

24<sup>TH</sup> ANNUAL



# TPO<sup>®</sup> 2023 GLOBAL AUTOMOTIVE CONFERENCE

Troy, MI • October 1-4, 2023  
Powered by SPE Detroit Section

ENGINEERED POLYOLEFINS FOR THE  
**MOBILITY EVOLUTION**



OCT 1-4  
**2023**

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**ENGINEERED POLYOLEFINS FOR THE**  
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# WELCOME FROM THE CHAIRS

## CONFERENCE CO-CHAIRS



**Mike Balow,**  
Auxin Consulting, LLC



**Rob Philp,**  
Sirmax



**Neil Fuenmayor,**  
LyondellBasell (Retired)

**WELCOME and THANK YOU** for attending the 2023 SPE TPO Global Automotive Conference – the World's Leading Automotive Polyolefins forum. Buckle up, because we're about to embark on an electrifying journey into the future of automotive innovation at this year's conference! The 2023 Planning Committee and the Society of Plastics Engineers (SPE) Detroit Section are thrilled to welcome you to this extraordinary event, where excellence is the tradition, and the future is ours to shape.

We've assembled a stellar lineup of Keynote Speakers and industry leaders in our Technical Program, all focused on the paramount themes of Electrification and Sustainability. Leading the charge are our electrifying Keynote Speakers:

- Manoj Patnala, Director for Interior Advanced Technologies at Rivian - *Systematizing Sustainability*
- Drew Winter, Principal Analyst from Informa Tech Automotive Group, TU-Automotive, Wards Auto, Wards Intelligence - *Cockpit of the Future*
- Manojdeep Jasrotia, Vice President of North American Sales for Caresoft Global - *Reducing Carbon Footprint with Performance: The Role of Bio-Based Plastics in Mitigating Climate Change*
- Gustavo Lombardi, Director of Business Development at Braskem - *The Value of Benchmarking to the Mobility Evolution*

We're not just celebrating another conference, we're reveling in our 24th year of hosting the TPO Global Automotive Conference and evolving in our third decade of providing excellence. This isn't just a gathering - it's a deep dive into the rapid evolution of our industry and a thrilling glimpse into our exciting future. We've fortified the foundation of this unique Conference, offering an unparalleled exchange of polyolefin technical knowledge across essential automotive categories, with the entire value chain participating. Through our Keynote Addresses, Technical Program, OEM-led Panel Discussions, Student Competition, Industry Tutorials and Exhibition, we're showcasing innovations and emerging technologies that are driving the remarkable changes in our industry - the pivot to Electrification and Sustainability - perfectly echoing our theme, **ENGINEERED POLYOLEFINS FOR THE MOBILITY EVOLUTION.**

Whatever brings you here – whether you're sharing groundbreaking research, showcasing your organization's innovations, seeking solutions, expanding your network, or igniting the spark of creativity – we promise you'll find it at this year's event. As we look ahead to the next few days enjoy a comprehensive program with some exciting new elements this year:

- A global convergence of over 600 expected attendees and participants.
- 2 1/2 day Technical Program featuring over 60 informative presentations, organized into seven Technical Sessions.
- Two exclusive technical Industry Tutorials on Sunday, October 1: Past, Present and Future of TPVs; Innovations in Biocarbon Reinforced Polyolefin Sustainable Composites
- An integrated Exhibition showcasing Platinum and Gold Sponsors and Exhibitors, weaving together technical insights and interactive experiences
- New: Two Interactive OEM-led Panels focused on Sustainability from General Motors and Rivian
- New: An Executive Marketing Forum featuring select Sponsors/Exhibitors elaborating on their latest technologies, products, and services
- New: A complimentary facility tour, demonstrations, and networking at Caresoft Global, an award-winning technology-driven engineering solutions company.

Our aim? To equip you with knowledge, connections, and inspiration to navigate the exciting world of engineering polyolefins in the mobility sector and to illuminate the latest industry trends and market forces driving our future.

Our 2023 Conference Program isn't just about learning - it's about forging connections. From sponsored evening receptions to daily breakfasts and lunches, extended exhibition hours, strategic breaks within the program, and interactions with the speakers, we've woven networking opportunities across the entire value chain and into every aspect of the event.

We'd like to salute the dedication of our 50-member voluntary Planning Committee representing a cross-section of industry leaders, who've tirelessly crafted this year's Conference. Your feedback, through a post-event survey, will be our guiding light for future improvements as always. Please share what worked wonderfully and what areas we can elevate, in addition to suggestions for our future programs.

Over the next few days, brace yourselves for the electrifying experience of the 2023 SPE TPO Global Automotive Conference. And mark your calendars because we're excited to have you back in 2024 from Sept. 29 - Oct. 2, to celebrate our 25th anniversary with us!

# TECHNICAL PROGRAM HIGHLIGHTS

**SUSTAINABILITY** is the central program theme this year with a Super Technical Session on that topic with 12 talks and Two Automotive OEM Panelists providing perspectives on current practice. First Sustainability Panel is organized by General Motors with few of their supplier partners joining the panel and Rivian in the Second Sustainability Panel will focus on upfront design methodology for sustainability with few of their suppliers joining the panel to provide their perspectives. We hope you gain greater insights on sustainability from these discussions.

The Technical Program has six more technical sessions with a total of 62 presentations covering a broad spectrum of topics of current interest. We used three concurrent session tracks for the two and half a day program in scheduling the presentations. The three session rooms are adjacent to each other making it convenient if you prefer to change from one session to the other. Short (about 75 words) abstracts of all talks are provided in the Proceedings Book and on the conference website (along with copies of all presentation files) for your convenience in selecting specific talks you want to attend.

For the first time the conference includes half an hour of Marketing Presentations from a few of the conference Sponsors and Exhibitors in the Niles Room on Monday afternoon from 2 to 5 PM (run concurrently with the Technical Program). Further the conference features a Student Poster Contest and please make time to review the posters on Tuesday in the Niles Room and encourage students to pursue careers in plastics.

Two or three Co-Chairs for each of the 7 sessions have shared the responsibility for recruiting quality presentations and working out all the logistics in gathering all required documentation in a timely manner. The session chairs have complete autonomy in running their session for providing greater value to the participants. We are fortunate to have highly dedicated session chairs who recruited superb quality presentations on cutting edge technologies. The Program Schedule provides details of the session chairs and their affiliations.

The Session Chair's mission is to ensure both the presenters and the participants have pleasant experiences and receive enhanced value with the interactions. Based on the available time after the presenter concludes the talk, the session moderator will facilitate discussions with Questions and Answers. We urge you to engage the presenters in discussion for elaboration of details and improved clarity of the subject discussed. The presenters will be delighted to address any questions and gratified to know the interest you showed in asking for clarification. Further the value of the conference improves with the dialogue and discussion during the conference.

We believe strongly that we gain greater value with personal interactions with presenters at a conference than simply listening to the talks. Please seek out the presenters during breaks, lunches or receptions and get to know and engage them in discussions for improved learning. Remember both you and the presenter have a commonality of interest on the same technical topic.

Thank you for supporting the conference with your participation. Please provide us with feedback on what you have liked and how we can improve. More importantly we seek your support for next year's event by volunteering to organize a session (for recruiting presenters) or by joining the organizing committee (for managing sponsorships and exhibits).

## TECHNICAL PROGRAM CO-CHAIRS



**Dr. Norm Kakarala,**  
SPE Fellow and Honored  
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**Mike Balow,**  
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## TECHNICAL PROGRAM CO-CHAIRS

Dr. Norm Kakarala, Inteva Products LLC (Retired) | Mike Balow, Auxin Consulting, LLC | Dave Helmer, General Motors

## SPONSORSHIP CO-CHAIRS

Dr. Sassan Tarahomi, Alterra Holdings | Martin Popella, MP Squared, LLC | Karen Rhodes-Parker, SPE Detroit Section

## SESSION CHAIRS

### EXTERIOR TRIM & STRUCTURAL APPLICATIONS

Mark Pilette, Magna Exteriors (Retired)  
Charlie Yang, LyondellBasell  
Kevin DeGrood, Borealis Compounds

### PROCESS DEVELOPMENTS, ADDITIVE TECHNOLOGIES

Matt Sprouse, Washington Penn Plastics Co., Inc  
Dr. Suresh Shah, SPE Fellow, Plastics "Hall of Fame" Inductee  
David Tucker, New Wave Manf.

### SUSTAINABILITY

Mark Allen, Dow  
Murali Reddy, CCC Plastics  
Dr. Petya Yaneva, SABIC

### POLYOLEFIN ELASTOMERS & VULCANIZATES

Dr. Bhavesh Shah, Lion Elastomers  
Dr. Dave Patel, GuruTech Systems, Inc  
Dr. Nadeem Bokhari, Sumitomo Chemical

### MATERIALS DEVELOPMENT

Dr. Bin Sun, SABIC  
Quentin Boll, LyondellBasell  
Catherine Wilson, Ford Motor Company

### PERFORMANCE ADDITIVES & COLORANTS

Dr. John Mara, Amfine Chemical Co  
Heejung Kwon, Songwon

### INNOVATIONS IN AUTOMOTIVE INTERIORS

Dr. Pravin Sitaram, Haartz Corporation  
Austin Wagenhals, Ford Motor Company  
Hoa Pham, Sonoco Products Company

### SUNDAY TUTORIALS

Micheal Shoemaker, Borealis Compounds

## STAFF SUPPORT

Karen Rhodes-Parker, SPE Detroit Section

## CONFERENCE SECRETARY

Lyle Beadle, Advanced Innovation Solutions, Ltd.

## TREASURER

David Okonski, MSU - SuRF

## HOUSE

William Windscheif, Advanced Innovative Solutions, Ltd.

## KEYNOTE SPEAKERS

Lyle Beadle, Advanced Innovation Solutions, Ltd.  
Laura Shereda, Asahi Kasei Plastics  
William Windscheif, Advanced Innovative Solutions, Ltd.  
Neil Fuenmayor, LyondellBasell (Retired)  
Rob Philp, Sirmax

## OEM SUPPORT

Scott Aramian, Advanced Composites  
Drew Geda, Hyundai-Kai America Technical Center  
Tom Pickett, General Motors

## OPERATIONS

Rob Philp, Sirmax  
Mark Allen, Dow  
Richard Umemoto, Magna Exteriors

## DAY OF CONFERENCE SUPPORT

John Bonser, Formosa Plastics Group  
Jill Houser, JPI Creative

## CONFERENCE FEEDBACK

Richard Umemoto, Magna Exteriors  
Karen Rhodes-Parker, SPE Detroit Section

## TECHNICAL SESSION COORDINATION

Bill Coy, Mankiewicz Coatings, LLC  
Robert Eller, Robert Eller Associates

## PROCEEDINGS BOOK

Jill Houser, JPI Creative  
Laura Shereda, Asahi Kasei Plastics  
Dr. Norm Kakarala, Inteva Products, LLC (Retired)  
Neil Fuenmayor, LyondellBasell (Retired)  
Karen Rhodes-Parker, SPE Detroit Section

## COMMUNICATIONS

Beth Talaga, Dow (Retired)  
Catherine Wilson, Ford Motor Company  
Austin Wagenhals, Ford Motor Company  
Keith Siopes, Sumika Polymers NA  
Karen Rhodes-Parker, SPE Detroit Section  
Jill Houser, JPI Creative

## AUDIO/VIDEO

Rob Philp, Sirmax  
Mark Allen, Dow  
City Events Group

## WEBSITE

Rob Philp, Sirmax  
Rob Smuck, Big Water Media  
Neil Fuenmayor, LyondellBasell (Retired)

## MEMBERS

Paula Balhorn, Highland Plastics  
Rhianon Simmons, Highland Plastics  
James Hansil, Spartan Polymers  
Mark Lapain, Advanced Composites



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The SPE TPO Automotive Engineered Polyolefins Conference would not exist without the gracious support of our sponsors. Hence, it is with great appreciation that we thank and acknowledge the contributions of our 2023 sponsors, exhibitors, and other patrons in making this event a success.

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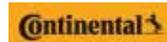
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## SPECIAL HIGHLIGHTS

### SUNDAY 10 | 1 COMPLIMENTARY TUTORIALS

PM 12:00	EXHIBITION SET-UP STARTS	
3:30	<b>SUNDAY TUTORIAL</b>	<b>History, Present and Future of Thermoplastic Vulcanizates (TPVs): A Structure Property Outlook</b> Dr. Nischay Kodihalli Shivaprakash, <i>Mitsubishi Chemical America – Performance Polymers Division</i>
4:15	<b>SUNDAY TUTORIAL</b>	<b>Innovations in Biocarbon Reinforced Polyolefin Sustainable Composites: A New Direction for Automotive Applications</b> Prof. Amar Kumar Mohanty, <i>University of Guelph</i>
5:00	EVENING RECEPTION SPONSORED BY <b>FORMOSA PLASTICS GROUP</b>	

### MONDAY 10 | 2 EXECUTIVE MARKETING FORUM

#### SPECIAL PRESENTATIONS BY OUR SPONSORS AND EXHIBITORS

NILES I AND NILES II ROOM, 2:00-5:00PM

	NILES I	NILES II
PM 2:00	ExxonMobil	HB Fuller
2:30	Alterra Holdings	Sirmax
3:00	BREAK	BREAK
3:30	Prett Advanced Materials	Carbon Polymer
4:00	Ecotek Lab	Mitsubishi

### TUESDAY 10 | 3 ECOTEK LAB STUDENT POSTER COMPETITION

AM 9:00	<b>STUDENT POSTERS ON DISPLAY</b> NILES I AND NILES II ROOM, 9:00AM-5:30PM
TO	9:00AM - 1:00PM ATTENDEE VOTING OPEN 1:00-2:00PM COMMITTEE JUDGING
PM 2:40	2:40PM POSTER COMPETITION AWARDS, HALLS I-II-III

REv. 3

## MONDAY 10 | 2

AM 7:30 **REGISTRATION / EXPO / NETWORKING / BREAKFAST**  
 8:15 **CHAIR WELCOME REMARKS / SPONSORSHIP MESSAGE**  
 8:30 **KEYNOTE** **Cockpit of the Future**  
 Drew Winter, *Informa Tech Automotive Group, TU-Automotive, WardsAuto, Wards Intelligence*  
 9:15 **PANEL DISCUSSION** **Achieving Sustainable Thermoplastic Olefins Across the Value Chain, led by General Motors**  
 Matt Vandyke, *General Motors – Senior Plastics Sustainable Materials Engineer*  
 Panel Representatives from: *Inteva Products, LLC, Magna, Advanced Composites, Dow, LyondellBasell and ISCC*  
 Moderated by: *Dr. Petya Yaneva, SABIC; Pravin Sitaram, Haartz Corp.*

### 10:45 NETWORKING BREAK SPONSORED BY **SPE DETROIT SECTION**

	HALL I	HALL II	HALL III
	<b>SUSTAINABILITY</b>	<b>INNOVATIONS IN INTERIORS</b>	<b>PERFORMANCE ADDITIVES &amp; COLORANTS</b>
	Mark Allen, <i>Dow Chemical</i> Dr. Murali Reddy, <i>CCC Plastics</i> Dr. Petya Yaneva, <i>SABIC</i>	Dr. Pravin Sitaram, <i>Haartz Corp.</i> Austin Wagenhals, <i>Ford Motor Co.</i> Hoa Pham, <i>Sonoco</i>	Dr. John Mara, <i>Amfine</i> Heejung Kwon, <i>Songwon</i>
11:00	<b>Challenges of Mechanically and Chemically Recycling Post-Consumer Polypropylene</b> David Nix, <i>Green Group Consulting</i>	<b>Plenary Talk - Industry Trends Driving More for Less</b> Ken Gassman, <i>Inteva Products, LLC</i>	<b>How Stabilization of Automotive TPO Compounds Changed from the Past and How it Could Evolve in the Future</b> Margot Clauss, Klaus Keck, <i>Rianlon</i>
11:30	<b>Life Cycle Assessment Based on Carbon Footprint of PVC Slush IP Skin vs TPE Injection Molded Soft Skin</b> Susan Kozora, <i>IAC</i>	<b>Wave Casting Technology for Automotive Interiors</b> Dr. Greg Farrar, <i>CpK</i>	<b>Ionic Additive to Improve Melt Strength in Recycled and Virgin PP Compounds</b> Brett Robb, <i>Resin Solutions</i>

### PM 12:00 NETWORKING LUNCH SPONSORED BY **SPE DETROIT SECTION**

1:30	<b>Upcycling of Waste Polyolefins and Recycled Ocean Plastic in Biocomposites Uses for a Circular Economy</b> Manjusri Misra, <i>University of Guelph</i>	<b>Challenges of Smart Surfaces in Automotive Trim</b> Jeremy Husic / David Whitehead, <i>Inteva Products, LLC</i>	<b>Developing Polyolefin Compounds with a Metallic Look</b> Kevin George, <i>GEON Performance Solutions</i>
2:00	<b>Post Industrial Recycling of Natural Fiber Reinforced Polypropylene (NFPP)</b> Thomas Sybrandy, <i>Inteva Products, LLC</i>	<b>Decarbonization in Automobiles - Material Options for Automotive Interior Applications</b> James Leo Mazurek / Akim Khalef, <i>FORVIA / MATERI'ACT</i>	<b>Superior Polypropylene via Use of Novel Nucleating Agent Technology</b> Yuhei Hattori, <i>Amfine</i>
2:30	<b>Sustainability Certification for TPO Supply Chains using ISCC PLUS</b> Peter Hawighorst, <i>ISCC</i>	<b>Next Generation Cold Temperature Ductile Interior TPOs</b> Robert Mimms, <i>Advanced Composites</i>	<b>Thermo-oxidative Stabilization of Mechanical Recycled Polypropylene Compounds</b> Heejung Kwon, <i>Songwon</i>

### 3:00 NETWORKING BREAK SPONSORED BY **SIRMAX**

3:30	<b>Product Designs to Facilitate Increased Recycled Content</b> Kevin Lyons, <i>Inteva Products, LLC</i>	<b>Antifungal Test Methods - What you Need to Know</b> Dr. Mail Ha, <i>Microban</i>	<b>MATERIALS DEVELOPMENT</b> Quentin Boll, <i>LyondellBasell</i> Catherine Wilson, <i>Ford Motor Co.</i> Dr. Bin Sun, <i>SABIC</i>
4:00	<b>Sustainable Polyolefin Composites for Today and Tomorrow</b> Kevin George, <i>Geon Performance Solutions</i>	<b>Recycled Content TPE for Automotive Interiors</b> Stephen Cranney, <i>Kraiburg</i>	
4:30	<b>Sustainable Mechanically Recycled Polypropylene Compounds for Automotive Applications</b> Junhua Zhang, <i>SABIC</i>	<b>Incorporating Recycled Polypropylene in a Compound Intended for Automotive Interior Applications</b> Luca Gazzola, <i>Sirmax</i>	

### 5:00 EVENING RECEPTION SPONSORED BY **ADVANCED COMPOSITES**

## TUESDAY 10 | 3

AM 7:30 REGISTRATION / EXPO / NETWORKING / BREAKFAST  
 8:15 CHAIR WELCOME REMARKS / ECOTEK LAB STUDENT POSTER COMPETITION / SPONSORSHIP MESSAGE  
 8:30 **KEYNOTE** **Systematizing Sustainability** Manoj Patnala, Director for Interior Advanced Technologies, RIVIAN  
 9:15 **KEYNOTE** **Reducing Carbon Footprint with Performance: The Role of Bio-Based Plastics in Mitigating Climate Change**  
 Gustavo Lombardi, Director of Business Development, Braskem

10:15 NETWORKING BREAK SPONSORED BY **SPE DETROIT SECTION**

HALL I

HALL II

HALL III

**EXTERIOR TRIM & STRUCTURAL APPLICATIONS**

Mark Pilette, Magna (Retired)  
 Charlie Yang, LyondellBasell  
 Kevin DeGrood, Borealis

**Automotive Seating and Interiors Innovation using EPP**  
 Steven R Sopher, JSP

**Transforming EPP for New Solutions**  
 Chris Gregory, Magna

**Advancement in Translucent TPO Compounds for Innovative Automotive Lighting Design**  
 Dan Zhang, LyondellBasell

**POLYOLEFIN ELASTOMERS & VULCANIZATES**

Dr. Bhavesh Shah, Lion Elastomers  
 Dr. Dave Patel, GuruTech Systems, Inc  
 Dr. Nadeem Bokhari, Sumitomo Polymers

**Split-Proof Thermoplastic Vulcanizates (TPV) for Corner Molding Application**  
 Dr. Nischay Kodihalli Shivaprakash, Mitsubishi Chemical America

**Santoprene Thermoplastic Vulcanizates in EV Cooling Hose Applications**  
 Paul Zwick, Celanese

**Self Lubricated Low Coefficient of Friction Thermoplastic Vulcanizates (TPV) for Corner Molding Application**  
 Şerif Erdoğan, Elastron

**MATERIALS DEVELOPMENT**

Quentin Boll, LyondellBasell  
 Catherine Wilson, Ford Motor Co.  
 Dr. Bin Sun, SABIC

**How to Overcome Material Specifications in Talc Modified TPOs: Introducing New Product Line Neofill**  
 Piergiovanni Ercoli Malacari, IMI Fabi SpA

**Newly Developed Innovative SEBS for Automotive – Interior Parts**  
 Kazuhisa Takagi, Asahi KASEI

**Novel Flame Retardant Polypropylene for Large EV Battery Part Production through Extrusion and Thermoforming**  
 Dr. Petya Yaneva, SABIC

PM 12:00 NETWORKING LUNCH SPONSORED BY **SPE DETROIT SECTION**

**PANEL DISCUSSION**

**Accelerating Sustainable Materials Development For a Greener Future, led by RIVIAN**

**MODERATOR:** Manoj Patnala, Director for Interior Advanced Technologies, RIVIAN  
**RIVIAN PANELISTS:** Farshad Toomadj, Lead CMF; Lauren Palomba, Staff Materials Engineer; Mudit Shukla, Rivian Core Engineer; Yichi Zhang, Sr. Staff Materials Engineer; Venu Krishnardula, Staff Materials Engineer  
**SUPPLIER PANELISTS:** Advanced Composites, The Materials Group

**PROCESS ENABLING & ADDITIVE TECHNOLOGIES**

Matt Sprouse, Audia  
 Dr. Suresh Shah, Dephi (Retired)  
 David Tucker, New Wave Manf.

2:40 ECOTEK LAB STUDENT POSTER COMPETITION WINNERS ANNOUNCED  
 2:45 NETWORKING BREAK SPONSORED BY **M HOLLAND**

**Trends in Design & MFG. of Door Hardware Modules**  
 Brian Staser, Inteva Products, LLC

**Innovative Elastomer Product Designs and Processing**  
 Dr. Talat Karmo, VINTECH INDUSTRIES

**Compression Molded EV Battery Enclosures with Flame Retardant Glass Reinforced Polyolefin Compounds**  
 Dr. Koffi Dagnon, SABIC

**Polyolefin Elastomer Choices in Designing Translucent TPO Compounds**  
 Gaoxiang Wu, Dow

**Newly Developed TPV for Glass-Run Channel Corner Joint Applications**  
 Takeshi Tominaga, Sumika Polymers (Sumitomo)

**Advanced Simulation Techniques for Predicting and Mitigating Stress Marks on High-Quality Product Surfaces**  
 Alex Baker, Moldex3D

**Innovative Short Glass Fibre Reinforced Polypropylene Compounds for Liftgate an High Class Automotive Applications**  
 Nicolas Schlutig, Sumika Polymers (Sumitomo)

**Reduce Carbon Footprint with Santoprene ECO-R TPVs**  
 Dr. Prashant Bhadane, Celanese

**Implementation of Live, Nonfunctional Decorative Stitching as an Alternative to Cut-Sew-Wrap Technology for Automotive Applications**  
 Ed Wenzel, Inteva Products, LLC

**High Stiffness Thermoplastic Olefins (TPOs) Enabling Light Weight Body Panel Applications**  
 Jue (Jane) Lu, LyondellBasell

**Multi-featured Soft TPV; Extremely Low Permanent Set, High Fluidity, and Over-Moldability**  
 Kaho Tazeo, ENEOS Materials

**Polymer Fusion Labeling: A New Labeling Technology that Answers Major Safety Concerns and Reduces Liability**  
 Jason Brownell, Polyfuze Graphics

**Recent Glass Fibre Reinforced Polypropylene Compounds to Meet Carbon Footprint Target**  
 Nicolas Schlutig, Sumika Polymers (Sumitomo)

**Sustainable Styrenic Block Copolymer Solutions to Enhance Multipolymer Compatibilization and Performance in Automotive Applications**  
 Dr. David Truong, Kraton Polymers

**Digital Printing with Polypropylene in Automotive**  
 Dmitriy Yurchenko, GKN Additive, NA

5:30 NETWORKING RECEPTION SPONSORED BY **SPE DETROIT SECTION**

## WEDNESDAY 10 | 4

AM 7:30 REGISTRATION / EXPO / NETWORKING / BREAKFAST  
 8:15 CHAIR WELCOME REMARKS / CARESOFT GLOBAL FACILITY TOUR / SPONSORSHIP MESSAGE  
 8:30 **KEYNOTE** **The Value of Benchmarking to the Mobility Evolution**  
 Manojdeep Jasrotia, *Vice President of North America Sales, Caresoft Global*

9:15 NETWORKING BREAK SPONSORED BY SPE DETROIT SECTION

	HALL I	HALL II	HALL III
	<b>SUSTAINABILITY</b>	<b>INNOVATIONS IN INTERIORS</b>	<b>PROCESS ENABLING &amp; ADDITIVE TECHNOLOGIES</b>
	Mark Allen, <i>Dow Chemical</i> Dr. Murali Reddy, <i>CCC Plastics</i> Dr. Petya Yaneva, <i>SABIC</i>	Dr. Pravin Sitaram, <i>Haartz</i> Austin Wagenhals, <i>Ford Motor Co.</i> Hoa Pham, <i>Sonoco</i>	Matt Sprouse, <i>Audia</i> Dr. Suresh Shah, <i>Dephi (Retired)</i> David Tucker, <i>New Wave Manf.</i>
9:30	<b>Driving Sustainable Materials for Mobility</b> Lisa Madenjian, <i>Dow</i>	<b>Enhancing Automotive Interiors with Recycled Content TPE's</b> Chris Engel, <i>Avient</i>	<b>Managing Melt Temperature in a Co-rotating Twin Screw Extruder</b> Charlie Martin, <i>Leistritz Extrusion</i>
10:00	<b>Addressing Net Zero Emission Goals Using Carbon Negative Bio-Based Polypropylene</b> Megan Krampe, <i>Mitsui</i>	<b>Recycled Materials and Non-Halogenated FR Technologies in Crosslinked Closed Cell Polyolefin Foams for Interior Applications</b> Turner Slaughtner, <i>Sekisui VOLTEK</i>	<b>Compounding Bio-based Polymers with AI 2.0</b> Saeed Arabi, <i>Alterra Holdings</i>

**PERFORMANCE ADDITIVES & COLORANTS**

Dr. John Mara, *Amfine*  
Heejung Kwon, *Songwon*

10:30	<b>Additive Technologies to Improve TPO Performance in Automotive Applications</b> Michail Dolgovskij, <i>SI Group</i>	<b>Predicting Mechanical Performance &amp; Processing of Core-back Foam Injection-molded Parts with Grained Surfaces</b> Anil Tiwari, <i>SABIC</i>	<b>Additives Engineering and Impact on Polyolefins Weather Stability and Anti-Dust Properties</b> Enrico Galfre, <i>SABO</i>
11:00	<b>Advanced Polymer Additive Technology to promotes Circular Economy</b> Koichi Yuno, <i>Adeka</i>	<b>H.B. Fuller's Thermonex® Clearbond Transparent Adhesive for Interior Trim</b> Brent Landis / Rick Snyder, <i>H. B. Fuller</i>	<b>How Various Combinations of Additives Affects the Performance of Antiscratch Additives in PP Automotive Formulation</b> Dr. Emile Homs, <i>Cargill</i>
11:30		<b>Understanding Scratch and Mar Improvements for Increased Consumer Satisfaction</b> Kevin George / Tra Goss, <i>Geon Performance Solutions</i>	

PM 12:00 **FACILITY TOUR** **DEPART FOR CARESOFT GLOBAL FACILITY TOUR (Optional)**  
 1:00 - 1:30PM NETWORKING RECEPTION (Food/Beverages provided)  
 1:30 - 3:30PM Talk to the Experts...Demonstrations and Tour

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3:30 CONFERENCE CONCLUDES REv. 3

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Demonstrations and Tours

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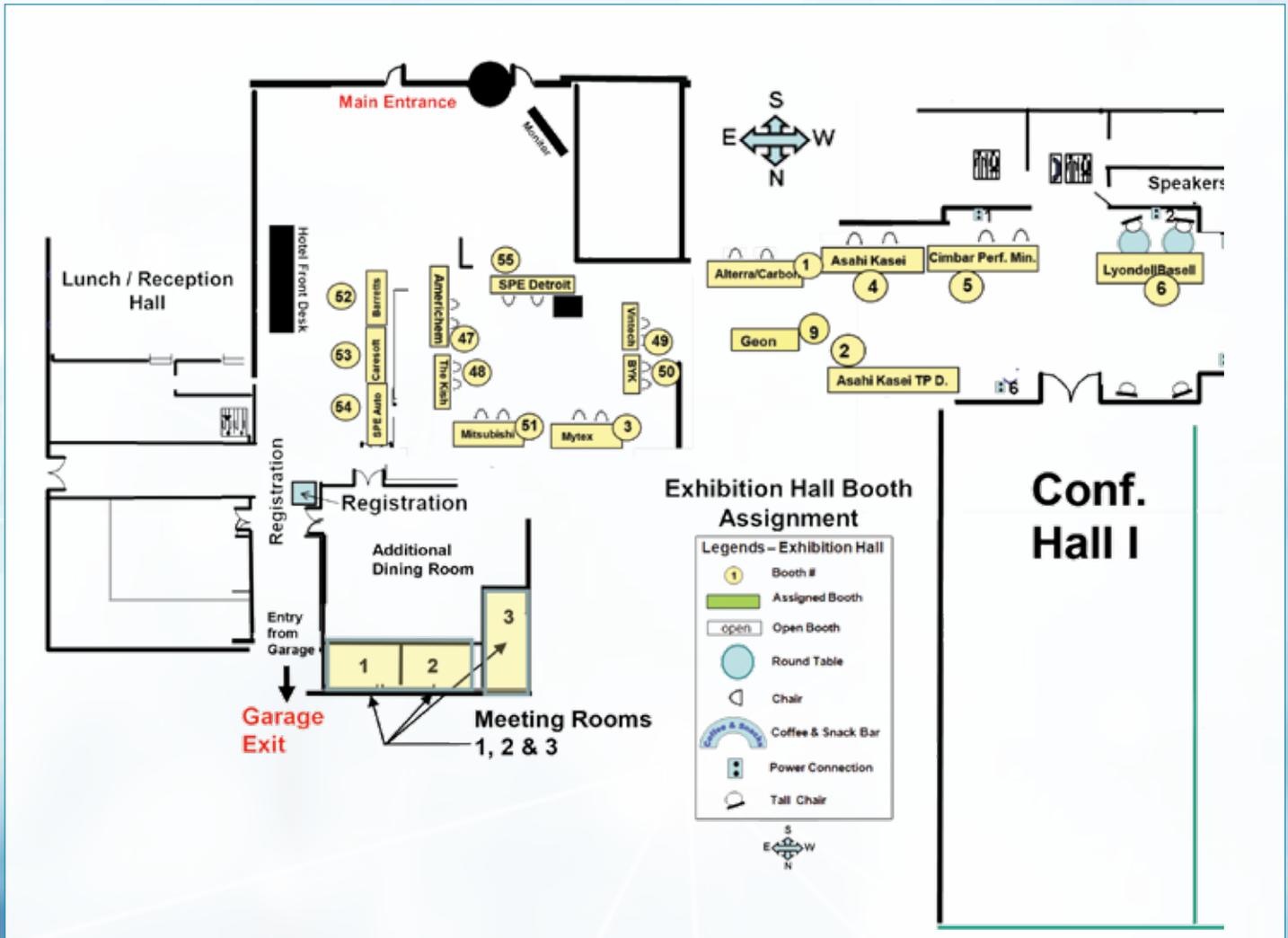


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# EXHIBITORS LOCATIONS

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MOBILITY EVOLUTION

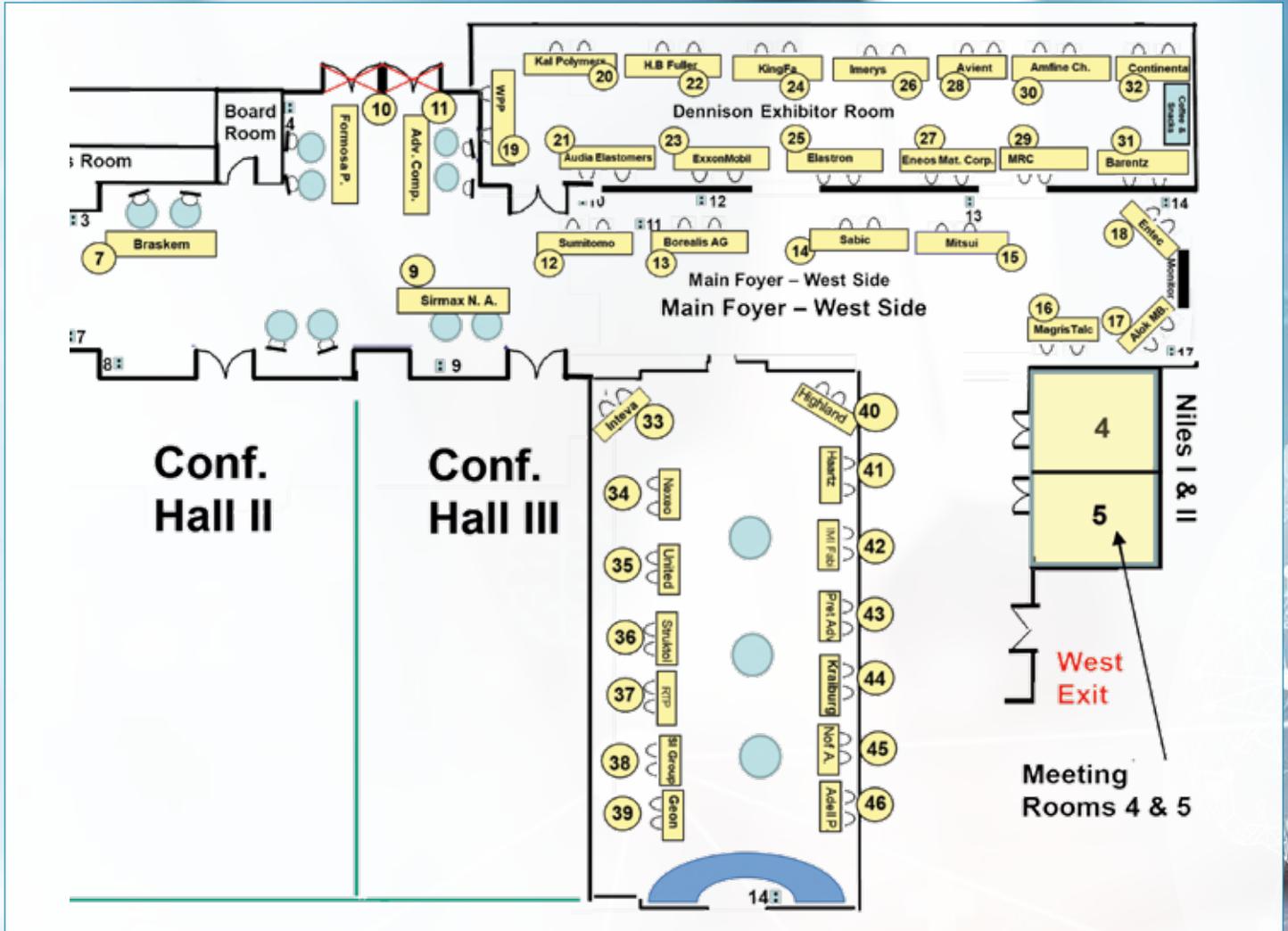


## 2023 EXHIBITORS ALPHABETICALLY

Advanced Composites	Platinum	11	MRC Polymers	Gold	29
Formosa Plastic	Platinum	10	Magris Talc	Gold	16
Alterra/Carbon Polymers	Gold	1	Mitsubishi Chemical Group	Gold	51
Amfine Chemical	Gold	30	Mitsui Plastics	Gold	15
Asahi Kasei Plastics	Gold	2	Nexeo Plastics	Gold	34
Asahi Kasei Thermoplastic Elastomer Div	Gold	4	SABIC	Gold	14
Borealis	Gold	13	Sirmax North America, Inc	Gold	9
Braskem	Gold	7	Sumitomo Chemical	Gold	12
Cimbar Performance Minerals	Gold	5	Adell Plastics	Exhibitor	46
ExxonMobil	Gold	23	Alok Masterbatches	Exhibitor	17
HB Fuller	Gold	22	Americhem	Exhibitor	47
Haartz Corporation	Gold	41	Audia Elastomers	Exhibitor	21
Kingfa Sci. & Tech.(USA), Inc	Gold	21	Avient Corporation	Exhibitor	28
LyondellBasell	Gold	6	Barentz	Exhibitor	31

# EXHIBITORS

## LOCATIONS



## 2023 EXHIBITORS ALPHABETICALLY

Barretts Minerals	Exhibitor	52	NOF America Corporation	Exhibitor	45
BYK	Exhibitor	50	Pret Advanced Materials	Exhibitor	43
Continental	Exhibitor	32	RTP Company	Exhibitor	37
Elastron	Exhibitor	25	SI Group	Exhibitor	38
Eneos Materials Corporation	Exhibitor	27	Struktul Company of America	Exhibitor	36
Entec Polymers	Exhibitor	18	The Kish Company	Exhibitor	48
GEON Performance Solutions	Exhibitor	39	Washington Penn	Exhibitor	19
Highland Plastics	Exhibitor	40	United Paint & Chemical Corp.	Exhibitor	35
IMI Fabi LLC	Exhibitor	42	VINTECH	Exhibitor	49
Imerys	Exhibitor	26	SPE Detroit		55
Inteva Products	Exhibitor	33	SPE Automotive		54
Kal-Polymers	Exhibitor	20	Caresoft		53
KRAIBURG-TPE	Exhibitor	44			
Mytex Polymers	Exhibitor	3			

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And don't miss Braskem America's Business Development Director, Gustavo Lombardi, present 'Unprecedented Carbon Neutrality and Performance Solutions Offered by Braskem'

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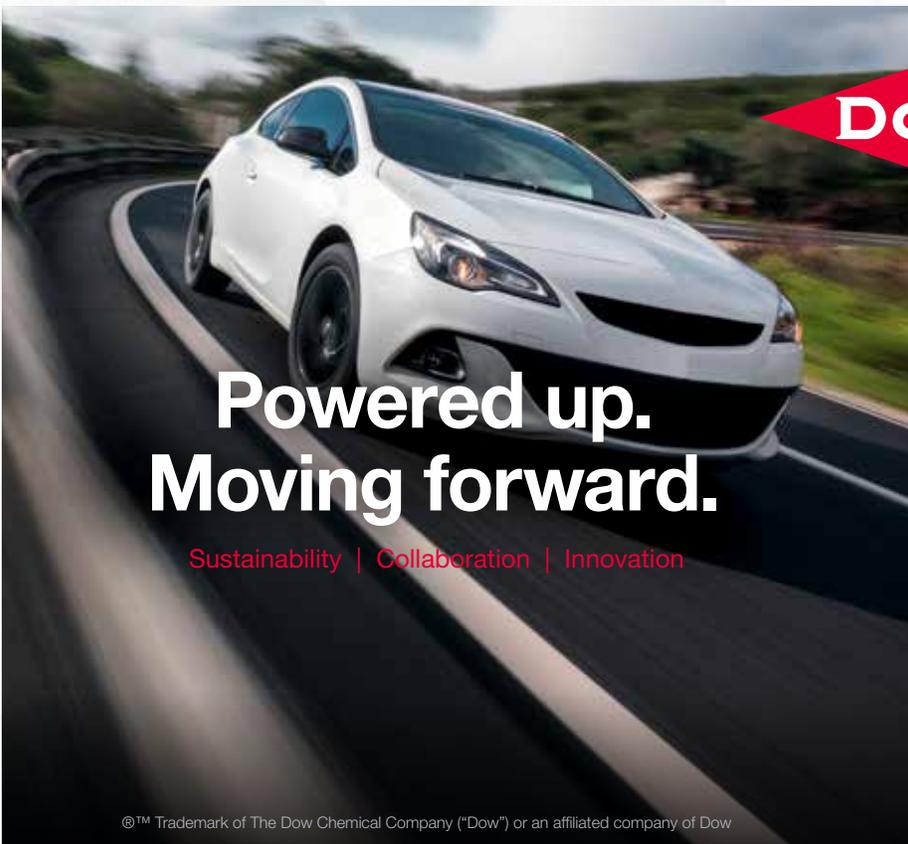


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# 2023 KEYNOTES

Now in its third decade, the 23<sup>rd</sup> Annual **SPE® TPO AUTOMOTIVE ENGINEERED POLYOLEFINS CONFERENCE** is the *world's leading engineered polyolefins forum*, highlighting advances in polyolefin materials, processes, and applications technologies as well as a growing range of thermoplastic elastomers (TPEs) and thermoplastic vulcanizates (TPVs). The conference keynotes take place each morning and will kick off **Monday, October 2 at 8:30 a.m.**



## MONDAY OCTOBER 2 AT 8:30 AM

**DREW WINTER, *Principal Analyst,***  
**Informa Tech Automotive Group, TU-Automotive, WardsAuto, Wards Intelligence**

**Drew Winter** has followed cockpit of the future topics and have been researching and writing about automotive interiors for more than 20 years, first as an award-winning automotive journalist and then as a producer of the WardsAuto Interiors and WardsAuto User Experience conferences. He test drives dozens of vehicles a year as a judge for the Wards 10 Best Propulsion Systems, Wards 10 Best Interiors & UX each year in addition to being a long-time juror for the North American Car, Truck and Utility of the Year awards. You can find his research here: <https://wardsintelligence.informa.com/>

### COCKPIT OF THE FUTURE

The vehicle cockpit is where all the mobility megatrends of electrification, connectivity, autonomy and sustainability converge. By mid-decade, vehicle cockpits will go through a major transformation that promises to bring new opportunities and challenges for TPOs. This presentation will feature pictures of the most impressive cockpit and IP designs coming out in 2024-2026. Instrument panels will be designed to limit driver distraction, with more information being projected on the windshield and virtual cockpit controls placed closer to the driver. Because a growing number of consumers view vehicles as a “third space” defined as a place outside of work and home, automakers are designing interiors more like living rooms with moveable seats. EVs also will drive a transition from electricity-guzzling HVAC systems to more efficient heated and cooled seats and surfaces. This presentation will reveal the results of our latest industry survey including when most vehicles will have 25% sustainable cockpit materials. Future cockpits also will have more safeguards for children, the elderly and the disabled, with antimicrobial surfaces and automatic doors for easy access.

## TUESDAY OCTOBER 3 AT 8:30 AM

**MANOJ PATNALA,**  
***Director for Interior Advanced Technologies,***  
**RIVIAN**

**Manoj Patnala** is the **Director for Interior Advanced Technologies** at **Rivian**. He is responsible for aspects of design, development, and delivery from concept through product launch. His role spans Product Development, Innovation, Material Development, Tooling, and Validation. He has more than 20 years of product development experience and has worked at Ford Motor Company and Tier 1 Suppliers prior to joining Rivian in 2021.

### SYSTEMATIZING SUSTAINABILITY

In his keynote, Manoj will talk about Rivian's approach towards driving sustainability into the product development process and how Rivian would like to lead the way in enabling implementation of sustainability through radical minimization of virgin resources and decarbonization across all stages of product design, development, production, and end of life. Manoj will also discuss how Rivian is leveraging innovation in plastics development and partnerships with suppliers in delivering its mission of producing products with high sustainable content.



# 2023 KEYNOTES

TUESDAY OCTOBER 3 AT 9:15 AM

**GUSTAVO LOMBARDI,**  
*Director of Business Development, Braskem*

**Gustavo Lombardi** is the *Director of Business Development* at **Braskem America**. In this role, he is responsible for the Biobased Polypropylene project, leading the strategy globally from sourcing to sales, including supplier and commercial partner selection and the long-term business plan for the project. Previously, Gustavo has held various roles at Braskem, including the Market Segment Leader for Nonwoven, Channels to Market, and Green Polyethylene for North America. He also served as the business leader for the Colombia and Andean Region in South America, and sales in Brazil. Prior to joining Braskem, Gustavo worked for Henkel, leading the industrial adhesives division in Brazil, and worked at the flexible packaging division for Bemis in Brazil. Gustavo holds a bachelor's degree in Polymeric Material Engineering from the University of Sao Carlos in Sao Paulo/Brazil. He furthered his education by obtaining a Business Administration specialization at the University of Berkeley, California.



## REDUCING CARBON FOOTPRINT WITH PERFORMANCE: THE ROLE OF BIO-BASED PLASTICS IN MITIGATING CLIMATE CHANGE

Actions to combat climate change and its impact are increasing, but what the plastics industry has accomplished so far is not sufficient to meet ambitious carbon reduction goals. Many companies are behind schedule on their initiatives because many current sustainable solutions are restricted by technical limitations. In early 2023, Braskem announced a plan to invest in an industrial-scale facility in the US to produce 100% segregated biobased polypropylene (PP) from bioethanol as part of its commitment to becoming carbon neutral by 2050. Braskem has been commercially producing biobased polyethylene (PE) from bioethanol in Brazil since 2010. This project will utilize Braskem's proven proprietary technology to convert bioethanol into physically segregated bio-based PP. This investment in biobased polypropylene validates Braskem's commitment to the North American PP industry by using well-known technology and decades of experience to deliver sustainable PP solutions.



WEDNESDAY OCTOBER 4 AT 8:30 AM

**MANOJDEEP JASROTIA,** *Vice President of North America Sales,*  
**Caresoft Global**

A seasoned engineering professional, leader, and strategist, **Manojdeep Jasrotia** is the *Vice President of North America Sales* for **Caresoft Global**. His experiences in industrial engineering, manufacturing, supply chain, and product line marketing help him in putting together and executing customized consulting and technical solutions for global Automotive clients.

As a leader at Caresoft, Manoj has been able to witness first-hand the mobility evolution and can speak directly to the current plastics applications in the market and the future we can expect to see.

## THE VALUE OF BENCHMARKING TO THE MOBILITY EVOLUTION

In his presentation, he will discuss how Caresoft Global finds itself at the center of the ongoing mobility revolution. As a benchmarking and engineering firm, they are in a unique position where they are able to observe and assess the different levels of efficiency, complexity, and opportunity for optimization within a vehicle. Manoj will share the evolving role of materials in enabling mass and cost savings, safety, styling, and ease-of-manufacturing for EVs.

# 2023 SPE TPO STUDENT POSTER COMPETITION

## SUPPORTING SCIENTISTS OF TOMORROW

Students from Ecotek Lab -a science research organization dedicated to supporting the scientists of tomorrow will present their plastic research project on a poster at the 2023 PO Conference on October 3, 2023. These young scientists are academically gifted middle and high school students who participate in international science research ventures, similar to the SPE TPO and EAV Conference. These young scientists work on challenging projects that prepare them for college-level opportunities while helping them understand the role science plays in the global arena.

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Science at Work!

**TUESDAY, OCTOBER 3**

9:00 AM - 5:00 PM  
Detroit-Marriott Troy,  
Niles Room

**WEDNESDAY, OCTOBER 4**

Winners announced at 2:40pm

### AWARDS

1<sup>st</sup> Place \$1,000,  
2<sup>nd</sup> Place \$750,  
3<sup>rd</sup> Place \$500  
Attendee Choice \$500

Ecotek Lab: Keith Young at [ecoteklab@gmail.com](mailto:ecoteklab@gmail.com)  
PlastiVan/SPE Foundation: Eve Vitale at [evitale@4spe.org](mailto:evitale@4spe.org)



Keith Young, Ecotek Labs

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# PANEL DISCUSSION

## ACHIEVING SUSTAINABLE THERMOPLASTIC POLYOLEFINS ACROSS THE VALUE CHAIN

Monday, October 2 | 9:15 AM



Led by **Matt Vandyke**

*General Motors*

*Senior Plastics Sustainable Materials Engineer*

Moderated by

DR. PETYA YANEVA, *SABIC* | PRAVIN SITARAM, *Haartz Group*

### PANELISTS



MARK LAPAIN  
*Advanced Composites*



PARVINDER WALIA  
*Magna*



LISA MADENJIAN  
*Dow*



DAVID KRAMER  
*LyondellBasell*



KEVIN LYONS  
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# PANEL DISCUSSION

## ACCELERATING SUSTAINABLE MATERIALS DEVELOPMENT FOR A GREENER FUTURE, led by RIVIAN

Tuesday, October 3 | 1:30 PM



Moderated by **Manoj Patnala**  
*Director for Interior Advanced Technologies -  
Core Engineering and Verification, RIVIAN*

### RIVIAN PANELISTS



**FARSHAD TOOMADJ**  
*Lead CMF*



**LAUREN PALOMBA**  
*Staff Materials Engineer*



**MUDIT SHUKLA**  
*Core Engineer*



**YICHI ZHANG**  
*Sr. Staff Materials  
Engineer*



**VENU KRISHNARDULA**  
*Staff Materials Engineer*

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# SUSTAINABILITY

SESSION CO-CHAIRS: Mark Allen, Dow Chemical | Dr. Murali Reddy, CCC Plastics | Dr. Petya Yaneva, SABIC



## Sustainability Certification for TPO Supply Chains using ISCC Plus

David Nix, Green Group Consulting

Use of recycled resins in main stream applications will be increasing in the coming years. Using recycled post-consumer resin as a replacement for virgin resin is the goal of many initiatives. Recycling PCR has added complexity over post-industrial material that will be explored. Green Group Consulting uses several industry and government studies to inform our discussion. There are benefits and drawbacks of both mechanical and chemical recycling that will be explored.



## Life Cycle Assessment Based on Carbon Footprint of PVC Slush IP Skin vs TPE Injection Molded Soft Skin

Susan Kozora, IAC Group

In this presentation the basic components of a life cycle assessment as well as how to interpret results will be reviewed. A case study comparing a polyvinyl chloride (PVC) slush skin to a thermoplastic elastomer (TPE) injected molded soft skin for use in automotive instrument panels will be presented. The results will be used to determine the optimal use of materials, designs and processes to improve sustainability for interior components without compromising performance or aesthetics.



## Upcycling of Waste Polyolefins and Recycled Ocean plastic in Biocomposites uses for a Circular Economy

Manjusri Misra, University of Guelph

The total weight of plastic wastes globally per year is around 300 million metric ton, which is equivalent to the weight of the total human population. Plastic waste is mostly comprised of mixed polyolefin which contributes more than 75% of total plastic waste. Thus, the valorization of waste polyolefin through upcycling as a sustainable composite is the new wave of the future. Both the matrix and reinforcement in a composite can be engineered from wastes, recycled materials, renewable sources and their hybrids, coined as “sustainable composites”. As a group of researchers at the Bioproducts Discovery and Development Centre (BDDC), University of Guelph, we are continuously developing sustainable biocomposites from waste, recycled plastics and natural fibres as well as from pyrolyzed biomass (known as biocarbon). Both injection moulded and 3D printed biocomposites for commercial attraction have been developed for automotive and rigid packaging applications. In one of our works, the BDDC developed novel injection moulded compatibilized hybrid biocomposites from waste bale-wrap and natural fibre through biocomposite uses [1]. In our work on valorization of waste biomass and waste plastic, we used waste coffee ground based biocarbon and waste polyolefin [2]. The developed sustainable composites contained more than 60% of waste recycled plastic. The newly engineered biocomposites showed good balance among stiffness and toughness with a heat deflection temperature of ~100-degree C. In another innovation, we engineered 3D printed composites from ocean recycled plastic and biocarbon [3]. This presentation will highlight how upcycling of waste polyolefin through sustainable composite manufacturing can support circular economy and can find new life for both waste plastic and waste biomass.



## Post Industrial Recycling of Natural Fiber Reinforced Polypropylene (NFPP)

Thomas Sybrandy, Inteva Products, LLC

Natural Fiber Polypropylene (NFPP) is a nonwoven product partially comprised of renewable resources that is used to provide a mass savings to automotive interior trim components. The manufacturing process used to form these interior trim components produces a large volume of offal which increases their cost, while negatively impacting the environment. This talk will provide insight on how this high-value offal can be recovered and reused. Finally, an overview is provided of our InLite™ product offerings, with a focus on providing a cost-effective approach to mass savings.



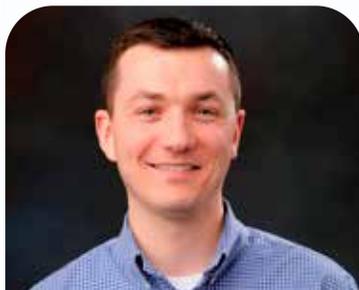
## Sustainability Certification for TPO Supply Chains Using ISCC PLUS

Peter Hawighorst, ISCC

Automotive companies have ambitious targets to reduce their GHG emissions in a timely manner. Along complex supply chains, chain of custody concepts like mass balancing ensure the credible connection of sustainability information to the materials and products in commerce, which is critical to the reputation of the companies involved. Companies, including TPO producers, are increasingly relying upon the International Sustainability and Carbon Certification (ISCC) scheme. ISCC is used by more than 7,000 companies worldwide and provides credibility and acceptance for both B2B partners and consumers, and can potentially be used for reporting under regulatory frameworks or voluntary initiatives.

# SUSTAINABILITY

SESSION CO-CHAIRS: Mark Allen, *Dow Chemical* | Dr. Murali Reddy, *CCC Plastics* | Dr. Petya Yaneva, *SABIC*



## Product Designs to Facilitate Increased Recycled Content

**Kevin Lyons\***, Amy Gilmer, Sam He  
*Inteva Products, LLC*

A circular economy strives to eliminate waste & pollution and to reuse high-value products & materials in the same application. Thermoplastic olefins (TPOs) and elastomers (TPEs) have a lower environmental cost when compared to other polymer choices. Additionally, TPO/TPE's are versatile, robust, and recyclable to support lowering a product's carbon footprint through mono-material designs and, ultimately, increased PIR/PCR content. The Inteather™ product line is committed to innovating around TPO materials to support these efforts. This talk will provide an update on three on-going developments at Inteva: (1) Bilaminate ECO Trim (2) TPO Artificial Leather and (3) Mono-material / Circularity.



## Sustainable Polyolefin Composites for Today and Tomorrow

**Kevin George**, *Geon Performance Solutions*

Two approaches to sustainability are: (1) effectively utilizing recycled content and (2) use of ingredients derived from renewable sources such as biofibers. Perceptions that limit the adoption of recycle content materials in various applications include factors such as recycle stream availability and technical factors such as material equivalency. A discussion on material equivalency and variability with Resilience R compounds will be presented, showing data based on multi-lot production data. An overview of recent GEON developments relative to the use of biofibers will be presented, and include our latest developments.



## Sustainable Mechanically Recycled Polypropylene Compounds for Automotive Applications

**Junhua Zhang**, *SABIC*

The automotive industry has a strategic desire to increase use of recycled plastics to support advancements in CO2 emissions reduction, cradle-to-cradle design and a circular economy. This paper highlights a set of sustainable mechanical recycling polypropylene compound solutions for automotive applications, with an overview of specific materials and their key properties for interior, exterior and under-the-hood applications. In addition, insights are shared on the future usage of end-of-life vehicles streams in the production of compounds for automotive parts.



## Driving Sustainable Polyolefin Materials for Mobility

**Lisa Madenjian**, *Dow*

Dow has developed a blueprint to further enable use of their polyolefin product offering in ever more efficient ways. The build out of this blueprint will help enable automobile engineers and designers to meet their goals for circularity/renewable content, reduced carbon footprint, and safer materials. Material mapping will highlight how polyolefins are the material of choice for multiple application spaces. Advancement in polyolefins that further improve sustainability will be showcased. Finally, a vision of how TPO can enable circularity of plastic materials at end of life for an automobile will be presented.



## Addressing Net Zero Emission Goals Using Carbon Negative Bio-Based Polypropylene

**Megan Krampe**, *Mitsui Plastics, Inc.*

Carbon negative bio-based polypropylene production is a promising approach to address the environmental impact of traditional petroleum-based plastics. Mitsui's bio-based polypropylene is produced using ethanol derived from bio-feedstock. The bio-Ethanol is converted to bio-Ethylene and used as a feedstock to produce Polypropylene. This offers a sustainable alternative to traditional Polypropylene production methods with no impact to the recycling stream and significantly reduces greenhouse gas emissions while also providing a drop-in cost-effective solution to the automotive, packaging, and compounding industries. We set out to compare this novel technology against petroleum derived as well as PIR and PCR polypropylene.

# SUSTAINABILITY

SESSION CO-CHAIRS: Mark Allen, *Dow Chemical* | Dr. Murali Reddy, *CCC Plastics* | Dr. Petya Yaneva, *SABIC*



## Additive Technologies to Improve TPO Performance in Automotive Applications

**Michail Dolgovskij, SI Group**

SI Group provides additive solutions to improve the performance and stability of TPOs used in automotive applications. Two case studies will be discussed. In the first, POLYBOND™ is used in glass-filled PP applications to bond the filler to the polymer matrix resulting in significantly improved mechanical performance. Data from both glass fiber compounding and long-glass fiber processing are given in support of applications for metal replacement. In the second case study, stabilization solutions featuring ULTRANOX™ 626 are shown to have superior color stabilization at reduced dosing levels than industry-standard stabilization packages. These stabilization packages with ULTRANOX™ 626 result in a material with less material intensity and overall superior performance. Finally, an update on EVERCYCLE™ for increasing the usability of PCR in automotive TPO applications will be given.



## Advanced Polymer Additive Technology to Promotes Circular Economy

**Yuno Koichi, Adeka**

In recent years, the automotive industry has been accelerating its efforts to achieve carbon neutrality, and there is a growing trend toward the application of recycled resins and biomass materials. We have been working on an approach to solve the issues when these materials are applied to the automotive and mobility markets through polymer additive technology. This paper focuses on advanced additive solutions for mechanical recycled resins and cellulose nanofibers which are attracting attention as next generation reinforcing fibers.

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# INNOVATIONS IN INTERIORS

SESSION CO-CHAIRS: Dr. Pravin Sitaram, *Haartz Corp.* | Austin Wagenhals, *Ford Motor Co.* | Hoa Pham, *Sonoco*



## PLENARY TALK Industry Trends Driving More for Less

**Ken Gassman, Inteva Products, LLC**

Mega trends are driving significant changes in the automotive industry. Competition is fierce and consumers are demanding more for less. The OE's are struggling to keep up and are applying pressure on the supplier community. These factors create an environment demanding innovation from all participants in the market. This is especially true in the automotive interior space. TPO material options provide an excellent platform addressing these needs.

The expectations of delivering vehicle interiors that only provide enough space to accommodate its occupants in a monochromatic bland and hard environment are long gone. In today's world, the vehicle interior is what sells the consumer. An appealing interior must have a luxurious look with plush soft surfaces, attune to what occupants have in their home. Interiors must provide multi-levels of functionality, including safety, entertainment, comfort, adaptability, and others. What does this mean to the engineer that is challenged with designing and developing the products to meet these high expectations?

This talk is intended to provide an engineer's perspective on how to meet the consumer's expectations and OE technical requirements in a cost-effective manner, including first surface innovation as a key enabler. I will be addressing the interior innovations required to meet higher level expectations/requirements in the areas of sustainability, human machine interface (HMI), styling, and performance.



## Wave Casting Technology for Automotive Interiors

**Dr. Greg Farrar, CpK Interior Products**

CpK Interior Products has decarbonized the slush molding process by designing and building an all-electric machine capable of reducing cycle times by up to 50%. The machine simultaneously utilizes infrared energy and forced convection air technology to uniformly heat tools, allowing for precision heating in real-time. In combination with this new proprietary casting technology, CpK has developed sustainable custom TPO chemistries that allow for the production of recyclable skin and foam composites.

In this presentation we will discuss CpK's Wave Casting process and the benefits of this technology versus traditional foam-in-place and bilaminate constructions.



## Challenges of Smart Surfaces in Automotive Trim

**Jeremy Husic\* / David Whitehead Inteva Products, LLC**

Inteva is developing smart surface technology which enables functional features in areas that were once just decorative automotive trim. Portions of the lighting and electronics are embedded into the trim layers, while others are packaged behind the substrate. Allocating the electronics in this new space has created a need for new business relationships. Technical challenges include material compatibility for bonding methods, appearance, softness, distinction of image, touch sensitivity, hidden front functionality, packaging space, connection and others.



## Decarbonization in Automobiles – Material Options for Automotive Interior Applications

**Akim Khalef\*, MATERI'ACT James Leo Mazurek, FORVIA**

The decarbonization of the use phase of automobiles is being addressed by electrification. With approximately 60% of a car's production CO2 footprint made up of its material, the next step is decarbonizing the production footprint of automobiles. MATERI'ACT, a FORVIA brand, is providing low-emission materials in four categories: Compounds, Foils as alternative to leather, carbon fibers, and green steel – supporting FORVIA's ambition to be CO2 neutral in its products, and in-line with OEM's objectives and end-users' wishes to have more sustainable vehicles



## Next Generation Cold Temperature Ductile Interior TPOs

**Rob Mimms, Advanced Composites**

Cold temperature impact performance is a key attribute for interior TPO compounds that are used in occupant safety applications. Historically, material formulations that provide a balance of ample stiffness and good impact performance at -40°C have been limited to lower melt flow rates. Advanced Composites has developed innovative material solutions that improve flowability over previous generation TPO compounds. In addition, more robust materials with aesthetically pleasing fleck effects have been developed to retain good cold temperature impact. This presentation will demonstrate the advantages of these next generation TPO compounds designed for safety applications.

# INNOVATIONS IN INTERIORS

SESSION CO-CHAIRS: Dr. Pravin Sitaram, *Haartz Corp.* | Austin Wagenhals, *Ford Motor Co.* | Hoa Pham, *Sonoco*



## Antifungal Test Methods - What you Need to Know

**Dr. Mai Ha, Microban**

Degradation of materials by microorganisms is a major problem that can impact various aspects of materials including physical properties and aesthetics. Antimicrobials are used to protect the materials, but evaluating the antimicrobial effectiveness is challenging. Currently, there are few test methodologies that are routinely used that accommodate a complex substrate such as foam. This presentation will look into these test methodologies and their ability to assess these types of degradation focusing on their limitations, relevance, strengths, and overall assessment of antifungal properties in foams. Test methods will include AATCC 30, AATCC 100, ASTM G1, ASTM E1428, and ASTM E2180.



## Incorporating Recycled Polypropylene in a Compound Intended for Automotive Interior Applications

**Luca Gazzola, Sirmax**

Although the use of recycled plastics by the automotive industry seems promising, there are still some limitations that need to be overcome in order to expand its use beyond under-the-hood, low-value applications. In particular, unsatisfactory mechanical properties, undesired odor, together with high condensation of volatile organic compounds on the surface of automotive interior trims (so-called “fogging emissions”), represents one main current concern of the automobile industry regarding the use of recycled plastics in new applications, like vehicles’ interior components.

This paper is aimed to give an example of how Sirmax is using its innovation expertise to broaden recycled plastic usage also to these applications that are still a change nowadays while meeting rising end-user demand for materials and applications with enhanced environmental sustainability. A polypropylene compound filled with 5% talc and containing 30% of recycled polypropylene is presented as alternative to a prime material compound intended for interior application like door panels. The approach used to reduce final compound odor while enhancing impact properties will be described.



## Enhancing Automotive Interiors with Recycled Content TPEs

**Christopher Engel, Avient**

Newly developed thermoplastic elastomers (TPEs) made from recycled content are helping automotive OEMs and tier suppliers incorporate sustainable materials into next generation vehicle designs while ensuring performance requirements are met. Avient, a global provider of specialized and sustainable polymer solutions, will discuss recycled content TPEs specifically formulated and tested for automotive interior applications. These solutions incorporate high percentages of recycled content to help engineers and designers meet their target sustainability goals. With comparable performance to traditional TPEs, these sustainable thermoplastics are suitable for PP overmolding, IM applications.



## Recycled Content TPE for Automotive Interiors

**Stephen Cranney, KRAIBURG**

KRAIBURG TPE has taken a significant step in contributing to circular economy and sustainability goals by developing three series of TPE materials containing recycled content. With minimum 30% PIR and PCR content, these materials exhibit a reduced overall carbon footprint. Additionally, these TPE materials comply with OEM specifications for emissions, odor, heat aging, weatherability, and mechanical properties, making them the ideal choice for both interior and exterior automotive applications in the Americas.



## Recycled Materials and Non-Halogenated FR Technologies in Crosslinked Closed Cell Polyolefin Foams

**Turner Slaughter, Sekisui VOLTEK**

Legislative changes across the world are mandating the use of recycled resins and non-halogenated flame retardants in plastic parts. At the same time, individual companies within the automotive industry and beyond are setting substantial sustainability goals to help combat global climate change. As an industry leader in crosslinked closed cell polyolefin foams, Sekisui Voltek is innovating new technologies for automotive interior and component applications to help auto manufacturers satisfy these legislative requirements and meet their own sustainability goals.

# INNOVATIONS IN INTERIORS

SESSION CO-CHAIRS: Dr. Pravin Sitaram, *Haartz Corp.* | Austin Wagenhals, *Ford Motor Co.* | Hoa Pham, *Sonoco*



## Predicting Mechanical Performance & Processing of Core-back Foam Injection-molded Parts with Grained Surfaces

Anil Tiwari, *SABIC*

Core-back foam injection-molding (CB-FIM) can be highly effective in driving weight- and cost-reduction – while retaining/improving flexural performance – for semi-structural non-visible automotive applications. Applicability of CB-FIM for visible applications requires robust control of surface aesthetics in grained parts and predictability of mechanical performance. Using validated case studies with polypropylene compound formulations, we present a method to model mechanical behavior of CB-FIM parts and processing insights to meet aesthetic requirements.



## H.B. Fuller's Thermonex® Clearbond Transparent Adhesive for Interior Trim

Brent Landis\* / Rick Snyder, *H.B. Fuller*

Automotive interiors are evolving to include more smart and functional surfaces to meet the expectations of today's tech savvy consumers. These new features offer specific challenges for adhesives to ensure the surfaces look as good in the vehicle as they did in the design phase. H.B. Fuller has launched its Clearbond product line to solve these complexities by adding transparency, transmittance, and UV resistance benefits to the premium bonding performance of the Thermonex® and Swift@lock brands. Clearbond products enable interior trim parts designers and manufacturers to explore creative new options in the automotive interior space.

This presentation will focus on the Thermonex® Clearbond material, how it is differentiated from our traditional Thermonex® adhesives and the value it brings to the market.



## Understanding Scratch and Mar Improvements for Increased Consumer Satisfaction

Kevin George\* / Tra Goss  
*GEON Performance Solutions*

GEON Performance Solutions will discuss an overview of testing methodologies for scratch and mar performance for automotive interior and exterior applications using polypropylene compounds. These methodologies will be looked at from multiple performance perspectives, including historic, current and ideal performance and how they may differ based on the location in vehicle. GEON will also show how their portfolio materials using different reinforcement types and loading levels compare to one another as well as the performance requirements.

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# PERFORMANCE ADDITIVES & COLORANTS

SESSION CO-CHAIRS: Dr. John Mara, *Amfine* | Heejung Kwon, *Songwon*



## Compounds Changed from the Past and How it Could Evolve in the Future

**Margot Claus\*, Klaus Keck, Rianlon**

PP and TPO are one of the most important representatives of thermoplastic organic polymers. In term, one of the most important applications for PP and TPO are automotive compounds. As thermoplastics, PP and TPO are mixed and shaped above 200°C (390 F). Due to their organic nature, PP and TPO degrade oxidatively significantly at these elevated temperatures. In consequence, the materials must be stabilized with Anti Aging Materials of various classes to allow melt-processing and to achieve a reasonably long service life.

The stabilization strategies of Anti Aging Materials for TPO has improved over the past decades and continues to evolve due to more stringent technical requirements and regulatory challenges.

This paper reviews the past changes in the stabilization strategies of Anti Aging Materials for TPO and gives an outlook over future developments. A systematic guide will be discussed including for example antioxidants, light stabilizers and impact of recycling.



## Ionic Additive to Improve Melt Strength in Recycled and Virgin PPCompounds

**Brett Robb, Resin Solutions**

Polypropylene is a semi-crystalline polymer with a lack of melt strength. When recycled polypropylene suffers further thermal degradation it greatly reduces melt strength. Dymalink® 9200 creates a temperature-dependent, dynamic ionic network in PP-based homopolymers, copolymers, and elastomers. This ionic network boosts the melt strength of both virgin and recycled PP-based compounds. Allowing recycled PP to be utilized in extrusion, thermoforming, and foaming applications.



## Developing Polyolefin Compounds with a Metallic Look

**Kevin George, GEON Performance Solutions**

A metallic look, molded-in-color thermoplastic olefin has been desired by industry for many applications. GEON will highlight the evolving commercial reasons and discuss technical challenges and solutions. We will discuss environmental benefits, economic benefits, and design freedom, driving the necessity of this material technology. Working with metallic additives, it is crucial to balance components such as material, additives, part design, tool design and processing. GEON will discuss aspects of these sub-elements and how they affect the final part.



## Superior Polypropylene via Use of Novel Nucleating Agent Technology

**Yuhei Hattori, Amfine**

As a result of our continuous research, we have developed a novel  $\beta$ -crystal nucleating agent that can markedly improve the impact strength of PP even in the presence of fillers, and/or, pigments. Moreover, the improved ductility and isotropic shrinkage properties of PP films nucleated with our novel  $\beta$ -crystal nucleating agent compared to films nucleated with a commodity type nucleating agent make them well suited for battery separator films as found in EV battery applications. ADEKA has also developed a unique nucleating agent that improves both stiffness and ductility of PP. This paper will describe the performance characteristics of PP automotive formulations containing these advanced nucleating technologies.

# PERFORMANCE ADDITIVES & COLORANTS

SESSION CO-CHAIRS: Dr. John Mara, Amfine | Heejung Kwon, Songwon



## Thermo-oxidative Stabilization of Mechanical Recycled Polypropylene Compounds

Heejung Kwon, Songwon

In recent years, concerns about their impact on the environment have driven the need to select sustainable materials, which require numerous factors to be considered, including mechanical properties, economics and environmental impact.

One approach is to utilize mechanically recycled plastics to manufacture end products, but those obtained with post-consumer-recycled (PCR) polypropylene materials are more difficult to achieve the same quality standards as new materials. We will discuss the effect of re-stabilization of recycled polypropylene (r-PP) compounds.



## Additives Engineering and Impact on Polyolefins Weather Stability and Anti-Dust Properties

Enrico Galfre, SABO

Additives efficacy in a given substrate is resulting from a combination of functional groups' effectiveness and overall additive's structure design.

Same rule does apply to many kind of additives independently from the desired effect.

SABO, is a global player in the production of Light Stabilizers and Antistatic additives. In the present paper, examples of the above concepts are applied to light stabilization and anti-dust effects on polyolefins substrates.



## How Various Combinations of Additives Affects the Performance of Antiscratch Additives in PP Automotive Formulation

Dr. Emile Homsy, Cargill

We elaborate on the performance of bio-based additives within a typical TPO formulation for anti-scratch effectiveness. Previous studies and customer input have indicated that one additive as a top performing anti-scratch agent for TPOs. The current study evaluates in depth the mechanism of migration, the mode of action against percentage variations of nucleating agents and HALS within a disclosable formulation. The focus is on the durable effects and increased performance, processing improvements, recyclability, and sustainability advantages.



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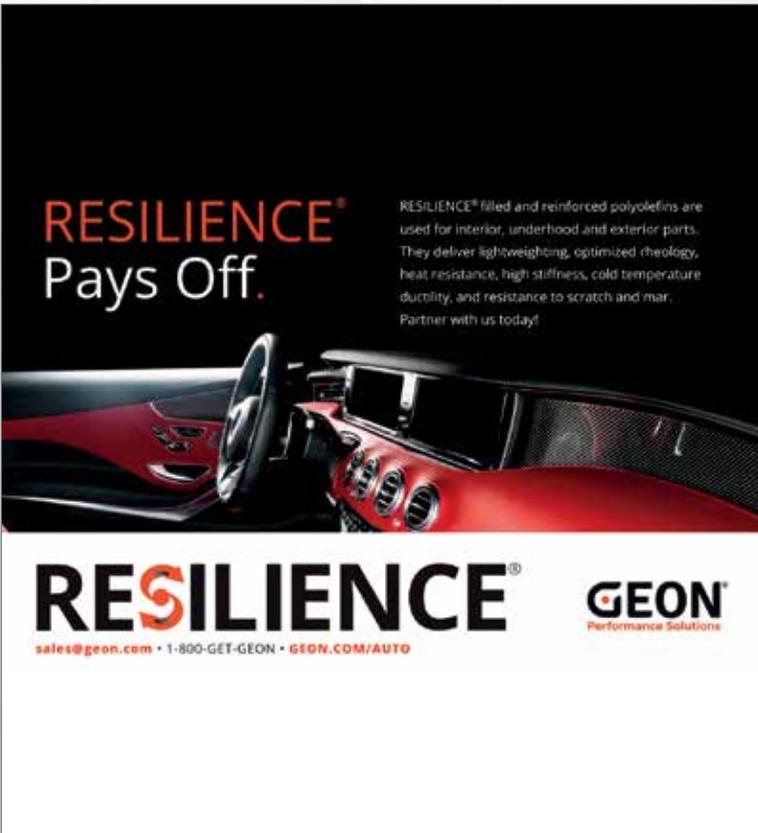
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# MATERIALS DEVELOPMENT

SESSION CO-CHAIRS: Quentin Boll, LyondellBasell | Catherine Wilson, Ford Motor Co. | Dr. Bin Sun, SABIC



## Next Generation SABIC Polypropylene Short Glass Fiber (PP-SGF) Composite

Tariq Ali Syed, SABIC

SABIC PP-SGF (G34 series) composites are optimized and deliver much better flow, impact and balance of mechanical properties compared to any other PP-SGF that exists in the market. A unique PP and chemically coupled glass deliver a material, which raises performance bar much higher with shorten cycle time on top. Performance and properties inches above the usual PP-SGF grades. Thus, in some application it might bridge the gap, where SGF is not performing and LGF may be difficult to deploy or an over engineering.

The grades are geared towards the auto applications but can be use wherever higher performance or thin wall is required. Thus, equally good for electronics, construction, furniture, and other endless applications.



## New Mineral Solutions for Automotive Applications

Saied Kochesfahani, Imerys

The recent evolution in automotive (electrification / electronics) have generated new challenges/opportunities paving the way for developments/innovative solutions. In this paper, we will cover new mineral solutions that have been developed to address such needs including light weighting, dimensional stability, flame retardancy, improved rheology, sustainability and processing/throughput. Experimental data will be presented in automotive formulations showcasing these attributes and benefits.



## Structural Enhancement of Sustainable Materials

Christopher Oberste, WEAV3D Inc

The automotive industry has committed to increasing the use of sustainable materials in order to meet long term embodied carbon and circular economy goals. "Sustainable" materials are not clearly defined, but generally include natural fillers and fibers, polymers produced from bio-renewable feedstocks, and post-consumer and post-industrial recycled polymers. While bio-renewable feedstocks are largely equivalent to petroleum-based feedstocks in final polymer performance, natural fibers and recycled materials suffer from reduced and inconsistent mechanical properties compared to their synthetic or virgin alternatives. A significant portion of plastic components in the vehicle today are glass reinforced, presenting a substantial performance barrier to the adoption of natural fibers.

WEAV3D has developed a novel hybrid-material approach, Rebar for Plastics®, that dramatically improves the performance of sustainable materials, through a combination of natural fiber reinforced polypropylene (NFPP) mats and woven composite lattices formed from unidirectional tapes. This combination of materials can be applied in one of two ways, downgauging of existing NFPP solutions and structural enhancement. Downgauging is the less impactful approach and involves reducing the thickness of an existing NFPP mat design, while utilizing the lattice reinforcement to retain the original part's strength and stiffness. With structural enhancement, it is possible to boost the mechanical properties of NFPP panels to match or exceed the strength and stiffness of long glass reinforced polypropylene (LGFPP). Replacing LGFPP with mixed carbon-and-glass-lattice-reinforced NFPP translates to an overall reduction in synthetic fiber content of up to 75%, reduction in polypropylene content by up to 36%, and weight savings of 30%. Flexural strength and stiffness equivalence to carbon fiber organosheet is even attainable if carbon fiber lattices are used, while still

retaining significant cost and sustainable content advantages. A detailed study of the mechanical performance of lattice reinforced NFPP structures will be presented, along with supporting finite element simulations, as part of a discussion of relative cost, performance, and sustainable content.



## How to Overcome Material Specifications in Talc Modified TPOs: Introducing New Product Line Neofill

Piergiorgio Ercoli Malacari  
IMI Fabi SpA

In plastic applications, the automotive industry demands high performance combined with visible weight reduction, especially in new solutions for e-mobility where overall weight is a concern. Solutions that offer higher rigidity in combination with good toughness can fulfil such stringent requirements.

Specifically, in a TPO product range, talc plays a relevant role as a functional mineral to increase rigidity, minimizing both CLTE and molding shrinkage, while preserving most of the polymer's original toughness.

Thanks to both its platy structure and its hydrophobicity, talc is the perfect modifier for polyolefin-based polymers and for most engineering thermoplastic polymers.

A new product line, NeoFill, is industrially available to offer the market an exceeding stiffness-to-toughness ratio on TPOs, making possible the developments of new applications for even more effective for light weighting approach. In this paper a description of properties achievable with NeoFill will be discussed.

# MATERIALS DEVELOPMENT

SESSION CO-CHAIRS: Quentin Boll, LyondellBasell | Catherine Wilson, Ford Motor Co. | Dr. Bin Sun, SABIC



## Newly Developed Innovative SEBS for Automotive – Interior Parts

**Kazuhisa Takagi, Asahi KASEI**

Asahi Kasei is a world leading supplier of innovative hydrogenated styrenic thermoplastic elastomers (SEBS: TUFTECTM and S.O.E.TM).

In this session, we will introduce “S.O.E.TM”, unique SEBS grades suitable for obtaining soft touch surface, abrasion resistance, and vibration damping properties which are required for automotive interior parts.

We will also introduce the newly developed S.O.E.TM for automobile interior materials applicable to a wide range of molding designs with the performance of conventional S.O.E.TM.



## Novel Flame Retardant Polypropylene for Large EV Battery Part Production through Extrusion and Thermoforming

**Dr. Petya Yaneva, SABIC**

Thermoforming is a widely used technology for large part manufacturing with lower initial tooling costs and relatively simple process. Currently, large EV battery components are manufactured predominantly through sheet metal forming, leading to relatively higher cost and some performance and design limitations. This session highlights the potential use of novel intumescent, flame-retardant polypropylene composites to manufacture large battery pack components through sheet extrusion and thermoforming to overcome these constraints.



## Smarter Materials

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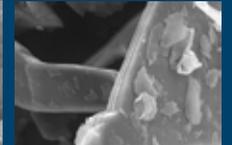
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# EXTERIOR TRIM & STRUCTURAL APPLICATIONS

SESSION CO-CHAIRS: *Mark Pilette, Magna (Retired)* | *Charlie Yang, LyondellBasell* | *Kevin DeGroot, Borealis*



## Automotive Seating and Interiors Innovation using EPP

**Steven R Sopher, JSP**

As the automotive industry transitions from traditional internal combustion engines (ICE) to electric vehicles (EV), there is renewed emphasis on weight reduction to achieve extended range goals. Corporate and industry objectives and government regulations have also dictated more sustainable solutions and product recyclability.

EPP has been used in automotive interiors for over thirty years and offers multi-functional part performance. EPP as a single component, shape-molded material provides excellent strength-to-weight ratio and accompanying weight and cost reduction as well as structural support, thermal insulation, sound insulation, repeated impact protection, and chemical resistance -- all across a broad temperature range.

Notably, one of the primary benefits of EPP is the range of densities possible from a low of 20 kg/m<sup>3</sup> (1.3 lb/ft<sup>3</sup>) to a high of 300 kg/m<sup>3</sup> (18.8 lb/ft<sup>3</sup>), all of which use the same base resin material. Additionally, as a particle foam, EPP offers isotropic impact properties that are not found in other extruded or free-rise foams that yield different compression properties across the X, Y and Z axes making energy management for those other materials difficult to predict.

Additionally, newer designs utilizing EPP combine EPP with “molded-in” wire, metal, and/or plastic inserts for improved performance in applications such as seat bolsters, seat cushions, seat risers, seat backs, head-rests, and numerous other interior applications. These designs as well as designs utilizing novel fastening techniques can allow for the removal and disassembly of those components which promote “end-of-life” recyclability and reuse.

This paper will describe recent advancements in the use of EPP for automotive applications, and how this material provides improved mechanical properties, weight reduction, cost reduction, all while offering circular recyclability. Performance modeling of EPP using Finite Element Analysis (FEA) will also be discussed.



## Transforming EPP for New Solutions

**Chris Gregory, Magna**

Polycon Industries, a division of Magna Exteriors, has been in EPP manufacturing for over 30 years. Changes in vehicle models and relaxed energy management regulations have led to a decline in EPP energy absorbers (EA) product’s life cycle. To counter this, the industry adopted a four-pronged product-growth strategy, diversifying EPP applications to include Seating, Bolsters, Headrests, and more.

With sustainability taking center stage, Polycon has implemented an innovative strategy that ensures all EPP scrap and end-of-life material is diverted from landfills, driving a 100% sustainable product initiative.

The future of EPP manufacturing is embracing diverse paths towards innovation. We continue to investigate new forms of material with some incorporating recycled products.



## Advancement in Translucent TPO Compounds for Innovative Automotive Lighting Design

**Dan Zhang, LyondellBasell**

Innovative automotive lighting design has lately become an important styling differentiator, which enhances safety through improved vehicle visibility and improve communication among the user, the vehicle, and its environment. LyondellBasell has actively worked with OEMs and Tiers to develop TPO compounds for various automotive applications especially liftgates and fascia, where hidden lighting designs are active innovation focus for several OEMs and Tier 1s. The presentation will touch upon the challenges and considerations involved in developing TPO compounds for automotive lighting applications, demonstrate developmental efforts on TPO formulations for their translucency and mechanical properties demanded for applications, and share the latest development result.



## Trends in Design & MFG. of Door Hardware Modules

**Brian Staser, Inteva Products, LLC**

Automotive door hardware systems have used various module concepts over the past 30 years. The first door modules were made by pre-assembling the typical door hardware components onto a steel panel. Since then, light-weighting and cost reduction trends have driven many innovations in the use of plastics in door modules, including the SPE Hall of Fame award winner in 2011. This presentation will look into door module construction forms of the past and the present, and then explore the options that Inteva is looking into for future door module applications. It will examine these options in light of the future trends in automotive door systems design.

# EXTERIOR TRIM & STRUCTURAL APPLICATIONS

SESSION CO-CHAIRS: Mark Pilette, Magna (Retired) | Charlie Yang, LyondellBasell | Kevin DeGroot, Borealis



## Polyolefin Elastomer Choices in Designing Translucent TPO Compounds

Gaoxiang Wu, Dow

Translucent TPO compounds can provide light-weight and cost-effective solutions for interior and exterior parts with diffusive light transmittance properties. These materials can enable future automotive part design with enhanced lighting, signaling, and messaging effects, while maintaining the benefits of traditional TPO materials, such as light weight, good injection molding processing, and low-temperature toughness. In this talk, the effect of polyolefin elastomer selection on optical and physical performance of translucent TPO compounds will be presented, highlighting polyolefin elastomer designs that enable an improved balance of properties.



## Innovative Short Glass Fibre Reinforced Polypropylene Compounds for Liftgate and High Class Automotive Applications

Nicolas Schlutig, Sumika Polymers (Sumitomo)

Automotive light-weighting is a long-term trend because it reduces emissions and fuel consumption, and it increases vehicle range and performance, especially in electrical vehicles.

In anticipation to this trend, Sumika Polymer Compounds Europe developed THERMOFIL HP® high performance chemically coupled glass-fiber reinforced recycled polypropylene

grades approximately 25 years ago, and they continue to create new and improved grades supported by full CAE tools.

This presentation will show the latest F811X series compared to engineering plastics giving best in class in CO2 footprint without compromise in mechanical properties.

Firstly, some technical background behind F811X series and how SUMIKA combined high aesthetical behavior for automotive's interior part AND high mechanical properties.

Full CAE tool will be explained for supporting development driving the substitution of engineering plastics in mechanicals and structural automotive applications using the latest cutting-edge tools.

Finally, showing one large and live automotive application (Liftgate) achieving automotive OEM's specifications and expectations by using 2 in 1 solution.



## High Stiffness Thermoplastic Olefins (TPOs) Enabling Light Weight Body Panel Applications

Jue (Jane) Lu, LyondellBasell

The automotive industry pursues weight reduction for vehicles to comply with increased fuel efficiency goals and other standards having an environmental impact. Replacing traditional metal or fiber reinforced composite body panels with Thermoplastic Olefin (TPO) materials presents key benefits including weight reduction, cost reduction, design freedom, recyclability, as well as dent & ding resistance. This paper will present a new generation of TPOs developed by Lyondellbasell, which exhibit high stiffness, low CLTE, good cold temperature impact performance and excellent surface aesthetics before and after painting, suitable for body panel applications, such as tailgate outers, fenders, door outer panel, etc.



## Recent Glass Fibre Reinforced Polypropylene Compounds to Meet Carbon Footprint Target

Nicolas Schlutig, Sumika Polymers (Sumitomo)

In the anticipation of light weighting and carbon neutrality trends, Sumika Polymer Compounds Europe developed THERMOFIL CIRCLE® high performance chemically coupled glass-fiber reinforced recycled polypropylene grades.

This presentation will show the latest F\*12R series compares to engineering plastics giving best in class in CO2 footprint without compromise in mechanical properties and especially in low temperature impact.

First, some technical background behind F\*12R series and how SUMIKA achieve high level of mechanicals properties. Then, some case story made on a real automotive part will be shown vs automotive OEM's specifications.

Finally, a Life cycle analysis will be also provided and support sustainable development driving the substitution of engineering plastics in mechanicals and structural automotive applications.

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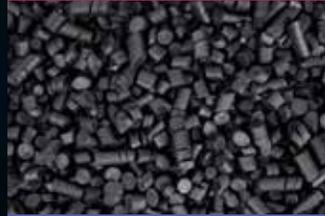
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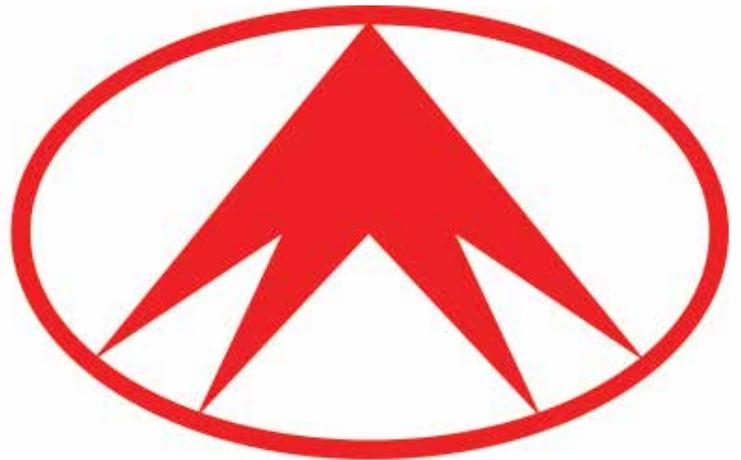
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**PRET**

# POLYOLEFIN ELASTOMERS & VULCANIZATES

## SESSION CO-CHAIRS:

Dr. Bhavesh Shah, *Lion Elastomers* | Dr. Dave Patel, *GuruTech Systems, Inc* | Dr. Nadeem Bokhari, *Sumitomo Polymers*



### Split-Proof Thermoplastic Vulcanizates (TPV) for Corner Molding Application

**Dr. Nischay Kodihalli Shivaprakash,**  
*Mitsubishi Chemical America*

Split is considered as a material failure which typically occur at the interface between two materials due to lack of adhesion. In this work, we introduce a new generation TPV material displaying exceptional adhesion to TPV and vulcanized EPDM elastomer seals used in glass-run channel corner molding application.



### Santoprene Thermoplastic Vulcanizates in EV Cooling Hose Applications

**Paul Zwick,** *Celanese*

This presentation covers the development of different EV cooling hoses and tubes with Santoprene® TPV and compares to other incumbent or competitive solutions, and suggests what future needs or trends might be addressed with Santoprene® in this application. Performance features as well as improved environmental impact features vs other alternatives are also discussed.



### Self Lubricated Low Coefficient of Friction Thermoplastic Vulcanizate (TPV) for Corner Molding Application

**Şerif Erdoğan,** *Elastron*

This presentation will showcase a new thermoplastic vulcanizate (TPV) material developed through long-term research experience with EPDM/PP-based TPVs. The newly developed material offers a lower coefficient of friction (CoF) and exceptional adhesion to thermoset EPDM weatherseal, making it ideal for use in corner molding applications for glass run channels. This innovative TPV boasts numerous advantages, including good elastic recovery, easy processing and higher mechanical properties, better weathering resistance, stable lower CoF and better adhesion performance onto EPDM weatherseals compared to standard low CoF TPVs.



### Innovative Elastomer Product Designs and Processing

**Dr. Talat Karmo,** *VINTECH Industries*

Innovative product designs and processing of several elastomers and vulcanizates resulted in new applications primarily for OEMs. Vintech Industries has pioneered many such applications. Some of the examples featured in this presentation are integrated extruded plastic fasteners, foam like extrusions, hybrid running boards, TPVs with integral slip coat and elastomer coextruded with metal to eliminate the need for powder coating.

Integrated extruded plastic fasteners are discussed in detail. Vintech Industries designed and developed multi material seal with integral clips to eliminate purchased fasteners, assembly equipment and operation. A typical such seal will have carefully selected and developed rigid polyolefin carrier coextruded with a compatible soft TPE or TPV material. Material and process considerations for the coextrusion of a given multi -durometer product design is discussed. The business case for such designs is also presented. The integrated and extruded plastic fasteners improve vehicle appearance, improve water management of the seal to the body and improve the reliability during installation with no missing attachment pins. This innovative design approach significantly lowers the overall vehicle cost through the elimination of traditional fasteners and is easy to assemble and service. Innovative Grill, Rocker, Hood and Fender Seal attachments are also discussed.

# POLYOLEFIN ELASTOMERS & VULCANIZATES

SESSION CO-CHAIRS:

Dr. Bhavesh Shah, *Lion Elastomers* | Dr. Dave Patel, *GuruTech Systems, Inc* | Dr. Nadeem Bokhari, *Sumitomo Polymers*



## Newly Developed TPV for Glass-Run Channel Corner Joint Applications

**Takeshi Tominaga, Sumitomo Polymers (Sumitomo)**

Sumitomo Chemical is committed to provide the technology solutions to enhance the comfort level and secure the optimal safety to the automotive industry by continuously developing novel materials through exploring new ways.

We have developed novel ESPOLEX® TPEs with excellent properties for Glass-Run Channel Corner Joint Applications.



## Reduce Carbon Footprint with Santoprene ECO-R TPVs

**Dr. Prashant Bhadane, Celanese**

Products offering overall lower carbon footprint and embracing full concept of product circularity are desired today. Santoprene® pioneered TPVs and is demonstrating the leadership by further extending the frontiers of performance, recyclability, and sustainability with the introduction of ECO-R family of products.

The products in this family range from 55 Shore A to 40 Shore D hardness and are made using up to 50% post-consumer recycle materials. They offer competitive performance while offering potential to reduce carbon footprint by about 40% compared to their virgin TPV counterparts and potentially up to 60% when compared to thermoset rubber. Part light-weighting is expected to bring in significant additional savings in carbon footprint in actual use. Santoprene® ECO-R products are designed to offer excellent molding as well as extrusion performance and, therefore, may satisfy need of common applications across many different sectors.



## Multi-featured Soft TPV; Extremely Low Permanent Set, High Fluidity, and Over-Moldability

**Kaho Tazeo, ENEOS Materials**

Thermoplastic vulcanizate (i.e. TPV) is a kind of thermoplastic elastomers which are used as alternatives to cured rubber for recyclability and saving energy consumption for production. In this presentation, we introduce a unique TPV with excellent softness. It has the same permanent set as cured rubber and can be over-molded with a variety of automotive materials due to its superior injection moldability and bonding ability.



## Sustainable Styrenic Block Copolymer Solutions to Enhance Multipolymer Compatibilization and Performance in Automotive Applications

**Dr. David Truong, Kraton Polymers**

Kraton developed CirKular+™ product lines to support value creation for automotive industry via light-weight design and lower carbon footprint by enabling and maximizing use of recycled content. CirKular+™ additives are designed to provide multipolymer compatibilization and performance improvements of PIR and PCR materials. In this presentation, we highlight the advantages of using CirKular+™ polymers compared to mPOE and C3C2 copolymers in recycling applications and leverage the benefits of styrenic block copolymers in automotive compounds.



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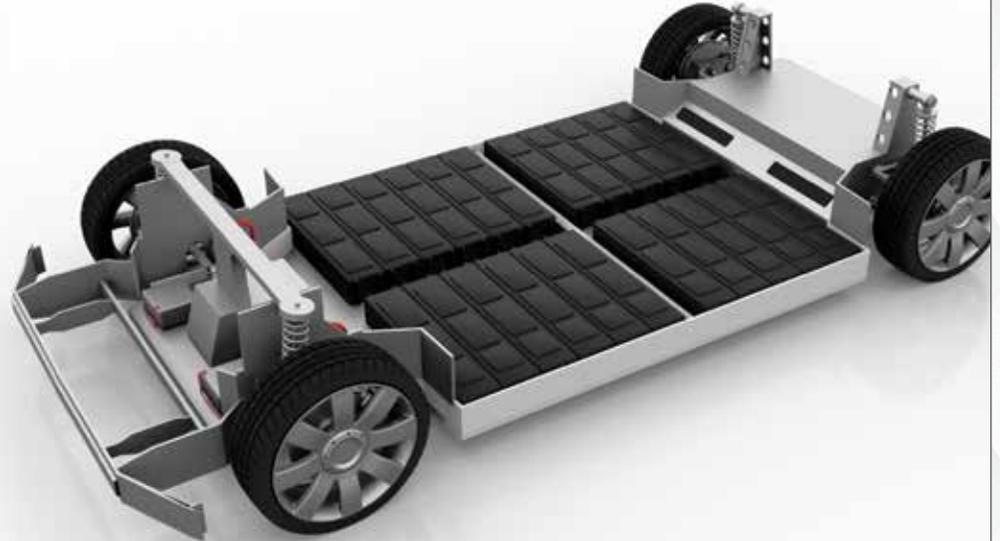
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# PROCESS ENABLING & ADDITIVE TECHNOLOGIES

SESSION CO-CHAIRS: **Matt Sprouse, Audia** | **Dr. Suresh Shah, Dephi (Retired)** | **David Tucker, New Wave Manf.**



## Compression Molded EV Battery Enclosures with Flame Retardant Glass Reinforced Polyolefin Compounds

**Dr. Koffi Dagnon, SABIC**

This paper focuses on compression molding of large EV battery enclosures with long glass fiber filled flame retardant thermoplastics. Considered is an evaluation of plasticizing, its effect on fiber length and the addition of inserts to improve electromagnetic shielding and mechanicals. Also reviewed is an investigation on reducing clamp force and warpage leveraging simulation software. These studies led to molding a cover for a leading OEM which was then tested for flame and mechanical performance.



## Advanced Simulation Techniques for Predicting and Mitigating Stress Marks on High-Quality Product Surfaces

**Alex Baker, Moldex3D**

Stress marks are a common issue in the manufacturing of high-quality products with cosmetic surfaces, such as electronic devices and automotive parts. In this paper, we propose a valve gate approach in simulations, combined with the concept of pin movement, to optimize the manufacturing process and mitigate stress marks. Two case studies: a 24-drop case study and a 4-drop case study, to demonstrate the

effectiveness of our approach are presented. We compared the results of simulations with uniform and profiled pin close speed, and found that profiled pin close speed was more effective in reducing stress marks. Our experiments showed that the valve gate approach with controlled pin movement can significantly improve the quality of high-end products, and reduce manufacturing costs. The proposed approach offers an efficient and cost-effective solution for manufacturers to optimize their manufacturing processes and achieve high-quality products with cosmetic surfaces.



## Implementation of Live, Nonfunctional Decorative Stitching as an Alternative to Cut-Sew-Wrap Technology for Automotive Applications

**Ed Wenzel, Inteva Products, LLC**

Over the past decade automotive interiors have exhibited a steady increase in the use of live, decorative stitching to enhance the feel of luxury within the vehicle. Cut-sew-wrap continues to be a primary means of providing this appearance but comes with a cost and is subject to inconsistencies in quality. Use of automation to apply a live, decorative stitch to a preformed part is an alternative to labor intensive hand sewing and provides the opportunity to push application thereof to lower-level (non-luxury) vehicles as well. This presentation explores recent technology advancements that enhance the ability to replicate the CSW look on a variety of different material constructions while providing market differentiation at low cost.



## Polymer Fusion Labeling: A New Labeling Technology that Answers Major Safety Concerns and Reduces Liability

**Jason Brownell, Polyfuzer Graphics**

This presentation will examine safety concerns with traditional labeling methods and why Polymer Fusion addresses those concerns. This will include examples of automotive OEM's who have adopted the technology on over 30 platforms. We will also take an in-depth look into what happens during polymer fusion and how it can reduce liability to an organization.



## Digital Printing with Polypropylene in Automotive

**Dmitry Yurchenko, GKN Additive, NA**

Polypropylene (PP) is a versatile material being used in a variety of automotive 3D printing applications. Lightweight in nature with high-impact resistance and chemical compatibility, PP is being used for interior components, prototypes, functional parts and more. With the potential for cost savings and design flexibility, PP provides the optimal balance between performance and cost. Join the presentation and explore the advantages and challenges to consider when adopting PP 3D printing in automotive manufacturing.

# PROCESS ENABLING & ADDITIVE TECHNOLOGIES

SESSION CO-CHAIRS: *Matt Sprouse, Audia* | *Dr. Suresh Shah, Dephi (Retired)* | *David Tucker, New Wave Manf.*



## Managing Melt Temperature in a Co-rotating Twin Screw Extruder

**Charlie Martin, Leistriz Extrusion**

The co-rotating, intermeshing twin screw extruder (TSE) is the compounding industry's most common device to continuously mix of polymers with additives and fillers. Atypical formulations that utilize atypical materials, including many bioplastics, are also processed via twin screw extrusion. It is well known that materials exposed to high shear and temperatures will degrade. Almost every product will benefit by strategically managing how shear (and energy) is imparted into the materials being compounded, and measured by the resulting melt temperature.

Various factors must be considered to manage the process to minimize degradation. In this presentation, emphasis will be given to OD/ID ratio, the melting zone in the screws, shear inducing elements that are specified and the front-end design.



## Compounding Bio-based Polymers with AI 2.0

**Saeed Arabi, Alterra Holdings**

Compounding with bio-based materials requires extra attention to process parameters as well as much better knowledge of the equipment design, material rheology, blending and compounding. Utilizing AI enables compounders to have great control on all process parameters and have a very high first-time throughput.

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Dr. Rodrigo Orozco, Celanese;  
 JP Wiese, Polyplastics

#### MATERIAL INNOVATIONS

Mike Shoemaker, Borealis; Paula Kruger, Ascend Materials; Sunit Shah, LyondellBasell

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Dr. Rose Ryntz; Jim Keller, Mankiewicz Coatings LLC;  
 Jeff Crist, Ford Motor Co

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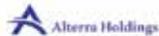
### CONFERENCE ADMIN

James Munro  
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For more information visit our website at:  
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Troy, MI April 8-10  
 2024



# Caresoft<sup>®</sup> FACILITY TOUR

24<sup>TH</sup> ANNUAL  
**spe**  
**TPO<sup>®</sup> 2023  
GLOBAL AUTOMOTIVE  
CONFERENCE**  
Troy, MI • October 1-4, 2023  
Powered by SPE Detroit Section

**ENGINEERED POLYOLEFINS FOR THE  
MOBILITY EVOLUTION**

2023 SPE TPO GLOBAL AUTOMOTIVE  
CONFERENCE and CARESOFT GLOBAL  
Invites you to Attend a **COMPLIMENTARY  
FACILITY TOUR** and **RECEPTION**

**WEDNESDAY | OCTOBER 4**

12:00PM Depart for Caresoft Global

**CARESOFT GLOBAL**

31770 Enterprise Dr, Livonia, MI 48150

[www.caresoftglobal.com](http://www.caresoftglobal.com)

**1:00 - 1:30 NETWORKING RECEPTION**

with Food/Beverages provided

**1:30 - 3:30 Talk to the Experts...**

Demonstrations and Tours

CARESOFT GLOBAL EXPERTS WILL FOCUS ON:

- ICE and EV vehicle construction comparisons, highlighting polymer applications
- How traditional applications for polyolefins have evolved in the pivot to electrification
- Future potentials for polymer solutions during the mobility evolution.
- Dedicated group tours focusing on polymer and EV components

**PLEASE SIGN UP IN ADVANCE TO ATTEND**



**12+ EVs BENCHMARKED AND PARTS ON DISPLAY**

GMC Hummer EV	Rivian R1T	Volkswagen ID4
MG MG4	Lucid Air	Great Wall Pao
Tesla Model Y	Toyota bZ4X	Renault Megane
Ford F-150 Lightning	Ford Mach-E	Tesla Model S Plaid



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# PLASTICS: CHARGING INTO THE AUTOMOTIVE REVOLUTION



**AUTOMOTIVE INNOVATION AWARDS COMPETITION & GALA**  
HONORING THE BEST IN AUTOMOTIVE PLASTICS

**NOVEMBER 8, 2023**



## Call for Nominations

### MOST INNOVATIVE USE OF PLASTICS AWARDS

The Automotive Division of the Society of Plastics Engineers (SPE®) is announcing a “Call for Nominations” for its 52nd-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 8, 2023** at the Burton Manor in Livonia, Michigan. 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 [intuitgroup.com@gmail.com](mailto:intuitgroup.com@gmail.com).

For more info and to submit nominations, go to:

<https://speautomotive.com/spe-automotive-div-innovation-awards/>

#### CATEGORIES:

- BODY EXTERIOR
- BODY INTERIOR
- CHASSIS/HARDWARE
- ELECTRIC AND AUTONOMOUS VEHICLE SYSTEMS
- LIMITED EDITION/SPECIALTY VEHICLES AND AFTERMARKET
- MATERIALS
- POWERTRAIN
- PROCESS, ASSEMBLY & ENABLING TECHNOLOGIES
- SAFETY
- SUSTAINABILITY

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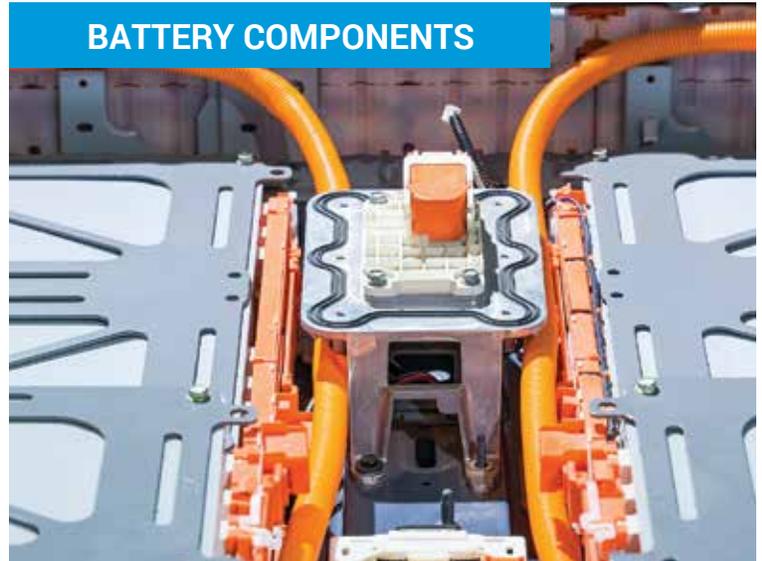
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Delivering innovative and sustainable polymer solutions across a variety of EV and ICE applications

UNDER HOOD COMPONENTS



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EXTERIOR



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