

IMFD RESEARCH SEMINAR PRESENTATION (VIRTUAL) PROF. MARCELO DAPINO, THE OHIO STATE UNIVERSITY

Hosted by Professor Björn Kiefer, Ph.D. · Chair of Applied Mechanics - Solid Mechanics

Emerging trends in vehicle design: structural lightweighting and functionalization

PRESENTER



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Smart Materials and Structures Laboratory: <https://smsl.osu.edu/>
Smart Vehicle Concepts Center: www.SmartVehicleCenter.org

BIOGRAPHY

Marcelo Dapino is the Honda R&D Americas Designated Chair in Engineering at the Ohio State University, where he is a Professor in the Department of Mechanical and Aerospace Engineering. Prof. Dapino serves as Director of the Smart Vehicle Concepts Center, a National Science Foundation Industry-University Cooperative Research Center. Professor Dapino joined Ohio State University as a faculty member in 2001 where he has served as a mechanical engineering educator and primary advisor for over 80 graduate dissertations and theses, undergraduate theses, and post-doctoral associates. Along with his advisees and collaborators, he has published 130 archival journal articles, 9 book chapters, 120 conference papers, and has generated 14 patents and intellectual property disclosures. Professor Dapino has an extensive record of service to the Adaptive Structures and Materials Systems community within the Aerospace Division of the American Society of Mechanical Engineers (ASME). He is a Fellow of ASME and SPIE (Society of Photo-Optical Instrumentation Engineers).

ABSTRACT

This presentation deals with the functionalization and lightweighting of vehicle structures. The former is accomplished through the design of sensors, actuators, and energy harvesting systems based on “smart” materials. The latter revolves around

Thursday,
May 27, 2021
3 pm

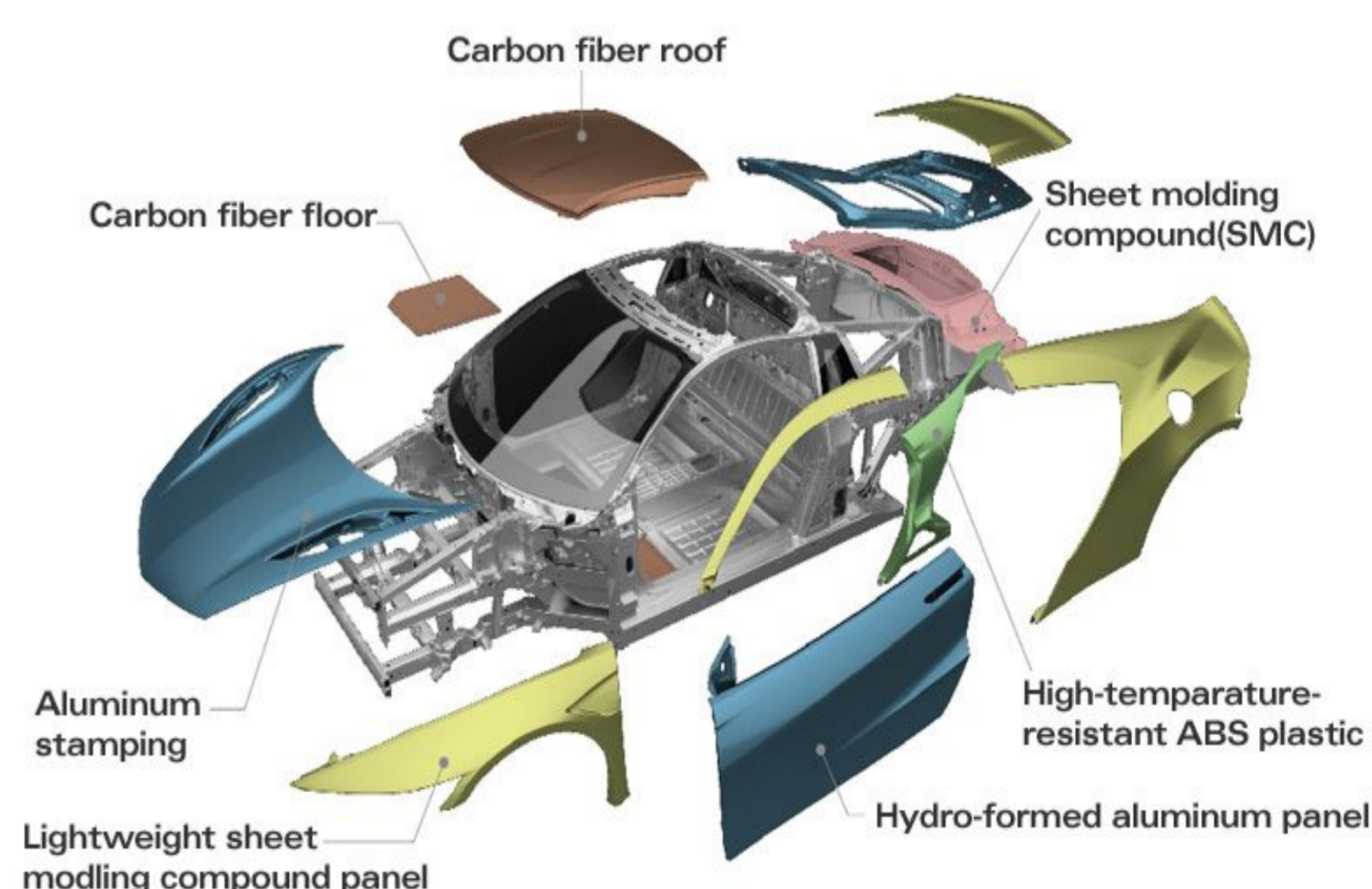
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multi-material integration using ultrasonic additive manufacturing (UAM), a solid-state metal 3D printing process that allows for seamless joining, embedding, and integration of structural metals, organic polymers, shape memory materials, ceramics, electronics, and high-value components. The research programs discussed here are conducted within the Smart Vehicle Concept Center (SVC), a National Science Foundation Industry-University Cooperative Research Center (IUCRC) that was established to accelerate the transition of smart materials from the laboratory to the mobility industry.

Multi-Material Space Frame and Body Panels



Although smart materials have made inroads in vehicle design, work remains to create pathways that allow a systematic implementation of smart materials in mass-market vehicles and, in doing so, train the next generation of engineers as savvy smart material users and advocates. This presentation highlights past and current efforts toward that end while aiming to motivate opportunities for collaboration between TU Freiberg and Ohio State University.

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