CONFERENCE DAY – OCTOBER 9, 2017 – TD Convention Center – Greenville, SC.

AGENDA COORDINATED BY:

Preliminary agenda

Session 1: 01.00pm-01.25pm: Materializing the Future of Aerospace part 1
Bob Skillen, **VX Aerospace**

Session 2: 01.30pm-01.55pm: The Path to Automotive Lightweighting: Understanding the Foamability of Polypropylene Based Thermoplastic Olefin Blends via Supercritical Fluid Assisted Injection Molding
Matt Horbaly, **Honda R&D** and Sai Aditya Pradeep, **Clemson University**
The automotive industry has been transitioning from a primarily metals based assembly towards a multi-material architecture driven by the need to meet the Corporate Average Fuel Economy (CAFE) standards that mandate automakers to have a fuel economy of 54.5 MPG by 2025. Automotive OEM's have been aggressively pursuing an approach of mass decompounding whereby the use of lighter materials translates to a systems level decrease in weight of allied vehicular systems. In this context, the increasing use of plastics and composites as substitutes to metals offer an effective means of achieving weight savings without compromising on performance and safety. Polypropylene (PP) based Thermoplastic Olefin (TPO) blends constitute a major portion of the automotive market due to their extensive use in many interior, exterior and under-the-hood applications. However, lightweighting of PP based TPO blends via chemical foaming often presents challenges of, pitting deformations on class A surfaces when exposed to high humidity and temperature and non-homogeneous foaming. In this work, Clemson University and Honda R&D Americas are investigating the foamability of PP based TPO blends via Supercritical Fluid Assisted (ScF) assisted injection molding wherein facile gases like N2 and CO2 are used in their supercritical state to induce foaming at the microcellular scale. The study investigates the effect of processing conditions like variation in melt temperatures, ScF dosage and injection speed on cellular morphology, mechanical properties and paintability.

Session 3: 02.00pm-02.25pm: Materializing the Future of Aerospace part 2
Michel van Tooren, **Ronald E. McNAIR Center for Aerospace Innovation and Research, University of South Carolina**

Session 4: 02.30pm-02.55pm: Enabling Research from Atoms to Automobiles at Clemson Composite Center part 1
Srikanth Pilla, **Clemson University**
In the current research landscape, we often see a great disconnect between fundamental research and application development. With this, we see a great lead time between market implementation and research validation. Often, standalone research centers don't have the skillset or infrastructure to foresee the implication of scaling up. However, by forcing both ends of this research spectrum under single roof and leadership, more holistic approaches can be fostered. Clemson Composite Center is founded on this very same principle of systems approach, where understanding the consequence of the research and there by cascading requirements and targets to a fundamental level is the prima facie focus. This presentation will give you an overview about the capabilities and infrastructure available at this center along with the services offered to the industry. This center also enables education at various level, from K-12 to working executives on advance materials and manufacturing.

Break: 02.55pm – 03.10pm

Session 5: 03.15pm-03.40pm: Enabling Research from Atoms to Automobiles at Clemson Composite Center part 2

Srikanth Pilla, **Clemson University**

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Session 6: 03.45pm-04.10pm: Materializing the Future of Aerospace part 3

Speaker from Chomarat – TBC

Session 7: 04.15pm-05.10pm: A Systems Approach to Develop Ultra Lightweight Closures Using Advanced Materials and Manufacturing Technologies

Aditya Yerra, **Clemson University**

Vehicle lightweighting provides opportunities for enhancing fuel efficiency. Often it is the vehicle body (aka body-in-white, BiW), the heaviest structure of a vehicle, which is the key target for new weight reduction strategies within the vehicle architecture. Within the body, closures contribute 35-50 % of the mass and are very challenging to lightweight. It is hypothesized that a technology (designs, materials, and process-methods) that is developed for closures will seam into the BiW without major technical barriers. Moreover, closures are often produced as stand-alone subsystems and assembled late in manufacturing. As such, their innovation would provide less technology constraints related to vehicle assembly. It is in this regard that the Department of Energy's (DOE) Vehicle Technology Office has set a challenge to lightweight a fully assembled driver's side front door by at least 42.5 % but not spending more than $5 for every pound of weight saved.

This presentation will give an overview of process that a team of interdisciplinary researchers led by Clemson University have employed, to develop an ultra-lightweight door with fiber reinforced thermoplastics as the primary material system. These materials are significantly expensive than the conventional steel. As such, the team must reimage the entire construction of the door from the scratch to use these materials efficiently to meet both performance and cost targets set by DOE.

Light Cocktail: 05.10pm – 06.00pm