Implementing Transformative Technologies, New Tools & Processes For:

**Mixed-Metal & Low-Cost Composite Joining, Application Optimization Of Adhesives**

Exploiting New Manufacturing 4.0 Technology Innovations, Simulation And Advancements In Material Systems That Enable Greater Automation & Faster Processing

Latest Innovations To Reduce Processing Complexity & Increase Production Capacity For EVs and Autonomous Vehicles

“**The leading event on automotive mixed-material joining, forming, manufacturing technologies and processes for lightweight structures**”

**NEW! Highlights of 2019 Agenda**

- **Application Optimization Of Adhesives** - And How To Avoid Quality Control Issues
- Solving Real World Challenges In **Joining Metallic And Non-Metallic Materials**
- Best Practices In **Simulation And Modeling Of Manufacturing Processes**
- **Approaches And Equipment Used For Non-Destructive Testing (NDT)** And Quality Control Of Joining Processes
- Joining Of New, **High Strength Steels And Aluminum Alloys**
- **Scaling Up Additive And 3D-Manufacturing With Metals**
- Simplifying Integration, Reducing Process Complexity An **Increasing Production Capacity With Manufacturing 4.0**
The transition by OEMs to a new generation of electric vehicles is placing increased emphasis on break-through technologies for lightweight vehicle manufacturing processes and integrated assembly.

The 6th edition of the Summit will **explore new** manufacturing technologies and solutions being adopted for EVs, including multi-material components and structures to optimize structural integrity, meet safety and NVH objectives, and achieve mass reduction to offset heavy batteries.

**WHAT’S NEW ABOUT THE 2019 AGENDA?**

Exclusive to the 2019 Summit will be a top-level industry panel discussion on **exploiting digitalization of automotive manufacturing under industry 4.0 for smarter, more agile production and improved profit margins**, featuring senior decision-makers from global OEMs.

Our agenda is developed specifically for **senior engineers and technical specialists** in body structures, lightweight advanced materials, process engineering, materials joining and forming.

Attending one of the most important events in the automotive calendar will help improve your day to day decision making and face these challenges with enhanced knowledge including:

- Best practices in joining of new high strength steels and aluminum alloys … Application optimization of adhesives and how to avoid quality control issues …Solving real world challenges in joining metallic and non-metallic materials … Advances in simulation and modeling of manufacturing processes to reduce costs … Assuring quality and dimensional control in the body shop …. Simplifying integration, reducing process complexity and increasing agility with Industry 4.0.
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<tr>
<th>Name</th>
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<tr>
<td>Khaled Shahwan</td>
<td>Technology Lead, Advanced Development Engineering, Autonomy, Materials, Strategies</td>
<td>Fiat Chrysler Automobiles (FCA)</td>
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<td>Mahindra NATC</td>
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<td>Technical Sales and Marketing - STAF Project</td>
<td>Sumitomo Heavy Industries</td>
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<td>Troy Waldherr</td>
<td>North American Sales Manager</td>
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08:00 Coffee and Registration
09:00 Chair's Welcome And Introduction
Dr. Khaled Shahwan, Technology Lead - Composites, Methods & Strategies, Global Innovation - Advanced Development Engineering (ADE), Fiat Chrysler Automobiles (FCA)

COST-EFFECTIVE STRATEGIES FOR JOINING OF HIGH STRENGTH STEELS AND ALUMINUM ALLOYS

OPENING PANEL – SENIOR VP’S OF BODY STRUCTURE ENGINEERING
09:10 Impacts Of Migration To EVs And Mixed-Material Body Structures On Joining Technologies And Manufacturing Processes
• Comparing different methods of joining aluminum to steel in terms of costs and payback
• Best practices specifically on joining of new high strength steels and aluminum alloys
• How to manage the joining process with different coatings and interfacing treatments
• Achieving a balance between lightweighting, vehicle performance and corrosion performance for EVs
Adam Ballard, Innovation Lead Engineer, Upper Body, Body SMT Innovation Team, General Motors
Antonio Mercado, Advanced Manufacturing Manager, Karma Automotive
Daniel Saltzmann, Staff Engineer - Joining and Materials Specialist, NIO
Martin (Marty) McDonnell, Experimentor Mechanical Engineer, Joining and Additive Manufacturing (JAM) Team, Materials Division, TARDEC

Hank Bonutti, Advanced Technology Manager Mahindra NATC
Panel Chair: John Catterall, Executive Director, Auto/Steel Partnership (A/SP)

CASE STUDIES
09:45 The Auto/Steel Partnership’s (A/SP) Mixed Material Joining Project: Case Study Of Joining An Aluminum Roof Panel To A Steel Body Structure
• Evaluating multiple mixed material joining technologies for OEM body shops
• Creating a matrix of strength data for typical load cases
• Evaluating new technology as it is presented to the project team
Adam Ballard, Innovation Lead Engineer, Upper Body, Body SMT Innovation Team, General Motors

10:15 Joining And Manufacturing New High Strength Steels And Aluminum Alloys – Applying Innovation To Technology, Treatments And Coatings
• Friction Stir Dovetailing (FSD) - applying innovation and quality enhancements to the joining process
• Examining the latest transformative technology for joining HSS and aluminum
• Dealing with Liquid Metal Embrittlement (LME) and porosity challenges in welding processes
Martin McDonnell, Experimental Mechanical Engineer, Joining and Additive Manufacturing (JAM) Team, Materials Division, TARDEC
Dr. Antonio Ramirez, Professor, Welding Engineering Program, Materials Science and Engineering, The Ohio State University (OSU)

10:40 Questions and Discussion
10:50 Networking Coffee Break In Exhibition Area
11:20 Headline Sponsor Presentation: Innovations In New Fastener Types And Rivets For Joining Aluminum, Carbon Fiber And Steel
• Developments in new lightweight fastener types and riveting for mixed material structures and reduced vehicle weight
• Joining aluminum and carbon fiber to each other and to steel
• Implications for mechanical fastening approaches with the adoption of Industry 4.0, increased automation and automated assembly cells
Viral Varshney, Director of Engineering, Rifast Systems

OPTIMIZING STRUCTURAL ADHESIVE USE AND APPLICATIONS
11:50 Structural Bonding For Battery Electric Vehicles
• Potential for smart chemistries to enable OEMs to meet lightweighting goals
• Paving the way for new vehicle structures
• Using different resins and fibers
• Structural hybrid solutions for EV battery protection
Brooke Virost, Business Development Manager, Henkel Corp.
Eugene Chung, Business Development Manager, Henkel Corp.

12:15 Questions and Discussion
12:25 Inline Robust 3D Inspection And Process Control Of Bead Dispensing
• Importance of inline inspection of bead quality with structural adhesives and sealants
• Utilizing 3D machine vision to inspect complex parts during the manufacturing assembly process to ensure highest quality finished components
• High speed inline inspection to increase throughput
Zhenua Huang, General Manager of Americas, Coherix

12:50 Questions and Discussion
13:00 Networking Lunch In Exhibition Area
14:00 Automotive Benchmarking Using X-Ray Scan Technology
• Complete vehicle architecture and digital mock up (DMU)
• Modelling of joining techniques and material properties
• 3D simulation and engineering data comparison in a virtual environment

14:30 Developments In Automation For Inspection And Assuring Quality And Dimensional Control In The Body Shop
• Role for automation in ensuring enhanced dimensional control in manufacturing and reducing time to achieve objectives in new production lines
• Automated vision systems for optimized joining, assembly and dimensional control
• Inspecting Class A surfaces visible to the customer with laser scanning at high resolution and high volume rate to provide surface quality validation
Samy Panneerselvam, Technical Director, Caresoft Global

15:00 Innovations In Joining Using Flow Fastening Technology
• Process overview and adaptive parameterization
• Advancements in available fasteners
• Developments in installation equipment

15:25 Questions and Discussion
15:30 Networking Coffee Break In Exhibition Area

16:00 Joining Modern Materials: Mechanically And Electrically
• Developments in mechanical joining of like and dissimilar materials
• How mechanically joined material combinations perform as an electrical conductor
• Benefits of the clinching process over other commonly used joints for electrical conductivity in both low and high amperage applications

TROY WALDHERR, North American Sales Manager, TOX-Pressotechnik

16:30 Advancements In Wet Compression Molding (WCM) For High Speed, Mass Production Of Structural Composite Parts
• Overview of recent advancements in molding techniques and resin systems for achieving faster cycle times, improved surface quality, reduced void content and increased part complexity
• Benefits of Dynamic Fluid Compression Molding (DFCM) compared to traditional WCM and HP-RTM
• Description of applications and fabric selections

GEORGE GUO, Senior Scientist, Huntsman Advanced Materials

17:00 Disruptive Technologies In Forming And Joining
• Emerging manufacturing technologies to rapidly develop next-generation prototypes and serve high-quality, high-volume manufacturing
• Metamorphic manufacturing - on-demand shaping of high-quality structural components
• Impulse joining - suite of methods that allows for high strength metallic weldments without melting
• Development paths and commercial opportunities

GEORGE GHANEM, Founder and Principal Consultant, BSMA, Six-Sigma MBB, Lean Manufacturing, ProcessChamp

17:30 Questions and Discussion
17:40 Chair’s Closing Remarks - Day 1
17:45-18:45 Networking Drinks Reception For All Attendees
Sponsored By
WEDNESDAY, FEBRUARY 20, 2019

DAY 2

Enabling Greater Integration, Reduced Process Complexity, More Flexible And Increased Production Capacity With Industry 4.0, Simulation And Manufacturing Technology Advancements

08:00 Coffee And Registration
09:00 Chair’s Opening Remarks
Elie Tohme, Director, Body Engineering, Karma Automotive

UNDERSTANDING AND REALIZING THE POTENTIAL FOR DIGITALIZATION AND INDUSTRY 4.0 MANUFACTURING

09:10 Industrial Internet Of Things (IIoT) And The Future Of Electric Vehicle Manufacturing - Overcoming Challenges To Achieve Profitability
• Functional requirements from an architecture perspective for EV manufacturing
• IIoT design principles and approaches
• Importance of big data analytics in EV manufacturing
• Implementation case studies of EV OEMs / models
• Growth opportunity areas - ecosystem participant approaches to overcome challenges to meet profitability
09:40 Questions and Discussion

09:50 Redefining New Vehicle Design And Transforming Traditional Production: Development Of The Uniti Electric City Commuter Vehicle
• New approaches to structure design, safety, sustainability and manufacturing scalability
• How digital twin technology is being implemented for each vehicle and each production factory, as well as planned tracking of in-service data to improve future designs and also production facilities
• Adoption of digital manufacturing approaches and virtual prototyping of a serial production line including cost modelling and logistics
• Development of partnerships and collaboration in manufacturing of the vehicle’s lightweight carbon fiber reinforced thermoplastic composite chassis
Lewis Horne, CEO and CTO, Uniti
10:25 Questions and Discussion

PANEL - SENIOR ARCHITECTURE AND BODY ENGINEERS

10:35 Evaluation Of Platforms And Architectures For EV And Their Implications For Body Design, Structures, Materials And Manufacturing Processes
James Truskin, Technical Fellow, Advanced Body Architecture, Development Lead, Fiat Chrysler Automobiles (FCA)
Elie Tohme, Director, Body Engineering, Karma Automotive
Lewis Horne, CEO and CTO, Uniti
11:15 Networking Coffee Break In Exhibition Area

BODIES STRUCTURES AND EV ASSEMBLY

11:45 Body Structure Evolution From ICE (Internal Combustion Engine) To ACES (Automated, Connected, Electric And Shared) Vehicles
• Evolution of body structure design - transitioning from ICE to EV vehicles
• Mass saving premiums ($ per kg mass saved) for the various lightweighting options for automotive body structures
• Lightweighting and design advantages offered by advanced high strength 3rd Gen steels applied to EV structures
• Lightweight body structure designs using 3rd Gen steels taking full advantage of well-established conventional body shop practices with manufacturing and assembly methods suitable for high volume production
Harry Singh, Senior Product Application Engineer, United States Steel Corp.
12:05 Questions and Discussion

DIGITAL TWIN
12:10 Adopting Digital Twin For Integrated Design And Manufacturing To Reduce Process Time
• Enabling a digital footprint of a product from design to development and throughout the entire product life cycle
• Modelling and simulating real time manufacturing processes
• Managing the performance, effectiveness, and quality of fixed assets such as machines, lines, and plants using advanced visualization, IoT, and analytical tools
• Case studies on digital twin in automotive design and production
Nathan (Nate) Hartman Ed.D, Dauch Family Professor of Advanced Manufacturing and Dept. Head Director, Digital Enterprise Center, Co-Director, Indiana Manufacturing Competitiveness Center, Purdue University
12:40 Questions and Discussion

12:50 Networking Lunch In The Exhibition Area
13:50 Afternoon Chair’s Opening Remarks

DEVELOPMENTS IN ADVANCED MANUFACTURING PROCESSES AND MATERIALS CUSTOMIZATION

NEURAL NETWORKS IN JOINING
13:55 Lightweight Fastening And Joining Update
• Fastening design enhancements Flow Drill (FDS®)
• Application of neural networks to joining processes
• Future areas of investigation
Dr. Brandt Ruszkiewicz, PhD, Lead Development Engineer, Semlex Corp.

EXPLOSION CLADDING PROCESS
14:15 Dissimilar Metal Welding Best Practices
• The explosion cladding solid state welding process for high shear strength and tensile strength joins
• Cladding steel with corrosion resistant alloy metals
• Joining compatible and non-compatible metals
Waren Salt, Director of Business Development, NobelClad
14:35 Questions and Discussion

INCREMENTAL FORMING
14:45 Maximizing Lightweighting In Steel Automotive Bodies And Frames With The Steel Tube Air Forming (STAF) Process
• Hotel metal air forming
• Flange forming technology
• Optimization of hot forming process
Ryuichi Funada, Technical Marketing, STAF Project, Sumitomo Heavy Industries
15:10 Questions and Discussion

15:15 Networking Coffee Break In Exhibition Area

MANUFACTURING PROCESS INNOVATION
15:45 Composite Materials Simulation And Modeling For Enhanced Lightweight Body Structures
• Lightweighting opportunities for composites in an automobile
• Predictive modeling for manufacturing of composites
• Virtual design of composites
• New developments in composites - leverage for next generation automobiles
Dr. William Rodgers, Technical Fellow, Chemical and Materials Systems Laboratory, Research and Development Center, General Motors
16:10 Questions and Discussion

MATERIALS JOINING LOOKING AHEAD
16:15 Challenges On Dissimilar Materials Joining - Role Of The Manufacturing And Materials Joining Innovation Centre (MaJIC)
• Looking ahead at the development of new materials and innovative joining solutions
• Cost-efficiency, driving weight savings, performing for the required application, and addressing the components and material life cycle
• Impactful technologies and plans to address US manufacturing challenges
Dr. Antonio Ramirez, MaJIC Director, Professor, Welding Engineering Program, Materials Science and Engineering, The Ohio State University (OSU)
16:40 Questions and Discussion

ADDITIVE AT LARGE SCALE
16:45 Progress Update On Manufacturing Process Enhancement Through Additive At Large Scale With Metals
• Scaling up additive and 3D manufacturing for metals
• Current capabilities - Where can additive manufacturing support high volume applications now? - In future?
• Where is the break over volume in industrial additive manufacturing? - How fast can you do it and at what volume are you better off just making the tool?
• Case studies on potentially transformational applications
Dr. Andrzej Nycz, R&D Staff, Manufacturing Demonstration Facility (MDF), Wire-Arc Metal Additive Manufacturing Technical Lead, Oak Ridge National Laboratory
17:10 Questions and Discussion
17:15 Chair’s Closing Remarks - Amazon Echo and Champagne Draw
17:20 End of Conference
I Would Like To Register The Delegate(s) Below For
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Organization
Email

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<td>(Cut-off date: Friday, December 21)</td>
<td>☐ $1,399 SAVING $500</td>
<td>☐ $1,699 SAVING $200</td>
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