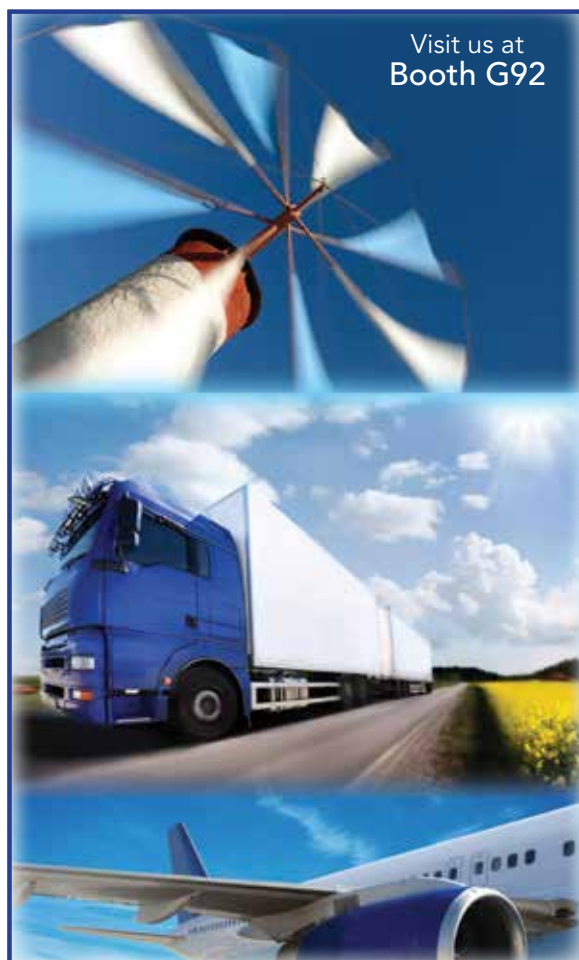
Dr. Donald W. Radford, professor of



Mechanical Engineering and the director of the Composite Materials, Manufacture and Structures Laboratory at Colorado State University (Fort Collins, Colorado). Radford

has demonstrated significant contributions to the advanced materials industry through his commitment to the development of several generations of composites students and professionals, through meaningful research and development in composites processing, and through his many years of work at multiple levels of SAMPE.

Dr. Katie E.G. Thorp, chief of the Soft Matter Materials Branch at the Air Force Research Laboratory, Wright-Patterson Air Force Base, (Dayton, Ohio). Thorp is a key leader in the development of advanced materials for the United States Air Force. Her leadership in polyimides led to increased turbine engine and test aircraft/aerospace structural performance. Her educational outreach advocacy promotes future material scientists and engineers. Her vision of SAMPE growth and strategic positioning facilitated its foundation for growth and globalization. ✉



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Award-Winning Technical Papers Presented at CAMX

The 2015 CAMX Steering Committee has selected this year's CAMX Technical Paper Award winners. Each awardee has addressed critical areas important to the composites and advanced materials industry from business, applications and research perspectives. Here is a listing of the award-winning papers and when they are scheduled to present during CAMX 2015:

- Ferrie van Hattum, Saxion University of Applied Sciences: *Effect of Overlap Length on the Mechanical Properties of Flake Reinforced Thermoplastic Composites*. **Tuesday, Oct. 27 | 2:00 – 2:25 p.m. | D171**
- Shawn Walsh, Army Research Laboratory: *Autonomous Systems: Driving Composite Materials in a New and Disruptive Direction*. **Tuesday, Oct. 27 | 4:00 – 4:25 p.m. | D161**
- Kara Storage, Air Force Research Laboratory, RXSA: *An Evaluation of Test Methods for Determining Adhesive Shear Stress-Strain Properties*. **Tuesday, Oct. 27 | 4:30 – 4:55 p.m. | D172**
- Stephen Brooks, Reichhold, LLC: *The Effect of Fracture Toughening a Thermoset Resin on the Fracture Toughness of a Fiber-Reinforced Laminate*. **Wednesday, Oct. 28 | 9:30 – 9:55 a.m. | D170**

- Christopher Childers, The Boeing Company: *Molecular Dynamics Simulation Procedure to Predict Thermoplastic Solubility and Phase Separation Behavior in a Thermoset*. **Wednesday, Oct. 28 | 3:00 – 3:25 p.m. | D174**
- Ruifeng Liang, West Virginia University: *Evaluation and Implementation of FRP Shapes for Lock and Dam Structures*. **Thursday, Oct. 29 | 9:00 – 9:25 a.m. | D174**
- David Olawale, Nanotechnology Patronas Group, High-Performance Materials Institute, Florida State University; Fa.m.U-FSU College of Engineering: *Triboluminescent Composite with In-situ Impact Sensing Capability*. **Thursday, Oct. 29 | 10:00 – 10:25 a.m. | D167**
- Hui Yu, New Functional Polymers, LLC: *New DCPD Based Resins for Low Cost Composites*. **Thursday, Oct. 29 | 11:00 – 11:25 a.m. | D170**
- Jay Feldman, ERC, Inc. – NASA Ames Research Center: *Development of an Ablative 3D Quartz / Cyanate Ester Composite for the Orion Spacecraft Compression Pad*. **Thursday, Oct. 29 | 3:00 – 3:25 p.m. | D163**
- Darshil Shah, University of CambridgeSilk for Light: *Weight Syntactic Foams and Tough Textile Composites*. **Thursday, Oct. 29 | 4:30 – 4:55 p.m. | D165** 🏆

Catch a Shuttle Bus

CAMX provides transportation to and from CAMX hotels to all attendees and exhibitors. The shuttle bus stops are located in the main bus drop off area on Ceremonial Street (Level 1) near D100 conference program rooms. If you require an ADA shuttle bus or would like additional information, call 310-466-4699. (Call at least 30 minutes prior to desired pick-up time if an ADA bus is required.)

Hotel	Route
Hyatt Regency Dallas	1
Sheraton Dallas	2
Crowne Plaza Dallas Downtown	3
Homewood Suites Dallas Downtown	3
Springhill Suites Dallas Downtown	3

Hours of Service*

Tuesday, Oct. 27

7:00 – 10:00 a.m.; every 10 – 15 minutes

10:00 a.m. – 3:00 p.m.; every 30 minutes

3:00 – 6:30 p.m.; every 10 – 15 minutes

Wednesday, Oct. 28

7:00 – 10:00 a.m.; every 10 – 15 minutes

10:00 a.m. – 3:00 p.m.; every 30 minutes

3:00 – 7:30 p.m.; every 10 – 15 minutes

Thursday, Oct. 29

7:00 a.m. – 2:00 p.m.; every 10 – 15 minutes

2:00 – 6:00 p.m.; every 30 minutes

*Last bus leaves from hotel 30 minutes prior to end time with no return service.

ACE AWARDS, continued from page 3

production system for industrial scale manufacture, intended to meet market demand for high performance composites in consumer products, infrastructure, automotive and aerospace. NanoStitch delivers the mechanical and conductivity enhancement that VACNTs are known for, at large scale for the first time.

Kingetics has developed orthotic systems for advanced combat and construction safety boots. The systems enhance the end user by increasing foot-wear puncture-, blast- and fire-resistance. They also increase the energy efficiency of



This orthotic system enhances safety and user experience for combat and construction boots.

gait with a spring lever orthotic and prosthetic mechanism.

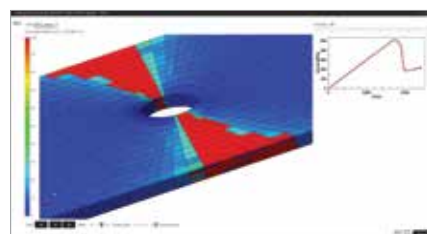
Strongwell's pultruded fiberglass DURAGRID HD-4000 2.5-inch grating panels are installed as a trench cover at the Utah State University Electric Vehicle and Roadway (EVR) research facility in



These grating panels are installed as a trench cover for a system that can charge electric vehicles in motion.

Logan, UT. The EVR serves as the vehicle systems integration facility for the Center for Sustainable Electrified Transportation. Magnetic transfer plates are housed beneath the grating, which charges electric vehicles in motion. DURAGRID HD-4000 provides support for vehicle loadings while protecting the magnetic transfer charging plates on the electrified quarter-mile test track.

e-Xstream engineering's Digimat-VA is simulation software that cuts time and cost



Simulation software cuts time during generation of material allowables values.

during the generation of material allowable values. It provides multiscale material modeling and finite element modeling techniques enabling engineers to generate hundreds of coupon simulations and obtain virtual allowables at a fraction of the usual cost and time.

Owens Corning has developed pultruded glass-reinforced composite rebar (vinyl ester resin and Owens Corning's Advantex glass) to replace epoxy-coated steel in concrete. The presence of chlorides in seawater prevents its use for concrete



Pultruded glass-reinforced composite rebar replaced epoxy steel in concrete.

production as it causes the depassivation of steel rebar, leading to premature corrosion. The composite rebar will allow the construction industry to produce cement and concrete without chloride limits, offering advantageous sustainability benefits such as the re-use of ash by-products.

Winners will be announced today at 2:30 p.m. in the ACE pavilion. 🏆

Product News at CAMX 2015

Airtech Advanced Materials: Infusion Molding Supplies

Airtech Advanced Materials (Huntington Beach, CA) is featuring several products for infusion-based molding processes in its booth. Premium Multi-Valve 408 has a solid body design that combines the male quick-disconnect and thru-bag connector. It eliminates threaded connections and potential leak paths. Stainless steel construction ensures corrosion resistance and long life. High-temperature O-ring and platinum cured silicone gasket give a long service. It is interface-compatible with Parker Snap-Tite 0.25-inch style quick disconnects. The valve mechanism and O-ring seals can be replaced to extend life. BBH 1080 Hose is a durable high-temperature and high-pressure autoclave hose. The hose construction consists of an inner flexible stainless steel conduit overwrapped with a stainless steel braid. A stainless steel armor jacket covers the hose and protects it from the harsh autoclave and production environment. Airflow 100 Armor Sleeve is a durable high-temperature and high-pressure autoclave vacuum hose. The hose construction features an outer steel armor

jacket protecting the braided steel which holds a PTFE inner tube supported by a flexible steel spring conduit. This design prevents collapse from vacuum or autoclave pressures. It is also available with a 90° fixed end fitting on one or both ends. Econobreaker 2R is an inexpensive, multi-purpose, rubber adhesive pressure-sensitive tape. This tape is ideal for holding down vacuum bagging materials, thermocouples and other layup items. Econobreaker 2R is suitable for room-temperature applications and heat cures to 177°C. Vac-Gauge 40D is a versatile digital vacuum gauge used for leak detection and vacuum determinations under the vacuum bag. The gauge offers vacuum readings in four selectable units: mBar, mmHg, inHg, and Kpa. Airtech Vacuum Test Unit is a compact, lightweight and easy-to-use device that can be used to test in-service equipment or to check equipment that has undergone maintenance like seal replacements on vacuum valves or end-fitting replacements on vacuum hoses.

Airtech Advanced Materials, Booth S76



Montalvo: Web Tensioner

Web tension control specialist Montalvo (Gorham, ME) is showcasing its new Modular Automated Tensioner (MAT) and Automated Tensioning Stand (ATS) units. Designed for applications running multiple strands (via creels, rovings, etc.) of composite materials, the MAT and ATS systems are drop-in units for existing and new applications



that create a high-performance and reportedly cost-effective tension zone prior to the material being processed. This new tension zone allows every strand of composites

material to be precisely tensioned, automatically and continuously, throughout a production run, ensuring reduced waste and higher quality end product. Applications include hand layup, filament winding, pultrusion and prepreg processes.

Montalvo, Booth F92

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Product News at CAMX 2015

Coastal Enterprises: Tooling Board

Coastal Enterprises (Orange, CA), a manufacturer of Precision Board high-density urethane tooling board, is featuring two new products in Booth G57. Updated Precision Board with higher physical properties and improved machining characteristics is said to hold edges better and provide smoother tapers. Chip loading has also been improved, allowing concise speed and feed control. Samples are available at Coastal's booth. New custom, machinable, Precision Board filament winding mandrels are now available in any square size. These

custom mandrels enable producers of filament-wound tanks and cylinders to more easily accommodate last-minute design changes and help reduce machining time on prototype or low-volume projects. The center shaft is molded into the mandrel during manufacture, which Coastal says eliminates twisting or turning of the shaft during winding. Coastal does not charge for engineering the mandrel design.

See a small-scale example of a custom-made mandrel in Coastal's booth.

Coastal Enterprises, Booth G57



Wisconsin Oven: Batch-Curing Ovens

Wisconsin Oven Corp. (East Troy, WI) is featuring its line of electrically heated, gas-fired and indirect gas-fired composite curing batch ovens. Features include data acquisition instruments, vacuum piping, pumps and transducers. All equipment is designed for combination airflow arrangement, which ensures even and uniform heat distribution throughout the work chamber and provides quicker heating rates and recovery times. Wisconsin Oven's composite curing ovens are typically guaranteed and certified for $\pm 10^\circ$ at 350°F temperature uniformity. Tighter

tolerances and certification at other temperatures are available. Equipment is completely tested prior to shipment and must pass a 154-point quality inspection.

Wisconsin Oven also supplies ovens for a variety of applications including finishing, heat-treating and solution-treating.

Wisconsin Oven Corp., Booth P74



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Product News at CAMX 2015

Hexcel: Carbon Fiber, Tooling Material, Core

Hexcel (Stamford, CT) is featuring several products, including HexSHIELD, Acousti-Cap, HexTOOL, HexPly and HexTow. HexSHIELD is new honeycomb technology that provides high-temperature resistance in aircraft engine nacelles. By inserting a thermally resistant material into honeycomb cells, HexSHIELD is said to provide a core product with unique heat-shielding capabilities that allows for the potential reuse of material after a fire at 1,093°C. This product builds on Hexcel's history of heat-resistant honeycombs including HexWeb HRH-327, with temperature resistance up to 260°C. Acousti-Cap, Hexcel's broadband noise-reducing honeycomb, has resulted in multi-degree of freedom (MDOF) liners that bring significant improvements in acoustic absorption capabilities in aircraft engine nacelles. The acoustic treatment may be positioned at a consistent depth and resistance within the core, or can be placed in a pattern of varying depths and/or resistances, offering an acoustic liner that is tuned to engine operating conditions. Acousti-Cap has been tested at NASA on a full engine test rig and met all 16 design conditions without trade-offs. An example of this new technology is on display in Booth U74. Hexcel is also displaying tooling made from



HexTOOL M61, which is used to make CFAN fan blades for the GE90 and GENx engines and is manufactured by Sawyer Composites. Visitors can also see carbon fiber composite automotive body-in-white (BIW) parts made with HexPly M77 preforms from Hexcel's automated process. The preforms' low tack allows for automated handling by the customer. They require no surface preparation and are designed for one-step bonding and curing in a press,

requiring no finishing operations. Common BIW part joining technologies such as welding can be used, and the parts are compatible with e-coating processes. Building on the attributes of HexPly M77, Hexcel reports that it has now installed a fully automated production line in Austria that converts UD prepreg into 2D preforms in just seconds. The process allows prepreg plies of different weights and orientation to be combined in the same plybook and includes automated cutting, camera-assisted ply positioning and integration of adhesive and automated packing. In addition to product displays, Hexcel is promoting its new Prepreg Resin Selector app. This app focuses specifically on the prepreg products that Hexcel develops and supplies for aerospace and industrial markets. The app allows users to select the best prepreg resin for their application, based on market and application, cure temperature and maximum service temperature (T_g). The app also allows the user to view the full range of Hexcel's prepreg resin data sheets. The new Hexcel app is available for download free of charge to all users through the Apple iTunes Store (search, Hexcel Prepreg Selector). [Hexcel, Booth U74](#)

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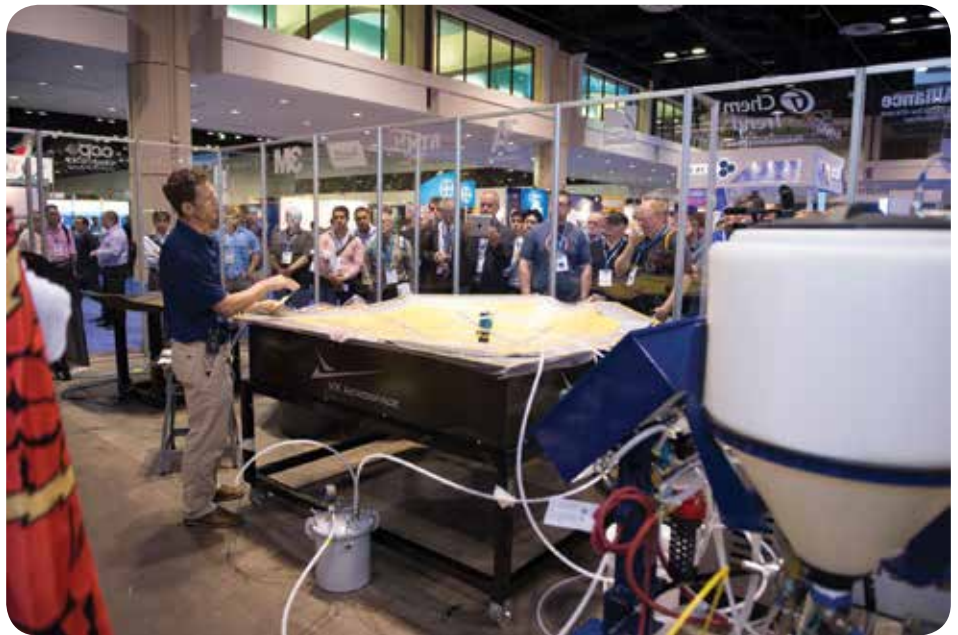
Stop by our booth at CAMX (Booth T112) to see VectorLam Cirrus 2.0!

Product News at CAMX 2015

Composites One: Closed Molding Systems

Composites One (Arlington Heights, IL) is featuring live closed molding and advanced process demonstrations, along with high-performance products in Booth Q94.

Composites One and the Closed Mold Alliance are presenting the Lean Mean Process Machine demonstration live on the exhibit hall floor. This year, the event called Lean Mean Process Machine — REDUX features a three-day event with more than 20 process demos in a massive enclosed staging area, building real-world parts, from aerospace nose cones and mini nacelles, to marine dashboards and the coolest long boards. Exhibits include a light resin transfer molding (LRTM) work cell and a time-lapse video showing a 3D-printed mold going from concept to reality in just hours, vacuum infusion, reusable silicone bag molding, and prepreg solutions. The prepreg parts are being cured using a large oven supplied by Wisconsin Oven. Products featured in the demonstration are provided by partners 3A Composites, AOC, Airtech International, Arkema, Ashland,



Chem-Trend, Chomarat, ITW Plexus, Huntsman, Magnum Venus Plastech, Owens Corning, Polynt Composites, Scott Bader, Stratasys, Sworl,

United Initiators, Vectorply, Raush Performance, Janacki Industries and RTM Solutions.
[Composites One, Booth Q94](#)

EconCore: Thermoplastic Core

EconCore (Leuven, Belgium) is emphasizing its patented ThermHex technology for continuous production of thermoplastic honeycomb sandwich materials. The ThermHex process consists of integrated steps of vacuum forming extruded film to a pattern, mechanical folding to honeycomb core structure, and lamination of skin material to the core. The ThermHex process is able to accommodate a wide range of thermoplastics to produce honeycomb core. PP is the most widely used, but PET, PA, PC, PLA, PPS, PVC, PMMA and others are also possible. Versatility regarding skin materials is equally broad, including thermoplastics, thermoplastic composites of glass fiber, carbon fiber, natural fiber, thermoset composites, steel, aluminum, wood, and more. ThermHex is used to produce sandwich materials for applications ranging from reusable packaging, automotive, transportation, building and construction, marine, graphical displays and others. EconCore is showcasing a



number of sandwich materials produced today by its licensees. The company is also stressing its ability to integrate finishing steps such as decorative or UV protection layers. Post-processing operations such as thermoforming can also be integrated in production process for final part. One example highlighted in Booth Z74 is an interior door panel (see photo) made using ThermHex process converting pellets to film, film to core, and in-line laminating of natural fiber skins to make sandwich panel. Decorative textile layer and thermoforming to final part shape may be integrated on commercial scale.
[EconCore, Booth Z74](#)

Matrix Composites: Out-of-Autoclave Molding

Matrix Composites (Rockledge, FL) is emphasizing its Hot Isostatic Resin Pressure Molding (HiRPM) process, an out-of-autoclave system designed for composite mold and composite part fabrication. HiRPM, says Matrix, offers ± 0.003 -inch dimensional repeatability, eliminates shimming processes in bonded assemblies, provides precise IML and OML profile controls, eliminates debulking, is compatible with qualified materials, and produces laminates with validated content of less than 0.5%. It's suitable for integrating multiple parts into a single assembly, offers minimal post-mold machining, can be easily customized and is well suited for the fabrication of radomes, spars, aero control surfaces, complex geometries and critical edges.
[Matrix Composites, Booth Y87](#)



Abaris Training Resources: Manufacturing and Repair Courses

Abaris Training Resources Inc. (Reno, NV) is showcasing its updated engineering, manufacturing and repair courses in Booth K59, covering the latest in advanced composite technologies. In addition, Abaris is now offering carbon fiber automotive structural repair training at its Reno facility, with two intensive courses designed to meet the specific needs of the emerging composite automotive

industry. Abaris Senior Engineering Instructor Dr. Rikard Heslehurst is giving a pre-conference tutorial, titled "Composite Structures Joint Design Technology." Lou Dorworth, Abaris direct services manager, is also participating in the Workforce Development & Technologies session panel on training, life-long learning and the next-generation work force.
[Abaris Training Resources Inc., Booth K59](#)

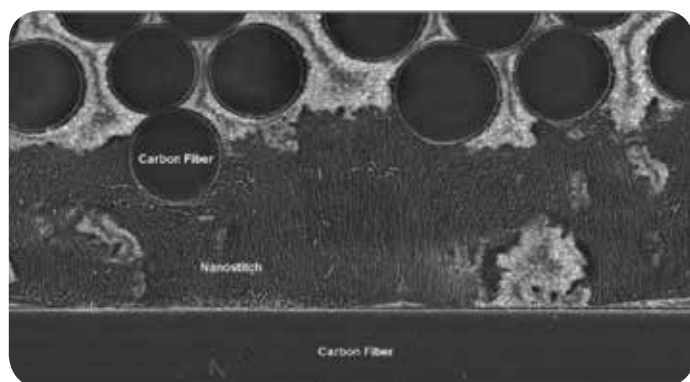
Product News at CAMX 2015

N12 Technologies: Vertically Aligned Carbon Nanotubes

Nanotechnology specialist N12 Technologies Inc. (Cambridge, MA) has commercialized a Massachusetts Institute of Technology (MIT)-licensed technology, called NanoStitch, to become the world's first manufacturer capable of industrialized, continuous vertically aligned carbon nanotube (VACNT) production. N12 is featuring this patented Z-axis mechanical enhancement technology in Booth S123. Via NanoStitch, nano-sized fibers can be "grown" perpendicular to and on the surface of a carbon fiber prepreg, conveying to the prepreg surface a z-direction bonding point that substantially

increases interlaminar shear strength (see photo). N12 says shear, fracture, compression and fatigue performance of composite materials can be significantly enhanced by NanoStitch. N12 is scaling manufacturing capacity, testing materials for multiple OEM programs and collaborating with the world's leading prepreg composite suppliers to develop a full range of certified NanoStitch-enhanced fibre/resin systems. The company is also developing NanoStitch-enhanced products compatible with resin infusion techniques, thermoplastics and adhesives. N12 says it has more than 100 OEMs

globally exploring and testing its technology and have now committed the capital through 2018 and beyond to build industrial-scale NanoStitch manufacturing capacity. [N12 Technologies Inc., Booth S123](#)



Sunstrand: Natural Fibers

Sunstrand (Louisville, KY) is a manufacturer of natural fibers for polymer composite reinforcement and plastic fillers. All Sunstrand products and processes, says the company, have been designed to deliver consistent, high-quality fibers that are compatible with typical composite manufacturing processes. The team has developed architectures to service a variety of industries including automotive, sporting goods, building materials, consumer products, and marine. CEO and Founder of Sunstrand, Dr. Trey Riddle, is leading an educational session: "Assessment of Composite Properties Utilizing Short Discontinuous Natural Fibers" today—Oct. 27th at 2:00 p.m.

[Sunstrand, Booth H119](#)



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Product News at CAMX 2015

Victrex: Thermoplastic Overmolding Materials

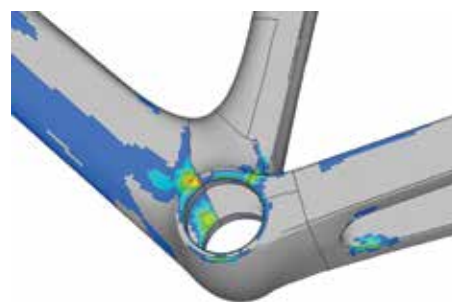
Victrex (Thornton Cleveleys, UK) is featuring its hybrid molding technology that allows



engineers to overmold a PAEK-based composite with fiber-reinforced PEEK injection molding materials. This polymeric advancement enables the design of stronger, lower cost components that are up to 60% lighter than typical metal and thermoset systems. Victrex and Tri-Mack Plastics Manufacturing Corp. (Bristol, RI, US) have cooperated to engineer an aerospace bracket using this new polymer and technique with the demanding performance requirements of loaded applications in mind. The bracket is available for viewing in the Victrex Booth ZA92. [Victrex, Booth ZA92](#)

Altair: Design Analysis and Optimization

Altair (Troy, MI) is emphasizing its tools and expertise for analyzing and optimizing composite structures. Several application case studies are highlighted in Booth J120 including carbon fiber bicycles, America's Cup racing yachts, automotive composites, prosthetic devices, and aerospace composites. Altair is also presenting a paper authored by Jeffrey Wollschlager on the application of Altair's design optimization technology in OptiStruct to create a super lightweight but strong composite beam. In addition, Altair is introducing its newly acquired technology from MultiScale Design Systems (MDS), which includes solutions for micromechanics, microstructural optimization and life prediction of complex materials. The company's technology integrates modeling, simulation, testing, uncertainty quantification and optimization of composite materials and structures at multiple spatial and temporal scales. Altair is also highlighting its set of Altair Partner Alliance (APA) solutions for composite analysis and design. These tools are offered by third parties and accessible under the Altair HyperWorks licensing system. Composite design products available in the APA offering include solutions for structural analysis, micromechanics modeling, failure modeling, complex stress analysis, material databases, injection molding analysis and mapping of material data from injection molding simulation of fiber-reinforced plastics. [Altair, Booth J120](#)



McLube Div. of McGee Industries: Release Agents

The McLube Division of McGee Industries Inc. (Aston, PA) is featuring its line of release agents for high-performance composites fabrication processes. These coatings, says McLube, address key concerns within the industry, including gloss, reduced VOC emissions, improved part appearance, abrasion-resistance and multiple pulls per application. McLube's products include water- and solvent-based releases and anti-tack coatings, and a full line of oils, greases and dry film lubricants. [The McLube Division of McGee Industries Inc., Booth X106](#)

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See it LIVE at Booth #S94

Presented LIVE by Composites One, the Closed Mold Alliance and our industry partners

