



AUTOMOTIVE PLASTICS NEWS

A PUBLICATION OF THE AUTOMOTIVE DIVISION OF THE SOCIETY OF PLASTICS ENGINEERS

SEPT/OCT 2018
VOL 48, ISSUE 1

Automotive Composites Conference & Expo (ACCE) is Growing Strong with Enhanced and Expanding Programs

The 18th annual Automotive Composites Conference & Exhibition (ACCE), organized by SPE's Automotive and Composites Divisions, was the best one ever! Every area of the event showed growth and improvement enhancing the program's mandate to educate the global transportation composites supply chain on the latest developments in polymeric materials, process, machinery and applications. Known as "The World's Leading Automotive Composites Forum," the conference is continuously improving and advancing the industry.

Great direction and leadership was provided from ACCE Co-Chairs, **Dr. Alper Kiziltas**, *Lead Research Scientist, Ford Motor Company* and SPE Automotive Division Education Committee Chair and **Matthew E. Carroll**, *Materials Engineering, General Motors Company* and recent SPE Automotive Div. Chair. Having two OEMs chair the event is a testament to the increased and growing interest OEMs have in composites for automotive applications.

Continued on page 8

18th-Annual



AUTOMOTIVE
COMPOSITES
CONFERENCE
& EXHIBITION

World's Leading Automotive Composites Forum

SOCIETY OF PLASTICS ENGINEERS
AUTOMOTIVE & COMPOSITES DIVISIONS

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AUTOMOTIVE

**MEETING SCHEDULE &
SPECIAL EVENTS CALENDAR**

IAG Parts Nomination Deadline September 15, 2018

First Round - Automotive Innovation Awards Judging

Celanese Corp. 8:00 a.m.- 5:00 p.m.
Auburn Hills, MI USA September 27-28, 2018

**Second Round / Blue Ribbon - Automotive
Innovation Awards Judging**

Celanese Corp., Auburn Hills, MI USA 8:00 a.m.- 5:00 p.m.
October 5 2018

20th-Annual SPE TPO Automotive

Engineered Polyolefins Conference (TPO) ALL DAY
Detroit-Troy Marriott, Troy, MI USA October 7-10, 2018

SPE Auto. Div. Board Meeting

American Chemistry Council - Auto. Ctr. 5:30 - 7:30 p.m.
Troy, MI USA October 15, 2018

48th-Annual SPE Automotive Innovation Awards Gala

Burton Manor 5:00-11:00 p.m.
Livonia, MI USA November 7, 2018

SPE Auto. Div. Board Meeting

American Chemistry Council - Auto. Ctr. 5:30 - 7:30 p.m.
Troy, MI USA December 10, 2018

Automotive Division Board of Directors meetings are open to all SPE members. All events are listed on our website at

<http://speautomotive.com>

Email Dave Helmer at

auto-div-chair@speautomotive.com for more information.



**INSPIRING
PLASTICS
PROFESSIONALS**

CHAIR'S WELCOME

Dave Helmer, SPE Automotive Division Chair



AUTOMOTIVE



As you may know, Matt Carroll stepped down as Chair of the Society of Plastic Engineers Automotive Division. So first and foremost I would like to thank Matt for his two years of service as Chair and look forward to his guidance as I assume that role. Matt will continue to support the Automotive

Division as Past Chair. Other committee changes as of June are Steve Van Loozen taking over the Newsletter role and Samar Teli taking over the Membership role. Thank you to Steve and Samar for taking those roles and again thank you to Matt for his continued support.

As always in the fall, SPE has many exciting events planned. First, the Automotive Division Annual Golf Outing was held on September 4th 2018 at Fieldstone Golf Course. Second, the ever growing Automotive Composites Conference and Exhibition (ACCE) was held September 5th through the 7th at Suburban Collection Showplace in Novi. Third, the 20th Automotive Thermoplastic Polyolefins (TPO) Conference will be held October 7th through the 10th at the Troy Marriott. Fourth, the Innovation Awards Gala will be held on November

7th at Burton Manor in Livonia. Thank you to the numerous volunteers who make these great events for learning and networking. For more details on attending any of the events, please go on our website <http://speautomotive.com/> and go to the events link – we hope to see you there.

On a sad note, Ron Price recently passed away on June 13, 2018. Ron was extremely active member of the SPE Detroit Section, Automotive Division, and was one of the founding members of the TPO Conference. I had the privilege to work with Ron through the TPO conference. He will truly be missed and our thoughts and prayers are with his family and friends. We honored Ron Price through a Celebration of Life Reception at the Troy Marriott on Monday September 17th 2018 from 6pm to 9pm. Thank you to all who attended.

Well as the new Chair, I hope to build on the past success at the Automotive Division by continuing to provide value to the Plastics Automotive community through our board, many events, and scholarship opportunities. At any time if you have ideas on how to make our division better or would like to volunteer, do not hesitate to contact me at auto-div-chair@speautomotive.com.



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Celebrating the Life of Ron Price



RONALD F. PRICE age 79, of Orchard Lake, Michigan and Bonita Springs, Florida, passed suddenly Wednesday, June 13, 2018 in his home in Michigan. Born on May 25, 1939, son of Colonel Franklin Price and Sadie Mae (nee. Lane) Price. Devoted husband to Marilyn Michele (nee. Bilaitis) and loving father to R. Todd, Susan Price Huber (Randy) and Jason. Brother to Hugh (Helen) Price, Philip (Rita) Price and Art Price.

A graduate of Greensboro High School and North Carolina State. Ron received a degree in Business Management and Marketing and completed further studies at Columbia University.

Ron had an outstanding career for over 45 years that spanned the globe in Automotive Plastics with Borg Warner, Exxon Chemical and Huntsman. He retired from corporate life and became a successful consultant and expert in the industry. He was the founder and avid supporter of and contributor to the SPE Global TPO Conference for over 20 years.

Ron had a passion and exuberance for life. He loved airplanes and was a single engine and glider pilot. An avid sportsman, Ron's passions included: boating, kayaking, hunting, skiing, golf, and most recently pickle ball. Ron had an amazing sense of rhythm and was known as a terrific dancer. His greatest joy was connecting with people making each and every one feel treasured and loved. He will be greatly missed by his family and friends. Ron persevered in all aspects of his life and encouraged his loved ones to do the same. He was a Southern Gentleman and a Man of True Grit.

Family and friends gathered to honor Ron and share memories of him on Thursday, June 28th at Kirk in the Hills Presbyterian Church.

For the plastics community, **the Ron Price Celebration of Life Reception** was held on Monday September 17, 2018, sponsored by the SPE Detroit Section, Automotive Division and the TPO Conference as a tribute for Ron's incredible passion for growth of the SPE. Memories and/or stories regarding Ron's life were shared by his "plastics buddies". Charitable donations may be made to South Oakland Shelter.

20
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**ATTEND THE WORLD'S LEADING
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Now celebrating its 20th year, the show is the world's leading automotive engineered polyolefins forum featuring 60+ technical presentations, keynote speakers, networking, receptions, & exhibits that highlight advances in polyolefin materials, processes, and applications technologies as well as a growing range of thermoplastic elastomers (TPEs) and thermoplastic vulcanizates (TPVs). This year's show will be held **Oct. 7-10, 2018** at the Troy-Marriott (Troy, Michigan) in the suburbs of Detroit.

**PRESENT TO THE LARGEST GROUP
OF DECISION MAKERS IN AUTOMOTIVE
ENGINEERED POLYOLEFINS**

The SPE TPO *Automotive Engineered Polyolefins Conference* typically draws over 900 attendees from 20 countries on 4 continents who are vitally interested in learning about the latest in rigid and elastomeric TPO as well as TPE and TPV technologies. Fully a third of conference attendees work for a transportation OEM, and nearly 20% work for a tier integrator. Few conferences of any size can provide this type of networking opportunity or put you before such an engaged, global audience interested in hearing the latest olefin advances. Interested in presenting your latest research?

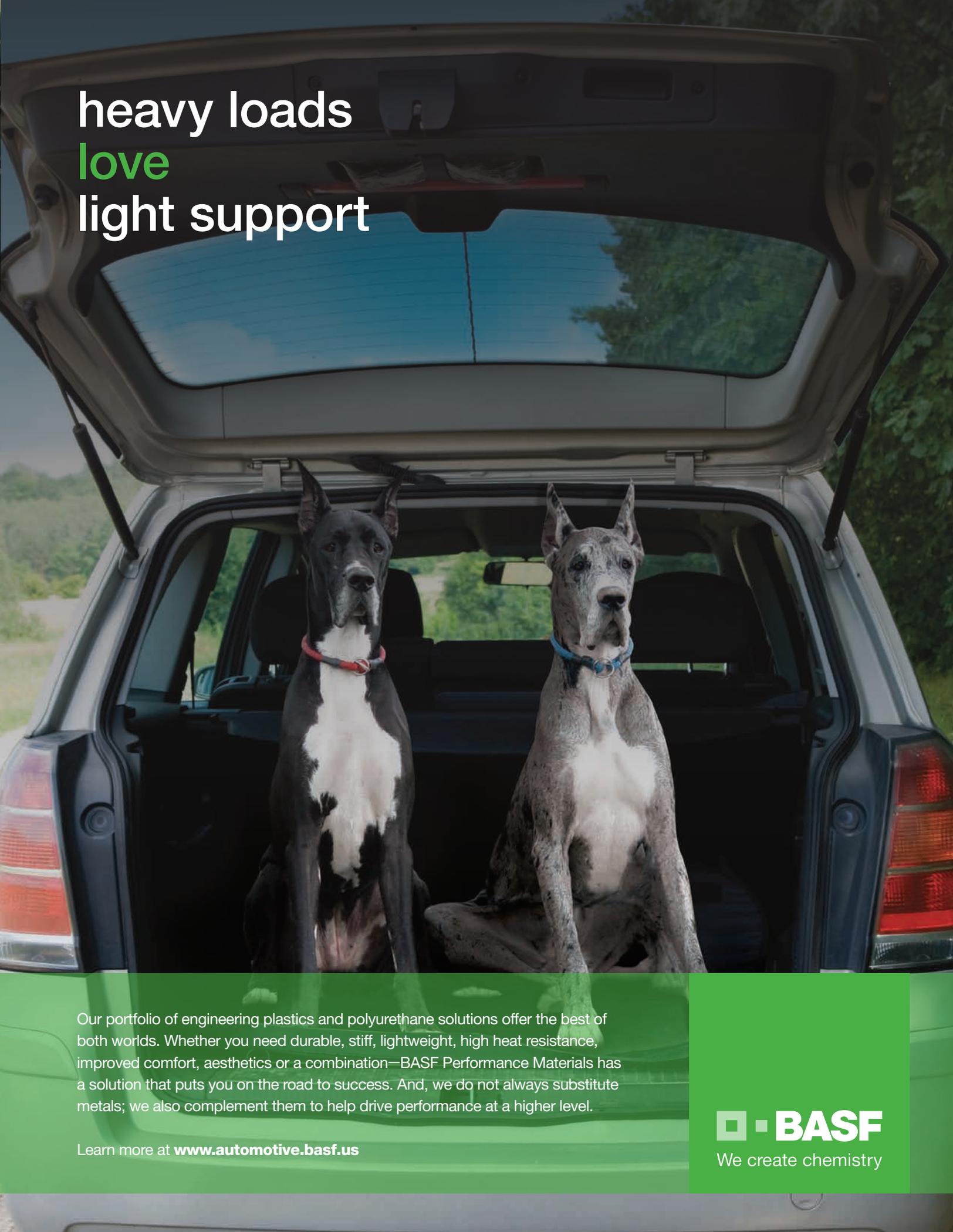
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A photograph of two Great Danes sitting upright in the back of a car with the trunk open. The dog on the left is black and white, wearing a red collar. The dog on the right is grey and white, wearing a blue collar. The background shows a green landscape and a clear sky.

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AUTOMOTIVE & COMPOSITES DIVISIONS



by Teri Chouinard,
SPE Automotive Div. Communications Chair

ACCE continued from Cover Page 1

ACCE CONFERENCE CO-CHAIRS

MATT CARROLL is a registered Professional Engineer and has a BS and an MS in Chemical Engineering. Matt started his career with stints at a BASF Paint Plant, a Huntsman Polymer Plant and with a Chicago area plastics machinery manufacturer.

Since 1994, Matt has worked at General Motors in Materials Engineering and as a Vehicle Systems Engineer. Currently, Matt is the Engineering Group Manager in Materials for Body Exterior and Electrical at GM. He has 16 Conference papers and presentations and is the Past Chairman of the SPE Automotive Division.



DR. ALPER KIZILTAS's research is focused on sustainability and emerging materials such as nanomaterials, polymeric and soft materials, biomaterials, glassy and amorphous materials, self-healing materials and bio-inspired and patterned functional materials. He received

his M.S. and Ph.D. from the University of Maine. He holds a bachelor's degree from Karadeniz Technical University (KTU). He has published over 55 peer-reviewed articles and papers in leading journals and conferences in his field, and regularly serves in organizational leadership roles for the SPE (ACCE TPO, Automotive Division), Thermoplastic Elastomer Summit and Advancements in Fiber-Polymer Composites Symposium. He is the recipient of the SPE-ACCE best professional paper award and holds 7 patent disclosures.



95 PRESENTATIONS ON THE LATEST AUTOMOTIVE COMPOSITES TECHNOLOGIES

This year's technical program included 95 presentations (the 2017 event included 80 presentations) on the latest advancements in thermoplastic and thermoset composites, enabling technologies, reinforcement materials, additive manufacturing and 3D printing, nanocomposites, carbon composites, virtual prototyping and testing, bonding/joining/finishing, and sustainable composites. A fifth track was added to accommodate the additional presentations (the 2017 event had 4 tracks, the 2016 event had 4 tracks but only 3 on the last day). Technical Program Chairs **Dr. David Jack**, *associate professor, Mechanical Engineering at Baylor University* and **Dr. Leonardo Simon**, *professor, Chemical Engineering at Waterloo University* vetted the paper submissions and enhanced many of the presentations with their expertise greatly improving the quality of the program.

ACCE TECHNICAL PROGRAM CO-CHAIRS



DR. DAVID JACK holds five undergraduate and graduate degrees across the fields of Physics, Mathematics and Mechanical Engineering, each while maintaining a 4.0 GPA. In his career David was awarded \$3,500,000 as P.I. and \$975,000 as co-PI in research funding (of which \$850,000 is tuition cost matching) and has published over 25 peer-reviewed journal articles, nearly 75 refereed national and international conference articles, and three patent applications in a program that until fall of 2014 did not offer a doctoral degree. David has successfully defended over 15 master's students, has recently defended Baylor's first PhD Mechanical Engineering student, and currently advises two master's students and four doctoral candidates. Dr. Jack's expertise crosses physics-based constitutive modeling with experimental polymer characterization, providing him a rare breadth of technical capability. Dr. Jack has received funding

from the National Science Foundation, L3 – Communications, Air Force Office of Scientific Research, NASA, Hess Incorporated, Axion Structural Innovations, Delta-G Aerospace, SPE, Oak Ridge National Laboratory, and Sandia National Laboratory.



LEONARDO C. SIMON is Professor in the Department of Chemical Engineering at the University of Waterloo, in Canada. He teaches undergraduate and graduate courses in Materials Sciences and Engineering, Polymers, and Nanocomposites. He obtained both his BEng (1995) and MEng (1998) in Chemical Engineering and his PhD (2001)

in Materials Science, all from the Federal University of Rio Grande do Sul located in Porto Alegre, Brazil. He joined the University of Waterloo as a faculty member in 2002. His research areas include the synthesis, characterization and properties of polymer materials, nanocomposites and bioproducts. His research group uses nanotechnology, polymer science and engineering to develop new and enhanced plastics and composites for applications in automotive, packaging and consumer goods. In 2018 he created Polynovus Consulting to meet the demand from industrial research collaborators and deliver consulting to companies in the areas of materials and manufacturing, new technology and innovation.

ACCE '18 KEYNOTE SPEAKERS



JOHN VIERA, *Global Director, Sustainability & Vehicle Environmental Matters, Ford Motor Company*

John Viera opened the conference with a fantastic keynote presentation on **“Sustainable**

Manufacturing at Ford and How

Composites Can Help to Address Industry Challenges,” on Wednesday morning, Sept. 5. His presentation outlined the future of sustainable manufacturing at Ford and highlighted how composites, including the development of hybrid cellulose composites with International Paper and Celanese, play an important role in this effort. He also challenged everyone to be dedicated to sustainability in all areas.

(Please see March/April 2018 issue of this newsletter for more info on Viera and his presentation.)



MARK VOSS, *Engineering Group Manager Body Structures Advanced Composites and Pickup Boxes, General Motors Company*

Mark Voss delivered an outstanding keynote presentation on **“The World’s First Carbon Fiber**

Pickup Box,” on Thursday, Sept. 6, the

second day of the conference. His presentation included dramatic footage of the 2019 GMC Sierra Denali CarbonPro box withstanding impact from sledge hammers, heavy bricks and more during lab testing. The team with Continental Structural Plastics (CSP), a Teijin Company, was honored for their contributions to the project.

(Please see June/July 2018 issue of this newsletter for more info on Voss and his presentation.)

THIRD KEYNOTE ANNOUNCED



DR. JEFFREY HELMS, *Global Automotive Sales Director, Engineered Materials, Celanese*

Our own Jeff Helms presented a keynote on **“Evolving Trends in Automotive Plastics and Composites”** on Friday morning,

Sept. 7. His presentation highlighted

evolving global trends and challenges

for engineering plastics in automotive including the potential effects of increasing electrification, autonomous vehicle capability and changing ownership models on material needs and requirements. Dr. Helms also examined the past several years of the SPE Automotive Division Innovation Awards program extracting key innovation trends as seen through over 300 innovation awards nominations.

Dr. Helms received his Bachelor of Science degree in Chemistry in 1984 and his Ph. D. in Chemistry in 1988 at the University of North Carolina at Chapel Hill. In addition, Dr. Helms received his MBA from Michigan State University through the Executive MBA program in 2000.

Dr. Helms has been employed by Celanese Corporation in the Engineered Materials business since November 2008 where he is the Global Automotive Sales Director. In this role, Dr. Helms is responsible for driving and coordinating the

growth of Celanese product lines at the OEM level for Celanese priority global OEMs.

Prior to November 2008, Dr. Helms had been employed by Ford Motor Company since October 1988. He held several positions in the Ford Research Laboratory including Plastics Technical Specialist, Plastics Research Team Leader and Manager of the Materials Research and Advanced Engineering. Over this time, he led or managed projects including lightweight materials, corrosion, coating technologies, fuel cell systems, materials characterization, biomaterials and manufacturing technologies. Following his tenure in the Ford Research organization, Dr. Helms held the position of Manager, Team Value Management, Ford North American Product Creation, Manager of the Paint Material Development and Release activity in the Ford Global Paint Engineering organization and Chief Engineer of Materials Engineering, Testing and Standards in the Ford Product Development organization.

Dr. Helms is a member of the Society of Plastics Engineers, the Society of Automotive Engineers and the American Chemical Society.

ADDITIONAL PANELISTS ANNOUNCED

PANEL DISCUSSION 1

Jeffrey Helms, Celanese also participated on the first Panel Discussion on Wednesday, Sept. 5, with **Jud Gibson, DSM** and **Paul Platte, Covestro** (see June/July 2018 issue of this newsletter for bios on Gibson and Platte) on:

HOW CAN THE COMPOSITES INDUSTRY PROFIT FROM THE NEXT GENERATION OF VEHICLES?

Key areas noted included areas for composites in electrification, autonomous vehicles – with an emphasis on interior and antimicrobial surfaces, exteriors, sensors and more. The presenters also outlined how their company products can play a role enhancing future mobility.

PANEL DISCUSSION 2

Soydan Ozcan, Oak Ridge National Lab (ORNL), David F. Erb Jr., UMaine, and **Tim Schniepp, Stratasys** joined **Ellen Lee, Ford, Jeff DeGrange, Impossible Objects** and **Kara Noack, BASF** on the second panel discussion of the conference on Thursday, Sept. 6, (Please see June/July 2018 issue of this newsletter for bios on Lee, DeGrange and Noack.)

HOW 3D PRINTING IS CHANGING AUTOMOTIVE COMPOSITES BUSINESS

Lee, from Ford, led the discussion and presented an overview of Ford's current activities and future opportunities to use 3D printing on the manufacturing floor, for products and for personalization. Erb, from UMaine, described a partnership with Oakridge National Labs (ORNL) in advancing large scale additive manufacturing of forest biobased low cost composite materials as well as, cellulose base nanofibrill modified polymers and the use of high temperature mold production using advanced polymers of PEI, PPSU and PEEK for manufacturing automotive composite structural components. DeGrange, from Impossible Objects, highlighted Essentium 3D's FlashFuse™ process which is a two-part, electric welding solution that combines nanomaterial and hardware technology to harness the power of Plasma to solve the Z-Strength issue that has long plagued FDM printed parts. Schniepp, from Stratasys, described their unique 90% isotropic material. Noack, from BASF, highlighted their products that are used in 3D printed automotive applications.

SOYDAN OZCAN, Ph.D., Senior Scientist, Materials S&T Division, Oak Ridge National Laboratory Joint Associate Professor of Mechanical Engineering, University of Tennessee at Knoxville



Dr. Soydan Ozcan is the Thrust Lead for Development of Bio-Derived Polymer Composites for Additive Manufacturing at Oak Ridge National Laboratory. His research addresses the broad and vital issue of identifying novel, high-value biomaterials from biomass, and viable processes for their preparation for composite and additive manufacturing applications. He also leads the Composite Recycling Effort for Institute for Advanced Manufacturing Composite Innovation (IACMI). He facilitates

the development of composite recycling technologies and utilizing of various composite techniques to repurpose them into useful applications. Dr. Ozcan is developing manufacturing techniques and exploring new materials to improve energy efficiency during composite manufacturing, decrease material waste, and improve material performance. He has actively initiated new programs and has been the principal investigator for over twenty R&D projects including research in the areas of fiber and composite manufacturing, composite recycling, and bio-derived materials manufacturing. Applied R&D of Ozcan's team engages over twenty industrial partners and delivers research with more direct applications to society. He has published nearly 80 papers, inventor or co-inventor of 18 issued and pending patents, has published 7 book chapters, and has been an active speaker with more than a hundred of presentations and short courses are given on manufacturing of fibers and composites related topics and research.

DAVID ERB, Senior R&D Program Manager at the University of Maine Advanced Structures and Composites Center



Mr. David F Erb Jr. has worked in the development of advanced materials for over 25 years creating diversified products for Aviation, Protective and Industrial applications. His education includes an MBA as well as degrees in Industrial Technology and Metallurgy. Mr Erb holds more than

20 US and International Patents in high performance materials including Ballistic Vests, Aircraft Insulations, Aircraft seating and other technologies. He is responsible for technical and strategic program development at the center including new products and markets for advanced materials. His current role includes leading the Consortium for Manufacturing Innovations in Structural Thermoplastics (CMIST) as well as the development of a Structural Thermoplastics Laboratory at the Advanced Structures and Composites Center. He is currently leading two programs with the US Army (NSRDEC) in the development of Organic Polymer Photovoltaic Textiles. Mr Erb served in the USAF active and Reserve forces both Enlisted and as a Commissioned Officer with nearly 30 years of service.

Mr. Erb holds a M.B.A. from Thomas College, 2001 and a B.S., Industrial Technology, University of Southern Maine, 1991.

TIM SCHNIEPP, Sr. Director, Composite Solutions



Tim Schniepp leads the Composite Solutions team at Stratasys responsible for accelerating advancement and adoption of additive manufacturing for composites applications globally. Prior to joining Stratasys in 2014, Tim was a materials and process engineer, technical lead, and manager at the Johns Hopkins Applied Physics Lab, GE Aviation, and Lockheed Martin. He is experienced in the application of additive manufacturing for fabrication of advanced composite structures.

PANEL DISCUSSION 3

Lauren Smith, General Motors Company and **Mark Minnichelli, BASF Performance Materials** joined **Debbie Mielewski, Ford, Jay Olson, John Deere,** and **Don Wingard, Wellman Advanced Materials** on Friday's panel discussion (Please see June/July 2018 issue of this newsletter for bios on Mielewski, Olson and Wingard.)

SUSTAINABLE MATERIALS MANAGEMENT AND THE CIRCULAR ECONOMY IN AUTOMOTIVE APPLICATIONS

Mielewski led the discussion challenging everyone on the panel (and in the audience) to play a part in sustainability. The panel was also challenged by a question in the audience on whether government should play a role or not in setting regulations for companies to be more sustainable. The panel was mixed on this. Smith from GM and Saltzberg from DuPont noted their companies are taking responsibility for sustainability on their own with Smith stating "It's on us," and Saltzberg nodding in agreement. All of the companies are taking measures toward sustainability and Minnichelli, BASF, added that he believes there should be regulation to level the playing field. There is concern that some companies who practice sustainability may have higher costs than those who do not. Mielewski was very adamant that OEMs and suppliers be sustainable and move towards it continuously step by step and cost should not be as much of a concern as the importance of sustainability to the planet.



**LAUREN SMITH, Project
Manager, Renewable Energy
& Sustainability Metrics,
General Motors Company**

Lauren Smith is program manager for General Motors' growing sustainability initiatives, developing the sustainable materials management strategy and managing projects to support GM's corporate sustainability goals. Lauren is responsible for driving projects to advance zero waste aspirations within GM and throughout its supply chain, including opportunities associated with plastics and batteries.

Prior to her current role, Lauren was project manager for General Motors' renewable energy portfolio, working to diversify GM's energy options and managing sustainability metrics. She identified new opportunities to meet GM's 100 percent renewable electricity goal by 2050 and tracked GM's clean energy use.

Lauren began her career at GM in industrial hygiene at the Warren Technical Center, and was then in safety at GM's Global Propulsion System Headquarters (GPS). Following those assignments, Lauren was an environmental engineer at GPS where she managed site compliance with environmental regulations. Prior to GM, Lauren was an associate at ICF International in the company's Climate Change and Sustainability Division in Washington D.C.

Lauren earned two Master's degrees from the University of Michigan, a Master of Public Health in Infectious Disease and Water Quality, and a Master of Science in Environmental Policy. She also holds a Bachelor's degree in Environmental Health, Global Climate Change and Issues in Sustainability from the University of Michigan. Additionally, Lauren is a registered Certified Hazardous Materials Manager.



**MARK MINNICHELLI,
Director, Technical
Development, BASF
Performance Materials**

Mark Minnichelli – After earning a bachelor's and a master's degree in Mechanical Engineering from MIT and Rensselaer Polytechnic Institute respectively, Mark began his career in the plastics industry in 1983 with GE Plastics, where he held various individual and leadership roles in the areas of computer-aided engineering, application development and customer technical support. In 1996, Mark joined AlliedSignal Plastics as Manager of Application Development Engineering, continuing his career interest in leading customer-focused development of engineering plastic components and assemblies. In 2003, Mark joined BASF as Director of Commercial Technology for BASF's North American Engineering Plastics unit. Today, as Director of Technical Development in BASF's Performance Materials business, Mark is responsible for customer-focused technical support of Automotive, Consumer, Industrial and Construction market areas, including Application Development, CAE, Advanced Process Development and Technical Service functions.

Over the course of his career, Mark has been involved in the development and support of a wide variety of engineering plastic technologies and applications, including automotive bumper systems, body panels, door systems, air intake manifolds, oil pans, seating systems, structural components, cooling system components, as well as a variety of computer and business equipment, industrial, and consumer goods applications.

New ACCE “Composites Quiz Event” will Benefit Exhibitors & Students

The ACCE “Composites Quiz Event” benefitted exhibitors by bringing more attention and traffic to their exhibits and helped students to learn more about the composites industry. Nineteen teams of three or four participants including an OEM and Tier mentors and one or two students visited participating exhibitor displays and answered questions about the exhibiting company products and services. They scanned QR codes at the displays with their iPhone, Android or other electronic device and had to answer the questions correctly to move on to questions about the industry. The answers to the questions about the company were easily identifiable from the exhibitor’s corporate profile and/or display. Example questions included “What types of products and/or services do we provide?” “How many locations do we have worldwide?” “What are the brand names of our products?” Questions about the industry were in categories including: Automotive, Composites, Materials, Applications and Processing. The OEM and Tier mentors assisted the students in answering the questions and some were quite competitive and had an especially great time! The top two teams that answered the most questions correctly by the end of the second day of the conference won. The winning students on each team received an iPad.

Kudos to Steve Eynon from Fiat Chrysler Automotive (FCA) for his interest early on and recruitment of other OEMs and Tiers to participate.

The winning team was students Nathan Arnold and Preetam Giri, and Mentor Suresh Shah.



Preetam Giri receiving an Apple iPad as an award



ACCE Hosted PlastiVan® Program and High School Students

Approximately 120 students and faculty from Clarkston and South Lyon High School visited ACCE on Wednesday, Sept. 5th, the first day of the conference. They visited the Student Poster Displays and talked to the college students about their posters and career goals and learned more about the industry and opportunities for a future in automotive plastics. They also visited some of the exhibitor displays and learned more about the companies, products and services in the industry.

In between visits to the show floor, the students attended PlastiVan® sessions hosted on site. The PlastiVan® program provides sound science and educational programs – including fun experiments with plastics – which spark scientific curiosity in students while increasing their knowledge of the contribution plastics make to modern life and encouraging them to seek careers in engineering.

Special thanks to Eve Vitale, SPE Foundation Chair and SPE Detroit Section President and Chuck Jarrett, The Materials Group for getting the students to participate and for coordinating the program.



ACCE Hosted the Largest Student Poster Competition Ever!

The student poster session is an annual event at the ACCE where students from U.S. and international universities present state-of-the-art work related to plastic composite materials and manufacturing technologies relevant to automotive applications. This year's competition, due in large part to generous sponsorship support from Ford Motor Company, was the largest one ever with 73 student participants - 60 graduate, 8 undergraduate and 5 high school students from 27 schools in the U.S. and Canada presenting their research at the 2018 ACCE. (Last year's event had 48 participants - 33 graduate, 12 undergraduate and 3 high school students from 16 schools in the U.S., Canada and Germany.) The event provided the students with an excellent opportunity to meet members of the automotive composites community and learn more about what it's like to work as an engineer or scientist in this field. It also provided the OEMs and their suppliers with the opportunity to meet the next generation of automotive composites engineers and scientists and potentially to hire them.

Thank you very much Dr. Alper Kiziltas, Ford Motor Company, SPE Automotive Div. Board Member and Education Chair and 2018 ACCE Co-Chair, & Dr. Uday Vaidya, University of Tennessee-Knoxville, SPE Composites Division Board Member and Education Chair for your dedication and support to growing this competition to benefit the students and industry.

For a complete list of all Student Poster Entries - please see the ACCE Program Guide pages 83 - 85 via speautomotive.com/ace-conference and click on 2018 Program Guide in the navigation bar.

Here are the winners of this year's competition:

1ST PLACE UNDERGRAD

Three Arm Poly(E-Caprolactone) Polymerization Using Twin-Screw Extrusion

Nathan Arnold, Michigan State University

2ND PLACE UNDERGRAD

Image Processing Algorithms for Estimating FiberLengths and Orientations in Short Fiber Carbon Composite Components

Vignesh Muthuramalingam
Michigan State University

3RD PLACE UNDERGRAD

Combining Traditional and Novel Composite Manufacturing Techniques in Rocket Development

Bryce Gardner, Auburn University

1ST PLACE MS

Latest Breakthroughs with Hybrid Micro-and Nanocellulose Reinforced Composites in Lightweight Applications

Dinesha Genasarajan
University of Waterloo

2ND PLACE MS

Manufacturing Process Simulation Informed Performance For SMC Composites : Validation & Sensitivity Analysis

Siddharth Pantoji, Purdue University

3RD PLACE MS

Weakly Coupled Thermomechanical Topology Optimization and Large-Scale Polymer Deposition

Jack Ramsey, Baylor University

Category A - Nondestructive Evaluation, Testing & Characterization

1ST PLACE GRADUATE, CAT A

A Nondestructive Approach to Determine the Extent and Depth of Internal Damage in Carbon Fiber Laminates

Ben Blandford, PhD, Baylor University

2ND PLACE GRADUATE, CAT A

Process Monitoring of Induction-Based Adhesively Bonded LapJoints Using Optical and Stress Waves Based NDE Techniques

Rajendra Palanisamy, PhD, Michigan State University

3RD PLACE GRADUATE, CAT A

Electromagnetic NDE Methods of Composite Materials Using Capacitive Sensors

Swathi Ramesh, PhD, Michigan State University

Category B – Manufacturing, Modeling & Simulation

1ST PLACE GRADUATE, CAT B

Fiber orientation evolution of injection molded parts

Sara Andrea Simon, PhD

University of Wisconsin Madison

2ND PLACE GRADUATE, CAT B

*Liquid Molding Of Carbon Fiber Based PA6 Composite:
A Novel And Versatile Processing Approach*

Siddhartha Brahma, PhD, UAB

3RD PLACE GRADUATE, CAT B

*Manufacturing Informed Performance Simulations
for Hybrid Composite Parts*

Justin D. Miller, PhD, Purdue University

Category C – Bio, Nano and Additive Technique

1ST PLACE GRADUATE, CAT C

*Chemical Recycling of Fiber-Reinforced
Amine/Epoxy Composites*

Yijia Ma, PhD, Univ of Southern California

2ND PLACE GRADUATE, CAT C

*3D Printed B-Stage Epoxy for Composite Joining and
Feature Integration*

Alec Redmann, PhD,

University of Wisconsin Madison

3RD PLACE GRADUATE, CAT C

*Effects of Fiber Aspect Ratio on Predicting Orientation-
dependent Elastic Properties of Short Fiber Reinforced
Composites Manufactured by Fused Filament Fabrication*

Zhaogui (Evan) Wang, PhD, Baylor University

HIGH SCHOOL

*Integrating Micronized Rubber Powder into Composites for
Increased Sustainability in Automobiles*

Annabel Sharnowski, Northville High School

HIGH SCHOOL

*Hemp Filled Composites for Sustainable and Lightweight
Automotive Applications*

Hannah Pfeiffer, Dearborn High School

HIGH SCHOOL

*Biobased Polyol into Foams for
Automotive Interior Applications*

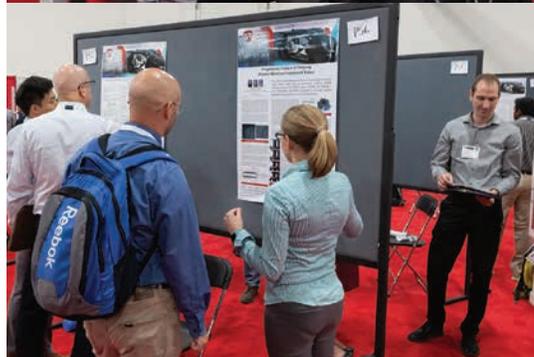
Everest Snyder, West Bloomfield High School

HIGH SCHOOL

CO₂ Based Polyol for Flexible Polyurethane Foams
Ghaida Abdulshafi, Edsel Ford High School

HIGH SCHOOL

*Utilizing Micronized Rubber Powder
As A Filler In Foam Production*
Liam Mcleod, St. Clair High School



ACCE Innovative Parts Competition Expands 100% to Include 14 Nominations

Thank you to all the OEMs and suppliers that submitted the 14 innovative parts to the competition at this year's ACCE. All of the parts were extremely innovative and impactful and deciding on only 5 winners was extremely difficult. A panel of 13 automotive composites experts, from industry and academia, studied the nominations and reviewed the parts onsite and voted independently for a winner in each category. The People's Choice award was determined from votes by ACCE attendees who voted for their favorite part online via the SPE ACCE event app. Here are the winners:

**MATERIALS CATEGORY:
MOST INNOVATIVE PROTOTYPE PART**

Fenyr Supersport Tailgate – Class A Painted Carbon Fiber Composite w/Graphene Enhanced Epoxy Prepreg

Submitted by: Magna Exteriors



Lightweight, Thermoplastic, Recyclable, Lithium Module Launched on 2019 Jeep Cherokee
Submitted by: Magna

**MATERIALS CATEGORY:
MOST INNOVATIVE PRODUCTION PART**

Carbon Pro – Industry First Carbon Fiber Reinforced Thermoplastic Composite Pickup Box

Submitted by:
General Motors & Continental Structural Plastics



**PROCESS CATEGORY:
MOST INNOVATIVE PROTOTYPE PART**

Composite Lightweight Automotive Suspension System: Tie Blade Knuckle

Submitted by: Ford Motor Company



**PROCESS CATEGORY:
MOST INNOVATIVE PRODUCTION PART**

Carbon Fiber Epoxy Hood for Copo Camaro Special Edition

Submitted by: Cynergy Composites Inc. & Hexion Inc.



Carbon Fiber Epoxy Hood for Chevrolet Camaro C1000 Special Edition Performance Vehicle
Submitted by: Cynergy Composites Inc. & Hexion Inc.

PEOPLE'S CHOICE

Composite Guide Rails for Roller Blind Sunroof Module

Submitted by: Polyscope Polymers BV
System Supplier: Webasto
Molder/Processor: ARK – Shapers



Composite Guide Rails for Roller-Blind Sunroof Module
Submitted by: Polyscope

OTHER NOMINATIONS:

MATERIALS CATEGORY: MOST INNOVATIVE PROTOTYPE PART

Phenolic SMC Battery Box Cover

Submitted by: Hexion Inc.



Composite Bearing Beam (aka Windage Tray) for Lightweight Engine Design

Submitted by: Hexion Inc.



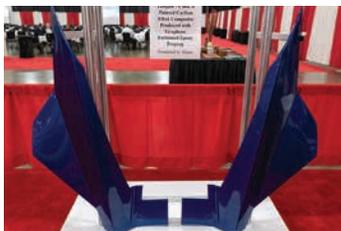
MATERIALS CATEGORY: MOST INNOVATIVE PRODUCTION PART

Acoustic and Aerodynamic Transmission Shield used on the F 150

Submitted by: Ford Motor Company
photo not available

Lightweight Thermoplastic Recyclable Liftgate Module Launched on the 2019 Jeep Cherokee

Submitted by: Magna Exteriors



Clean Glass Fiber Composite for Interior Applications

Submitted by: Renolit GOR S.p.A.



Extension Dash Panel (EDP) from Recycled Sources

Submitted by: Ford Research and
Innovation Center



PROCESS CATEGORY: MOST INNOVATIVE PROTOTYPE PART

Carbon Fiber SMC Wheel

Submitted by:
Forward Engineering GmbH



Lightweight Composite Underbody Protection (Skid Plate) for Off-Road Vehicle

Submitted by: Faurecia Clean Mobility
and Hexion Inc.



"In-Mold" Rotational Kinematic Joint Linkage Using Multi-Shot Injection Process

Submitted by: Magna Exteriors



TREASURER'S REPORT

Bonnie Bennyhoff, SPE Automotive Division Treasurer



A new fiscal year means a new set of goals and I am happy to say Automotive Division will continue to invest in programs that support students. We're off to a good start with increased emphasis on student participation at this year's ACCE – see reports on pages 13 and 14.

Automotive Division is on solid ground financially and continues to explore ways to better serve members. It's not too late to budget for new worthwhile initiatives and we welcome your suggestions.

Finally, I want to extend a personal thank you to the sponsors who faithfully support the Automotive Division – you play a huge role in our financial soundness! Please plan to join us for our second annual Sponsor Appreciation event in early December.

AS OF SEPTEMBER 15, 2018, THE DIVISION'S ACCOUNT BALANCES WERE:

Checking:	\$523,981.58
Savings:	\$ 27,470.07
Total:	\$551,451.65



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HUSHMAN® vs. The SQUEAK MONSTER

*It was supposed to be the perfect weekend. A happy couple, starting off on a getaway weekend where the future groom-to-be plans to pop 'the question'. These unsuspecting passengers are soon to be attacked by the sneaky and annoying... **SQUEAK MONSTER!***

A romantic mood fills the car... They slowly lean toward one another, resting their arms on the console. Where Squeak Monster lies in wait. First with a **LOW SQUEAK**...

Unsuspecting, the future fiancé places her water bottle in the console... and the plating area emits a horrific **SQUEAK!!**

YIKES! PLEASE, PULL OVER!!

The entire console is **SQUEAKING!**

ENGINEERS DESK AT THE OEM

HELLO? HEH? WHAT? WE HEAR THE PROBLEM

Flustered by the hideous and untimely NOISE, she gets out of the car! The future groom is in a panic! "This squeak is ruining everything! I can't let this happen - I'll call the OEM!"

Luckily, **HUSHMAN®** is flying above. He hears the awful noise and knows, "**SQUEAK MONSTER** has struck again." Is he too late to save the day - and romance??!

In the blink of an eye, **HUSHMAN** whisks the loving couple back to the manufacturer.

OEM plant management, engineers and workers listen as **HUSHMAN** explains how **HUSHLLOY®** cuts noise and cost while raising efficiency and quality

HUSHLLOY® to the rescue

...and joy erupts on the plant floor.

HUSHLLOY® SAVES THE DAY!!

With Squeak Monster defeated our engaged couple ride off into a romantic sunset and live happily ever after! **HUSHLLOY** is everyone's noise solution - **SILENCE IS GOLDEN!!**

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...and then they watch in amazement as **HUSHMAN** defeats the **SQUEAK MONSTER!**

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ACCE SCHOLARSHIP AWARDS

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SPE® Announces Winners of the ACCE & Dr. Jackie Rehkopf Scholarships for the 2018-2019 Academic Year

The Michigan Economic Development Corp. is sponsoring a total of \$8,000 USD in scholarships, for four awards for students pursuing advanced studies in a composites-related field. "We're proud to support the ACCE program held in Michigan annually, helping to grow the automotive sector and advancing lightweighting with composites technology, bringing 900 attendees from five continents and 15 countries seeing Michigan as a leading resource for automotive engineering talent and development," said Eric Shreffler, MEDC Managing Director, Automotive Office. The four winners of the SPE ACCE scholarships (\$2,000 USD each) are **Mr. Preetam Giri**, a PhD student at Michigan State University, **Mr. Eric Schmid**, a PhD candidate at the South Dakota School of Mines and Technology (SDSM&T) supported by the Composites and Polymer Engineering (CAPE) lab, **Mr. Zhaogui Wang**, a PhD student at Baylor University, and **Mr. Daniel Pulipati**, a MSc graduate also from Baylor University.

The Dr. Jackie Rehkopf Scholarship is sponsored by the SPE Automotive Division, the SPE Composites Division and generous donations from friends and family. The winner of the Rehkopf scholarship (\$5,000 USD) is **Ms. Barbara DeButts**, a PhD candidate in Macromolecular Science and Engineering at Virginia Polytechnic Institute and State University, commonly known as Virginia Tech.

Both scholarships are administered as part of the SPE Foundation®.

Preetam Giri, presently a fourth year Ph.D. student, works with Dr. Ramani Narayan's Bio-based Materials Research Group (BMRG) at Michigan State University. His primary research involves application development for the polylactide (PLA) extrusion process in two main focus areas: reactive extrusion to chemically modify PLA and natural fiber reinforced PLA composites. The reactive extrusion work stems from a collaboration with Natur-Tec®, a division of Northern Technologies International Corporation, while the composite development is in conjunction with the Ford Motor Company. The current objective is to achieve a tough and durable biobased PLA composite for high-volume applications such as with Ford. By adapting the LFT process, the reinforcement fiber length is preserved, thus enabling improved fiber-matrix load transfer.

Previously, Mr. Giri obtained his Bachelor's degree in Chemical Engineering from the Birla Institute of Technology and Science, Pilani – Hyderabad campus.





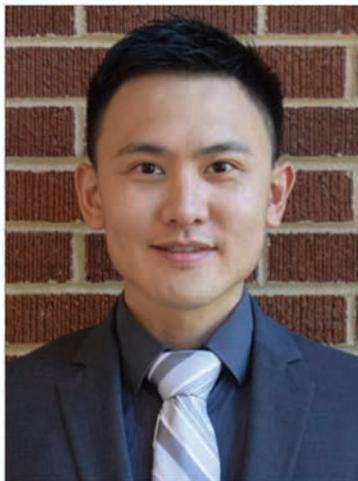
Eric Schmid is a PhD candidate at the South Dakota School of Mines and Technology (SDSMT) supported by the Composites and Polymer Engineering (CAPE) Lab. Herein, Eric is studying polymer composites fabricated with intentional anisotropic voids. These voids allow for substantial reductions in bulk density, while excellent mechanical and thermal performance are achieved

with a variety of composite and nanocomposite additives. These lightweight materials are highly tailorable and well suited for a variety of transportation applications.

Outside of the lab, Eric is active in the Society for the Advancement of Material and Process Engineering (SAMPE). In addition to helping manage the local SAMPE student chapter, He recently became the inaugural chair of the SAMPE North America Young Professionals. In addition to being a member of SAMPE, he is also a student member of SPE, MRS, and NSPE.

Eric has a BS in both Chemistry and Mathematics from the University of Jamestown, as well as a MS in Chemical Engineering from the University of North Dakota.

Mr. Zhaogui Wang is currently investigating the process modeling of large format polymer composite additive manufacturing with the intent to gain a better understanding of the interactions between the flow and the fiber orientation. He states the significance of his research projects as, "A deeper interpretation of how fibers and the molten polymer matrix affect each other enables the fabrication of composite



Eric Shreffler is the Managing Director for the Automotive Office at the Michigan Economic Development Corporation. In this role he works directly with automotive industry stakeholders to establish economic development opportunities for the State. His team collaborates with federal agencies to identify partnership and funding opportunities to drive innovation, commercialization, and growth.

Shreffler led a cross-functional team focused on advanced energy storage that led to \$6B in direct investment in the State, including \$1.3B in federal investment, as well as secured state funds to support the establishment of the ALMMII/LIFT and IACMI lightweight materials manufacturing innovation centers in downtown Detroit leveraging US Department of Defense and Department of Energy grants.

Prior to joining the MEDC in 2006, Shreffler was the Global Thermal Product Manager for Delphi Product & Service Solutions. He holds a BS in Applied Engineering from Michigan State University and an Executive MBA from Northwood University.

ACCE SCHOLARSHIP AWARDS (CONTINUED)

parts with better mechanical performances. Further, the combination of additive manufacturing and discontinuous fiber filled thermoplastics unlocks great potential in creating highly customized yet lightweight parts and tooling. This ultimately reduces the manufacturing cost in automotive and aerospace industries, to name a few."

Zhaogui achieved his bachelor degree from Dalian University of Technology in Dalian, China. He received his master of science in Mechanical Engineering in 2016 and is on track to complete his doctorate in 2019, both from Baylor University. Besides academic research life, he is heavily involved in the development of the local SPE chapter at Baylor, serving as the secretary in 2017 and 2018. With his contribution, the Baylor SPE student chapter has become one of the most distinguished groups among the SPE student chapters over the country.



Daniel Pulipati

began his impassioned academic journey at the Indian Institute of Technology, Dhanbad in the fall of 2009 and completed his Bachelor of Technology degree in 2013. In 2016, he completed his Masters of Science at the Milwaukee School of Engineering and is now on track to defend his

dissertation, at Baylor University, in 2019. His research focuses on modeling the long-term performance of blow molded recycled polyolefin post-consumer/post-industrial waste reinforced with glass fiber. These durable materials have several novel applications such as in railroad ties.

Daniel continues to serve as the president of the Baylor University SPE student chapter since

2017. As part of the SPE student chapter, Daniel has helped coordinate monthly industry guest presentations, several local facility tours, and promoted STEM involvement in schools through various engineering activities in the greater Waco area. Under his leadership, the SPE chapter has won several awards at Baylor and nationally.

Barbara DeButts

has worked to improve the sustainability of commodity polymers by incorporating economical protein additives into synthetic cis-1,4-polyisoprene rubber (IR) and poly(vinyl alcohol) (PVA). She is presently studying as a PhD candidate in



Macromolecular Science and Engineering at Virginia Tech where her work has applications in various industries, most prominently, in the automotive and flexible packaging industries. As a student with a non-engineering background, i.e., Barbara received a Bachelor of Fine Arts from the University of Nebraska-Lincoln in 2006, SPE has been pivotal in expanding her knowledge of the polymer engineering industry. At her first ANTEC® conference in 2016, she became involved with SPE's Next Generation Advisory Board (NGAB) from which she was inspired to found a SPE student chapter at Virginia Tech. She served as President of the VT SPE Student Chapter in 2017 and has been an active member of SPE, NGAB, and the VT SPE Student Chapter ever since. She will defend her dissertation in the upcoming academic year (2018-2019) and intends to pursue a career in the growing polymer engineering industry. She has enjoyed her research on the practical utilization of proteins in rubber composites and plans to continue to develop unique automotive composites in the future.



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You are invited to attend the Automotive Division of the Society of Plastics Engineers (SPE®) for its 48th-annual **Automotive Innovation Awards Gala**, the oldest and largest recognition event in the automotive and plastics industries. This year's Awards Gala will be held **Wednesday, November 7, 2018** at the Burton Manor in Livonia, Mich. Winning part nominations in 10 different categories, and the teams that developed them, will be honored with a **Most Innovative Use of Plastics** award. A **Grand Award** will be presented to the winning team from all category award winners.

SPONSORSHIP OPPORTUNITIES

This annual event currently draws over 800 OEM engineers, automotive and plastics industry executives, and media. A variety of sponsorship packages - including tables at the banquet, networking receptions, advertising in the program book, signage at the event and more are available. Contact Teri Chouinard of Intuit Group at teri@intuitgroup.com.



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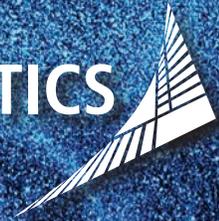
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SPE® Announces 2018 Automotive Composites Conference and Exhibition (ACCE) Best Paper Award Winners

The 2018 SPE ACCE Best Paper Award winners received the highest average ratings by conference peer reviewers out of a field of approximately 100 contenders. All three winners were honored for excellence in technical writing with a commemorative plaque during the SPE ACCE opening ceremonies on Wednesday, September 5th.

Sandeep Tamrakar, a post-doctoral research associate at Ford Research and Innovation Center (Dearborn, Michigan), took first place in this year's competition; **Jung-Ting Tsai**, a graduate student working on his M.S. degree in the School of Material Science at Purdue University (West Lafayette, Indiana), under the guidance of Dr. Mansson and Dr. Dustin at the Composites Manufacturing and Simulation Center, took second place; and **Anthony Favaloro**, who is continuing his research on rheological behavior and process simulation of prepreg platelet molding compounds focusing on further validation of PPMC process models and development and validation of Additive Manufacturing simulation methods, now as a postdoc at the Composite Manufacturing & Simulation Center at Purdue, placed third in the competition.

First place winner, **Sandeep Tamrakar**, was lead author on the paper titled *Determination of Mode II Traction Separation Law for S-2 Glass/Epoxy Composite Interface Under Different Loading Rates*. His co-authors were Raja Ganesh, Subramani Sockalingam and John W. Gillespie Jr. from the Center for Composite Materials at the University of Delaware. About this topic, the author says, "This paper presents a methodology to extract the rate dependent traction separation law for composite interface through iterative method by simulating all the physically observed mechanisms in a microdroplet experiment. Experimentally obtained rate dependent interfacial shear strength (1 $\mu\text{m/s}$ to 1 m/s), large strain resin properties (0.001/s to 12,000/s) and information on crack initiation at the interface obtained from carbon nanotube sensors are used as model input. Through simulation of microdroplet experiments, a unique set of traction separation laws were determined for a given loading rate by narrowing down the range based on IFSS prediction for different droplet sizes and the associated failure modes."



After earning his undergraduate degree in Civil Engineering from Tribhuvan University, Nepal in 2007, Tamrakar attended the University of Maine, where he earned his Master's degree in Civil Engineering in 2011 under the supervision of Prof. Roberto Lopez-Anido. He then earned a doctorate in Civil Engineering from the University of Delaware under the supervision

of Prof. John W. Gillespie, Jr. He is currently a post-doctoral research associate at Ford Research and Innovation Center. His research interest includes composite interfaces, rate dependent behavior of polymer composites and viscoelasticity. His work has been featured in numerous peer-reviewed journal papers and presentations.



Jung-Ting Tsai won second place in the competition for his paper entitled *Integrated Structural Monitoring of Composite Materials Via Distributed Optical Sensors*. About his topic, Tsai explains “Measuring the strain history in pre-impregnated thermoset composites during the curing process provides valuable data for manufacturing

specification development, quality control, diagnostics of dimensional stability, and validation of cure models. This study’s unique contribution to the field is the coupling of the optical sensor monitoring of composite cure strain with models of the cure kinetics, viscosity, and glass transition temperature of the thermoset matrix. Coupling the strain measurements to the material models facilitates coherent comparisons between strain sensor output and thermoset material behavior during the cure process.”

Tsai earned his B.S. degree in Material Engineering at Tatung University (Taiwan) in 2010, and M.S. degree in Mechanical Engineering at National Taiwan University of Science and Technology (Taiwan) in 2012. He received a full one-year scholarship from the Green Energy Technology Corporation and a summer school fellowship for an exchange program to the University of Tokushima, Japan. He worked as an Application Engineer at Henkel Taiwan in 2014 and an automotive maintenance engineer in 2015. Since 2016, he has been working on his M.S. degree in the School of Material Science at the Purdue University, under the guidance of Dr. Mansson and Dr. Dustin at the Composites Manufacturing and Simulation Center. His research involves integrating fiber optical sensors

in composite materials during manufacturing, interpreting and verifying the measurements of embedded fiber optical sensors, and studying the impacts of embedding fiber optical sensors in composite materials. Jung-Ting is interested in structural health monitoring, nondestructive testing, and fiber optical sensors.

Third Place Winner, **Anthony Favaloro’s** paper is titled *Flow Pattern Predictions & Validation for Discontinuous Prepreg Using Anisotropic Viscous Flow Simulation*. About his research, Favaloro comments, “This paper presents a simulation method that has been



developed in-house at the Composites Manufacturing & Simulation Center for investigating the manufacturing of a relatively new class of materials of interest for automotive and aerospace applications: prepreg platelet molding compounds (PPMCs). As the platelet orientation state is highly important to the performance of final parts, predictive methods are required. One method of assessing a flow simulation is through comparison of the predicted flow front to short shot experiments. Thus, the fully coupled fiber orientation and flow simulation method developed in Abaqus/Explicit is exercised in the prediction of flow fronts for the double dome geometry with two different initial charge geometries and compared favorably to short shot experiment.”

Favaloro earned undergraduate degrees in Aerospace Engineering and Mathematics at Mississippi State University in 2013 before attending Purdue University as an NSF Graduate Research Fellow under Dr. Byron Pipes. He defended his dissertation in December 2017 earning his PhD focusing on rheological behavior and process simulation of prepreg platelet molding compounds. He continues his research now as a postdoc at the Composite Manufacturing & Simulation Center focusing on further validation of PPMC process models and development and validation of Additive Manufacturing simulation methods.



2018 SPE AUTOMOTIVE DIVISION GOLF OUTING

A "HOT" TIME WHILE RAISING FUNDING FOR STUDENT PROGRAMS!

The 24th annual SPE Automotive Div. Golf Outing, held on a very warm Sept. 4, 2018 at Fieldstone Golf Club in Auburn Hills, MI, was full of fun, networking and professional generosity. Once again, our loyal sponsors made the event possible. Attendees also donated generously so everyone went home with a prize.

Part of this year's proceeds sponsored high school student participation, on Sept. 5, 2018, in the PlastiVan program at ACCE. Over 100 students from Clarkston and South Lyon high schools visited the college student poster displays and learned about applications for plastic composites in the automotive industry, visited the exhibitors, and learned more about the industry while viewing automotive parts and components made possible with plastic composite technologies.

Last year, \$1,000 checks were presented to student leaders at Kettering, Michigan State, University of Michigan, Schoolcraft and Ferris. The funding is used to promote student interest in SPE, purchase materials and supplies (including 3D printers) provide refreshments at meetings and more.

If you would like to participate in the SPE Automotive Div. Golf Outing next year on Sept. 3, 2019, and/or learn more about additional event, conference and newsletter marketing opportunities - contact teri@intuitgroup.com.



1st place team:
Plastic Engineering & Technical Services, Inc. (PETS)



2nd place team: Quadrant Plastic Composites



3rd place team:
Mitsubishi Chemical Carbon Fiber and Composites, Inc.



Thanks to our sponsors for making our 24th golf outing a big success!

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SPE® ANNOUNCES “LIFETIME ACHIEVEMENT AWARD WINNER” – DR. ROSE A. RYNTZ WILL BE HONORED AT THE SPE AUTOMOTIVE INNOVATION AWARDS GALA NOV. 7, 2018

Dr. Rose A. Ryntz, vice president, Global Advanced Development and Material Engineering at International Automotive Components Group (IAC) has been named the 2018

Lifetime Achievement Award winner by the Automotive Division of the **Society of Plastics Engineers (SPE®)**.

Ryntz is a technical specialist and research leader in automotive plastics technology with more than 35 patents and five trade secrets in production and material technology that have advanced the industry. Her game-changing innovations include the development of damage resistant fascias, automotive interior skin technologies for use in seamless passenger airbag instrument panels and interior and exterior automotive coatings on plastics. Her technical support, with several automotive suppliers, led to several Joint Development Agreements further advancing the industry. These include functionally integrated interior automotive components with heating, lighting, and Human Machine Interface (HMI) content, bi-laminate and compact sheet technologies for use in vacuum formed and In-Mold grain laminate doors and instrument panels and lightweight technologies incorporating natural fiber and bio-based solutions.

Ryntz has won more than 20 prestigious industry awards internationally (including three SPE Automotive Innovation Awards for Sustainability and Lightweighting) and is respected as an industry expert and a key opinion leader. She has been interviewed over 40 times by industry trade journals, been featured as a keynote speaker more than 15 times, presented more than 120 technical papers worldwide and authored four technical books. She will be honored for her lifetime of industry expertise and innovation, contributing to the advancement of the automotive plastics industry, at the **48th-annual Automotive Innovation Awards Gala** on November 7, 2018 at Burton Manor in Livonia, Mich.

“I am very honored to be recognized to receive this very prestigious award and hope it will help to inspire more women to pursue careers in Science, Technology, Engineering & Manufacturing (STEM) programs, and become more involved in their industry” said Ryntz.

“Working with Rose is always a positive experience,” said Lonnie S. Holmquist, vice president – Quality at IAC Group. “Not only is Rose innovative and intelligent but also brings to the team a strong desire to make a difference, improve the situation as well as provide support,” continued Holmquist. “Rose embodies the character traits of a strong leader and one who is truly valued - Rose rocks!”

“Dr Rose Ryntz is a unique visionary who goes above and beyond in everything she does,” said Davida Barrett, senior account manager at Celanese. “She is a mentor to many, who asks the best of herself and everyone she works with,” continued Barrett. “I am proud to know her and call her my friend and colleague - Rose congratulations on winning the SPE Lifetime Achievement Award. Bravo!”

“Rose is a true automotive industry innovator - her ability to tie the results from relentless research and development iterations to true commercial and performance benefits has led her and her teams to many successes over her career,” said Joe Schulcz, automotive market manager, Kraton Corporation. “This award is well deserved as her leadership was instrumental in many successes in the automotive marketplace,” continued Schulcz. “Congratulations on her achievement of this prestigious award and to many more future successes.”

Ryntz credits her success to her education, work experience and participation in SPE and other professional trade associations. Ryntz obtained a Ph.D degree in Organic Polymer Chemistry from the University of Detroit in 1983, a MBA in Business Supply Chain from Michigan State University in 2002 and a Bachelor of Science degree in Chemistry from Wayne State University in 1979. She was employed at various companies (Dow Chemical, DuPont, Ford Motor Co., Akzo Nobel, Collins & Aikman and Visteon) prior to her current role as Vice President, Global Advanced Development and Material Engineering at IAC Group North America. She was elected as a Fellow to the Society of Plastics Engineers in 2006 and has served on the board of directors of the Detroit Section of SPE and contributed to the success of many SPE events and conferences over the years. Ryntz is also very active in many other professional societies, trade associations, and Universities including Ward’s Interior Conference Moderator, Member of the University of Detroit Engineering and Science Board of Advisors, and Industry Mentor for Wayne State University Department of Chemistry.

Dr. Ryntz’s Significant Accomplishments and Awards include:

- Society of Plastic Engineers (SPE) – Detroit Section Lifetime Achievement Award, 2017
- Automotive News Top 100 Leading Women in Automotive Award, 2015
- Society of Plastics Engineers Detroit Section Outstanding Member Award, 2013-2014.
- SPE TPO in Automotive Emeritus Founding Member Award, TPO in Automotive Conference, 2014

- Society of Plastics Engineers Detroit Section Keynote Speaker at the TPO in Automotive Conference, Oct. 2013
- Society of Plastics Engineers Fellow, May 2006
- Joseph Matiello Award, Federation of Societies for Coatings Technology, 2005.
- Women's Automotive International Association, Professional Achievement Award, 2004
- Visteon Corporation, Leading the Way Award, 2004
- Roy W. Tess Award, American Chemical Society, 2003
- George B. Heckel Award, Federation of Societies for Coatings Technology (FSCT), 2000
- Roon Foundation Award, Federation of Societies for Coatings Technology (FSCT), 2000
- Ford Motor Company Customer Driven Quality Award, instrument panel skin technology implementation, 1999
- Ford Motor Company Customer Driven Quality Award for Implementation of Damage Resistant Fascias, 1999
- Strathmore's Who's Who Registry of Business Leaders, in Recognition of Outstanding Contributions to the Automotive Industry 1997/98
- Elias Singer Best Paper Award (Honorable Mention) for Presentation and Technical Content of Friction Induced Paint Damage: Effects of Coating Attributes, 1997
- Engineering Society of Detroit (ESD) Outstanding Leadership Award for Chairing Coatings Conference, 1995
- Henry Ford Technology Award for Conceiving a Systems Approach to New Painted Plastic Materials, 1994
- Ford PTPD General Manager's Excellence Award for Holistic Approach to Painted Plastics: Windstar Control Plan, 1994
- Society of Plastics Engineers ANTEC Best Paper Awards, 1994, 1996
- Engineering Society of Detroit (ESD) Gold Award for Outstanding Contributions to Advancing the Knowledge of Science and Engineering, 1994
- Elias Singer Best Paper Award for Presentation and Technical Content of Novel Dispersing Aides, 1993
- Best Speaker Awards, FSCT, 1986, 1991
- A.F. Voss Best Paper Awards, FSCT, for Technical Content of Society Papers 1987, 1988, 1989,

Dr. Ryntz's many Leadership Roles and Professional Affiliations include:

- Board of Advisors, University of Detroit College of Engineering, 2015 – present
- Federation of Societies for Coatings Technology (FSCT) **President**, 2006-2008 (led transition into new BOD structure, initiated discussions with NPCA on education **President Elect**, 2004 – 2005 (initiated AC Series educational seminars) **Technical Advisory Board**, 1992-1994 (led discussions on split of technical and member information journals) **Professional Development Committee Chair**, 1991-1996 (directed committee members and FSCT staff to develop programmatic initiatives for educational seminars) **Program Committee**, 1992, 1999-2002 **Program Committee Chair**, 2000 - 2002 **Editorial Review Board**, 1990- 2007 **Board of Directors, Member-At-Large**, 1993-1995 **FSCT Industrial Relations Task Force Chair**, 1996 **Coatings Industry Research Fund**, 1997 – 2001
- Society of Plastics Engineers Detroit Section **Board of Directors Member at Large 2007 - 2011 Chair / Co-Chair "Surface Enhancements" in TPO in Automotive Conference - 1993 -present**
- American Chemical Society **PMSE Board Member at Large**, 2003-2005
- NIST Review Board Member on Material Assessment **Vice-Chair**, 1997 (worked within member committees to review BFRL lab) **Chair**, 1999-2000 (led group of industry/academic experts in reviewing the BFRL lab) **NSF Environmentally Conscious Coatings Proposal Review Board**, 1996 (reviewed academic proposals on environmentally friendly coatings and advised on budgeting) **NRC Manufacturing Review Board**, Low Emission Coatings, 1999-2000 (reviewed manufacturing processes and contributed to document analyzing best practices)
- Technical Chairman, Detroit Society for Coatings Technology, 1988- 1994 Chairman, Younger Chemists Steering Committee, ACS 1988-1990

First given in 2001, the SPE Automotive **Lifetime Achievement Award** recognizes the technical achievements of individuals whose work – in research, design, and/or engineering – has led to significant integration of polymeric materials on passenger vehicles. Past winners include:

- J.T. Battenberg III, then chairman and chief-executive officer of Delphi Corp. (2001)
- Bernard Robertson, then executive vice-president of DaimlerChrysler (2002)
- Robert Schaad, chairman of Husky Injection Molding Systems, Ltd. (2003)
- Tom Moore, retired vice-president, Liberty and Technical Affairs at then DaimlerChrysler (2004)
- Mr. Shigeki Suzuki, general manager - Materials Division, Toyota Motor Co.(2005)
- Barbara Sanders, then director-Advanced Development & Engineering Processes, Delphi Corp. (2006)
- Josh Madden, retired executive at General Motors Corp. (GM) & Volkswagen of America (2007)
- Frank Macher, former CEO of Collins & Aikman Corp., Federal Mogul Corp., and ITT Automotive (2008)
- Irv Poston, retired head of the Plastics (Composites) Development-Technical Center, GM (2009)
- Allan Murray, Ph.D., retired technology director at Ford Motor Co. (2010)
- David B. Reed P.E., retired staff engineer, Product Engineering, GM (2011)
- Gary Lownsdale, P.E., then chief technology officer, Plasan Carbon Composites (2012)
- Roy Sjöberg, P.E., retired staff engineer - Body, Chevrolet-Pontiac-Canada Div.,GM and retired executive engineer-Viper Project, Chrysler Corp. (2013)
- Dr. Norm Kakarala, retired senior technical fellow, Inteva Products LLC (2014)
- Fredrick Deans, P.E., chief marketing officer, Allied Composite Technologies LLC (2015)
- Dr. Lawrence T. Drzal, university distinguished professor of Chemical Engineering and Director-Composite Materials and Structures Center at Michigan State University College of Engineering (2016)
- Dr. Suresh Shah, retired senior technical fellow at Delphi Corporation, formerly General Motors – ACG (Automotive Components Group) (2017)

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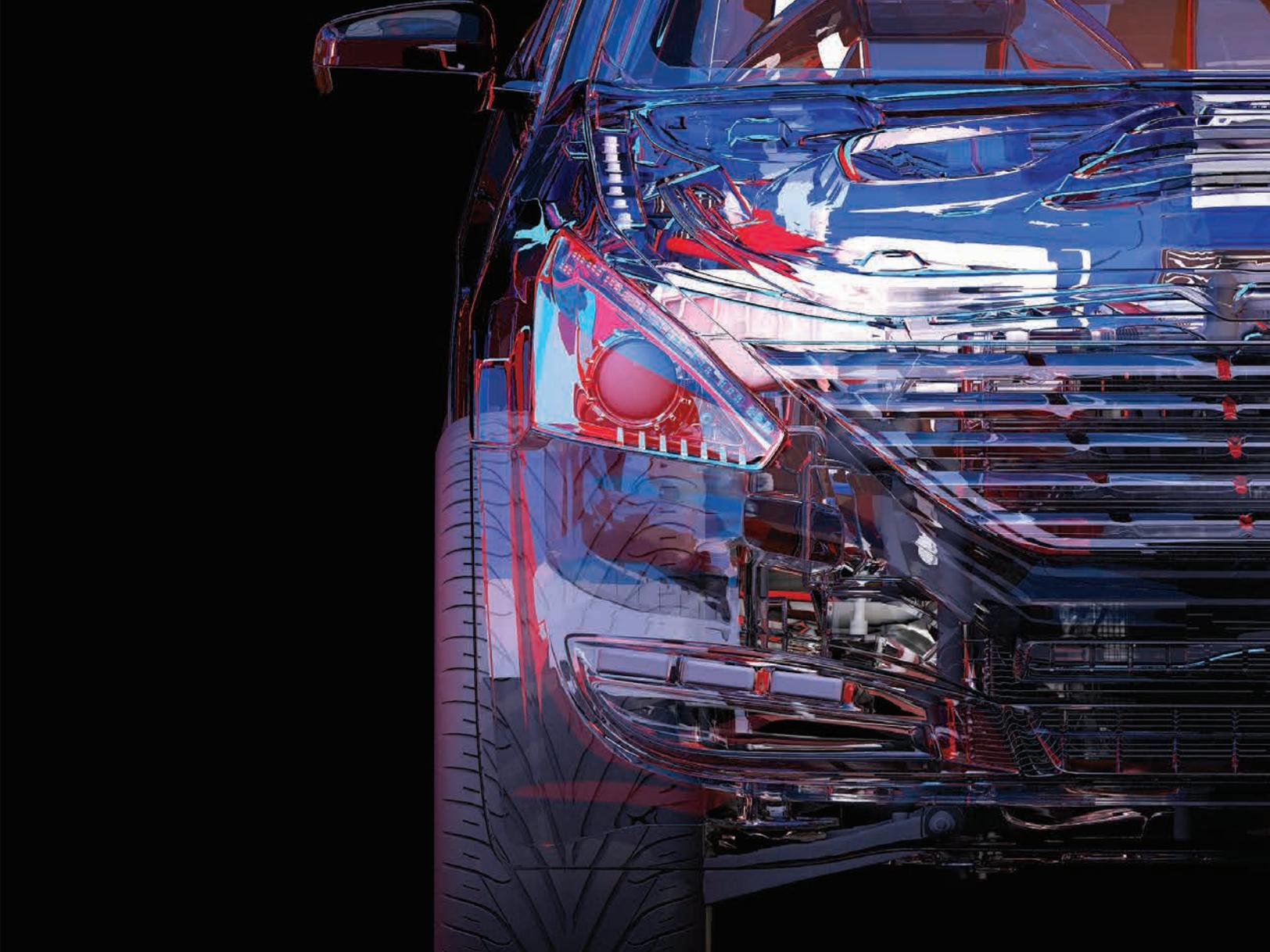
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DR. NORM KAKARALA & TOM PICKETT



The SPE Annual Technical Conference (ANTEC) will take place at the **Detroit Marriott** at the **Renaissance Center** in Detroit, Michigan, USA **March 18 – 21, 2019**. Do you have a paper that you would like to present to the world's largest international gathering of engineers, scientists, and business professionals in plastics?

It is an opportunity to receive feedback and discussion on your paper from leaders in the plastics industry. The Automotive Division Sessions of ANTEC are well attended each year by leaders in the Automotive Industry. At the ANTEC 2018, the Automotive Division had record participation: 3 different sessions with a total of 23 presentations.

Submit your paper (separate abstract submissions are not required) and encourage your colleagues and professional contacts to submit papers for the Automotive Division Sessions. The Detroit area hosts several popular regional plastics conferences each year and the papers presented

at those conferences may be updated and presented at the ANTEC reaching more global audience. As the ANTEC 2019 will be in the automotive center we expect to have much higher participation.

Dr. Norm Kakarala and Tom Pickett are Technical Co- Chairs of the ANTEC 2019 Automotive Division Sessions.

The deadline for submission of papers is **October 19, 2018** Please select the automotive sessions when you submit your paper.

Log on to the SPE website address and follow the directions to register and submit your paper. The SPE website is: www.4spe.org/antec



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INTERSOCIETY REPORT

Dhanendra Nagwanshi, SPE Automotive Division Intersociety Chair



“No one can whistle a symphony. It takes a whole orchestra to play it.” That quote is quite apt, especially for today’s automotive industry and our move towards Automated, Connected, Electric, and Shared vehicles (ACES).

Today, change is taking place at unprecedented rate. Global environmental challenges, urbanization, changing demographics, and many emerging technologies – all of these are coalescing to create great uncertainty about what vehicles of the future will look like.

While the automotive industry expects ACES to play an increasing role in the next five to 30 years — there is still much about those cars that is not defined.

To build an understanding of needs, opportunities, and solutions, the Center for Automotive Research’s (CAR), through its Coalition for Automotive Lightweighting Materials (CALM) group, organized a workshop on this topic, held May 21 during its quarterly meeting. More than 30 participants, including materials and manufacturing experts from automakers and suppliers, shared their insights and knowledge on the potential impacts of ACES on design, materials, manufacturing, and business models.

CALM itself is a collaboration of more than 40 industry-leading organizations working to support the cost-effective integration of mixed materials to achieve significant vehicle mass reductions.

The complete report generated from this workshop and CAR’s research initiative is available for download from the organization’s website (www.cargroup.org/), and I encourage you to do just that. This is an excellent product, and yet another example of the power generated through industry-wide collaboration.

Because when we connect and share, we can charge ahead together.

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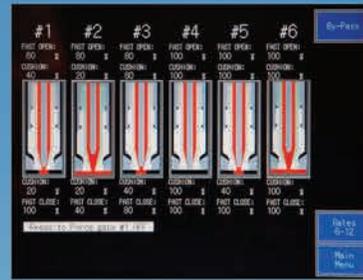
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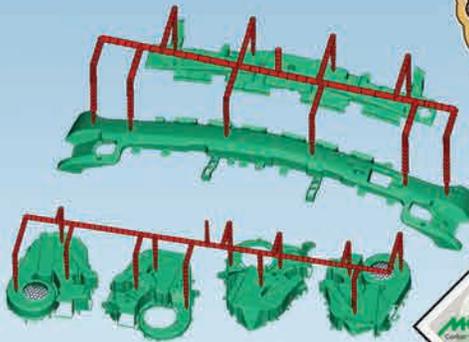
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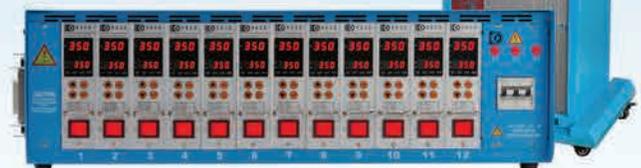
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AUTOMOTIVE

SECRETARY'S REPORT

**SPE Automotive Division Board Meeting Minutes
June 11th, 2018, by Crystal VanHouten**

ATTENDEES

Matt Carroll,
Alper Kiziltas,
Bonnie Bennyhoff,
Chuck Jarrett,
Crystal VanHouten,

Cynthia Flanigan,
Dave Reed,
David Helmer,
Fred Deans,
Gary Kogowski,

Jeff Helms,
Nippani Rao
Norm Kakarala,
Steve Van Loozen,
Teri Chouinard,

Thomas Pickett,
Mark Bahm,
Samar Teli
*Ph: Umesh Gandhi,
Jay Qizilbash,*

*Mark Lapain,
Suresh Shah,
Rick Hamilton,
Dhanendra Nagwanshi,
Brian Haggart*

Meeting was held at the ACC Office (American Chemistry Council) in Troy, 5:32pm – 7:28pm

OPENING – Matt Carroll

Review of Agenda for Meeting

FINANCIAL – Bonnie Bennyhoff

June 30th ends our fiscal year. A comprehensive review was completed of balance sheet and an initial review of the 2019 budget took place. Additional meeting to follow with committee leads.

A note was made to ensure at least \$1,000 was allocated for the Counselor in 2019 budget.

COUNCILOR REPORT – Suresh Shah

Reviewed the highlights of the SPE Council summary from ANTEC 2018 held in May in Orlando, Florida. Please read the published Counselor's report for all the details.

WEBSITE ANALYTICS – Mark Bahm

No new information

ACCE REPORT – Alper Kiziltas, Matt Carroll, Teri Chouinard, Bonnie Bennyhoff

Received 91 abstracts to date. Abstract acceptances are out. Paper deadline is June 15th, 2018.

There are two categories which had a minimal submission. Only 3 abstracts were received in bonding/finishing/joining and 2 in nanotechnologies.

All lunch sponsorships are sold.

Fred Deans said that the PlastiVan is scheduled to be at the ACCE conference, per the Composites Division. He will help obtain a visit schedule/write-up. Chuck Jarrett can contact South Lyon East school. Others were willing to volunteer depending on the schedule. The typical session is 45-50 minutes and 30 students at a time are ideal.

Discussed conference costs. Team should benchmark SAE and other non-profit conference costs.

DESIGN IN PLASTICS / The MAIN Event – Chuck Jarrett

Stratasys interested in partnering with SPE. Chuck to follow-up. More information coming in the fall as students get back to school.

EDUCATION – Alper Kiziltas

Five University Student SPE chapters were funded at \$1000 each. Cynthia to follow up with Alper, regarding WMU.

Oakland University reported that they are not planning to have a SPE Student Chapter for the 2018/2019 school year.

10 applicants for the ACCE scholarship.

MEMBERSHIP – Samar Teli

Samar Teli will be taking over for Steve Van Loozen
THANK YOU, Steve Van Loozen, for the contribution towards membership!!

Currently, there are 894 active members in the SPE Automotive Division.

NEWSLETTER

Steve Van Loozen will be the new chair of the Newsletter. THANK YOU, Dave Helmer, for all the effort and support during the last year!!!

Keith Siopes will be assistant to Steve

Plan 1300 newsletters for September (larger than normal to hand out for ACCE and TPO Conference)

August 15th hard deadline for articles

CHAIR REPORT – Matt Carroll

Pinnacle Gold Award Won Again!!

Reviewed Schedule of Events

Review Board Update

Dave Helmer will be the new Chair. THANK YOU, Matt Carroll, for all of your guidance and leadership!

SECRETARY'S REPORT

**SPE Automotive Division Board Meeting Minutes
June 11th, 2018, by Crystal VanHouten**



AWARDS

Board Members congratulated for ending their terms. They will be recognized at the 1st round of judging for the IAG. Thank you to Michael Whitens, Monica Prokopyshen, and Jay Raisoni for the continued support!!!

Service Awards presented to Bonnie Bennyhoff, Teri Chouinard and Marc Bahm for all the contribution to the SPE Automotive Division. Your support, enthusiasm, and hard work has shown through all events and activities you are involved in and support!! THANK YOU!!!

AUTO EPCON REPORT – Gary Kogowski

2018 AutoEpcon was a success. Still waiting for the income statement and final expense review. Will be a separate SPE Detroit Section and SPE Automotive Division event in May 2019; as in past years. Gary Kogowski is looking for a strong team of volunteers.

IAG – Jeff Helms

Earliest nominations – we have two!!

All arrangements mostly made; Concept Productions run the A/V. Possible benchmark activity for the A/V for next year's event

Proposed by IAG Chair to raise sponsorship 20% for 2019. Currently in review.

Need chimes/air horn to get everyone in the main dining area so the event starts on time.

INTERSOCIETY REPORT – Dhanendra Nagwanshi

Summary of the Coalition of Automotive Lightweight Materials (CALM) Q2 meeting held in May 2018. Over 50 individuals representing 30+ companies were in attendance. See the detailed published report in the newsletter

TPO SHANGHAI – Norm Kakarala

3rd annual SPE TPO conference held in Shanghai. Steady growth and technical content. Good feedback and attendance.

Expenses to Budget \$80K / Income to Budget \$100K

Jeff Helms reported that the WeChat app is popular in China and possibly we should use it

ANTEC – Norm Kakarala, Tom Pickett

23 presentations. Most ever for ANTEC Automotive. Scheduled in 3 sessions.

Following the technical presentations will be the Automotive Division Business Meeting

May 10th at 6:00 to 6:30PM.

Automotive Division every year has funded awards managed by the Foundation and given out at ANTEC: Fred Schwab Intl. Education Award and the SPE International Award (total \$2500).

Last year we gave \$2500 to Student Activities at ANTEC. This year, we increased Student Activities funding to \$5000. Matt received five tickets to the Wednesday Student Luncheon.

Automotive Division attendees included the following and more:

- Norm Kakarala – Co TPC
- Tom Pickett – Co TPC
- Matt Carroll – Pickup Gold Award, Attend Student Lunch, Moderate session
- Suresh Shah - Councilor Meeting, Keynote Speaker
- Paula Kruger – Speaker
- Teri Chouinard – Worked the Booth
- Jeff Helms – Coordinated Parts Competition; Speaker
- Other members presented papers.

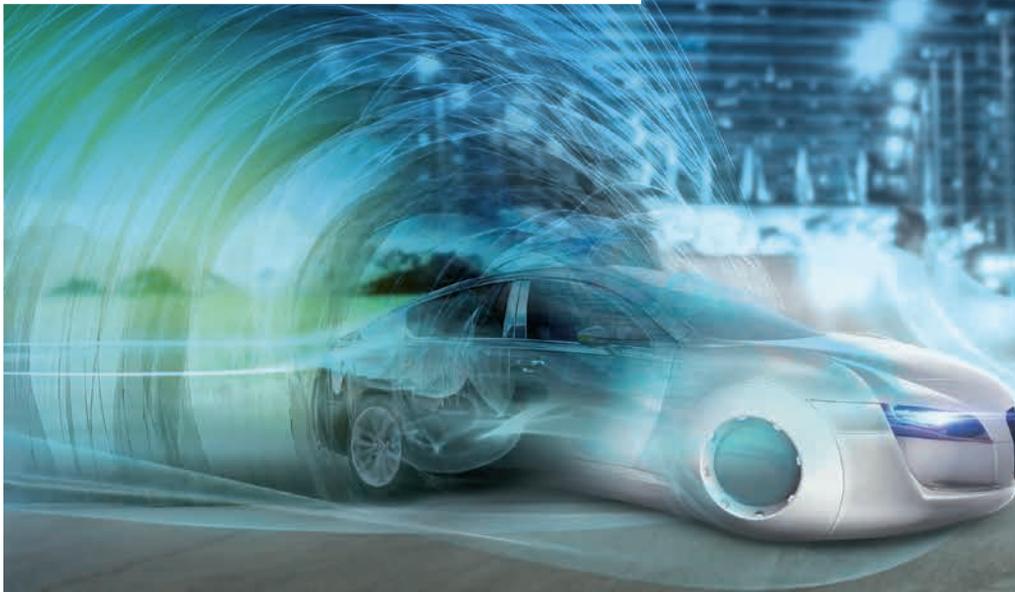
NEW BUSINESS / OPEN ISSUES / CONCLUSION

Sponsorship Appreciation Event in December, tabled discussion but need to consider timeframe and venue

New Masthead to be incorporated into the SPE Automotive Division logo to align with the new HQ logo.

Meeting adjourned at 7:28pm.

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TECHNICAL REPORT

Additive Manufacturing Fixtures Fadi Abro, Sales Executive, Midwest, Stratsys



Every production part requires some kind of jig or fixture in its life time. Fixtures are used all across the manufacturing floor. They are often used in quality control to aid in the inspection process, in assembly to aid workers to hold or align the part, and they are used in the shipping department to allow for proper packaging of a part.

The terms jigs and fixtures is often used in tandem but jigs and fixtures are actually different. The manufacturing industry typically uses the term jig when referring to a custom tool used to guide and control the location and motion of another work piece during an operation. Its primary purpose is to provide repeatability, accuracy and interchangeability as well as maximizing efficiency in the making of a product. On the other hand, fixtures are devices used to locate and hold a work piece in a fixed location during a post operation or other industrial process. Fixtures are also used to measure repeatability and accuracy of a part. The primary purpose of a fixture is to maintain consistent quality, reduce cost of production and enable a variety of parts to be made to a certain specification.

Jigs and fixtures are most commonly fabricated from metal, wood or plastic in quantities of one to 100 using a manual or semi-automated process. There are many challenges to produce these types of manufacturing tools. Fixtures can take a long time to get through a fabrication shop and have long machine set ups. On average, each tool takes between one and four weeks to design and build. This can often slow down the production process. Traditional manufacturing methods can limit the complexity of these fixtures. This can also affect ease of handling by making these fixtures heavy and sacrifice employee safety and ergonomics. Lastly, the cost of these custom-made tools is incredibly high.

Additive manufacturing or 3D printing can solve a lot of these challenges. By substituting Fused Deposition Modeling™ (FDM®), the traditional fabrication process is substantially simplified; tool-making becomes less expensive and time consuming. As a result, manufacturers realize improvements in productivity, efficiency and quality. Additionally, these tools can be designed for optimal performance and ergonomics as FDM places fewer constraints on tool configuration. The FDM process uses production grade thermoplastic filaments. The material is heated to a semi-liquid state and extruded across computer-controlled tool paths to build parts layer-upon-layer.

Benefits of 3D printed tools include time and cost reductions. Customers have seen a lead time reduction as high as 90% and cost reduction as high 80%. Furthermore, 3D printing allows you to recognize complexities without the huge cost penalty. These printed tools can save weight and allow for easier employee handling. With 3D printing, these tools can be produced on demand, reduce inventory, and allow for painless design revisions.

ABOUT FADI ABRO

Fadi Abro serves as a Sales Executive in the Midwest representing Stratsys and collaborates with strategic accounts to leverage the capabilities of additive manufacturing. Fadi joined Stratsys in 2010 as a Project Engineer where he developed extensive knowledge in 3D printing applications for the transportation industry. Prior to that, Fadi worked as a Project Manager and Sales Engineer. Fadi has a BS in Mechanical Engineering and an MBA from the Lawrence Tech University in Southfield.



A breakdown of the average cost savings we have seen across multiple manufactures and industries.

Recent material advancements have made printed fixtures a more realistic option for many automotive manufacturers. ABS material can be printed on many different types of 3D printing equipment and is very suitable for low impact applications. Nylon 12 CF is a new material that runs on Stratasys equipment. This nylon material has a chopped carbon fiber fill (35% wt) that provides incredible strength and stiffness. This material is being used as an alloy replacement in many cases where the users can save weight without sacrificing functionality. Some customers have experienced weight savings as high as 50%. Progressive manufacturers are ditching metal where possible.

It is often difficult to determine when to make the switch to printed fixtures and jigs. There are a few things to consider before making the change. Any fixture with medium to high complexity will likely be a better fit for printing. Any fixture where weight is beyond acceptable limits will likely benefit from this switch. This also includes general ergonomic concerns; a manufacturer could print a fixture per operator to ensure a true customized ergonomic solution.

Those who are familiar with 3D printing might be concerned by the accuracy that additive equipment can produce. There is a big difference between small printing machines and high powered industrial equipment. Typically, the large scale industrial 3D printing equipment will run higher durability material but also have a much higher accuracy. The cost savings found in printing fixtures will often justify the capital investment within first few years of ownership. It is also important to remember that tighter tolerances can always be achieved with some quick post processing on a CNC or manual machine.

One auto company who has adopted this mantra is TS Tech in Columbus, OH. This Tier 1 supplier has expanded its partnership role to include support of global design and manufacturing of the auto company's seating systems worldwide, so they understand the competitive market and the importance of innovation to maximize their allotted time in the supply chain. TS Tech owns a Fortus 900 FDM machine from Stratasys.

Engineers at TS Tech are constantly evolving and perfecting the tools they use to validate parts. Stephen Mollett, a tooling engineer that oversees the fixtures and tools used to inspect seat frames, was interested in improving the solid aluminum check fixture used to inspect a back-seat hinge. And because of his previous working knowledge of 3D printing applications, he understood the potential benefits.



Original solid aluminum check fixture from stamping facility



Most recent iteration with clamp-on assemblies

The above fixtures represent a 90% drop in weight from 40 pounds to 4 pounds for the 3D printed ABS fixture. “With this 3D printed check fixture being so much lighter, it’s far easier for the associate to lift it and carry it to the main station without the risk of hurting themselves trying to lift a 40-pound fixture,” Mollett said.

This printed fixture will check over 42,000 production metal stampings in its lifetime. This fixture also provided a 31% savings in cost compared to the original machined fixture. This printed fixture took a few days to produce while the traditional fixture took about six weeks. Mollett went on to say that this test case “opened the floodgates for 3D printed jigs and fixtures at TS Tech”.

Another leading automotive company that is leveraging 3D printing for jigs and fixtures is MAHLE. For one of its latest developments, MAHLE was searching for a faster and less expensive way to make fixtures for automotive HVAC assemblies. The fixture was to validate MAHLE’s production part, ensuring they could move onto the next phase of manufacturing without skipping a beat and save time and money in the process.



The fixture had to be designed, built and shipped from the United States to South Korea within a week. Without a fixture to verify the part’s design, accuracy and stability, MAHLE’s production timeline could be compromised. The immediate need meant a steel machined fixture wasn’t an option. The MAHLE team also wanted to consolidate the fixture from three separate components into one part.

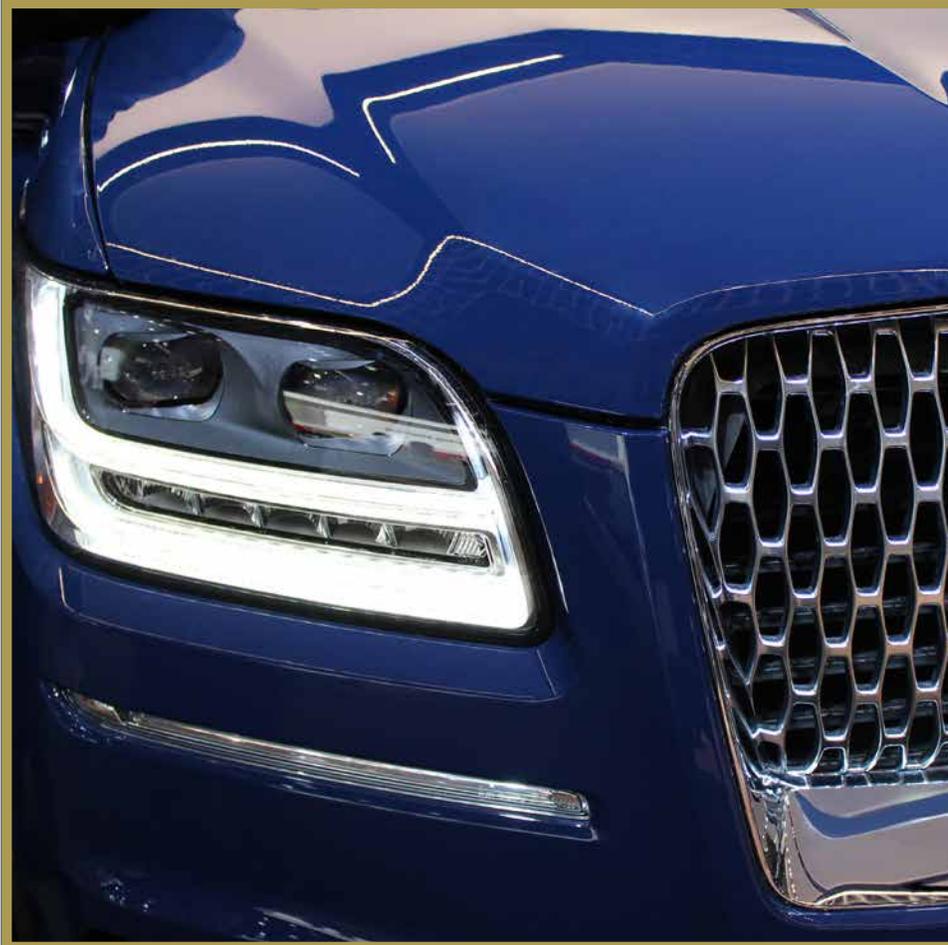


Unlike traditional manufacturing, which requires engineers and designers to adhere to strict assembly rules and to design parts based on their production method, additive manufacturing allows for parts to be designed for their form, fit and function. It also frees users from the design constraints of traditional manufacturing, paving the way for a consolidated part that would retain its shape over time.



This complex fixture was built in less than a week. According to MAHLE, a traditional process would have taken over 5 weeks. The fixture’s success could serve as a launching point for increased use of 3D printing: MAHLE hopes to find a number of applications where it is the go-to method for making jigs and fixtures. MAHLE owns several Stratasys Fortus 450’s and 900’s throughout their facilities across the country.

In summary, printing jigs and fixtures can compress the product development and production cycles. It can reduce cost, weight, and lead time. Additive tooling can be a one to one replacement in most applications without major design changes. Many companies have been adopting 3D printing to manufacture new jigs and fixtures, enabling lower costs, lighter and more ergonomic tools, lower waste of warehouse space and customization to specific requirements. Savings on the manufacturing floor and in jig and fixture production will be substantial. If you have a 3D CAD file and access to a 3D printing system, you are ready to start fabricating manufacturing tools with little to no hands-on labor. Combine the simplicity with typical time and cost reductions, and you will understand why 3D printing spurs companies to make more jigs, fixtures and other manufacturing tools than ever before.



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