

Séminaire du Pr. Suresh G. Advani

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Université Bretagne Sud

Amphi – Bâtiment Sciences 1

Faculté des Sciences et Sciences de l'Ingénieur, 2 rue Coët Saint-Haouen - LORIENT

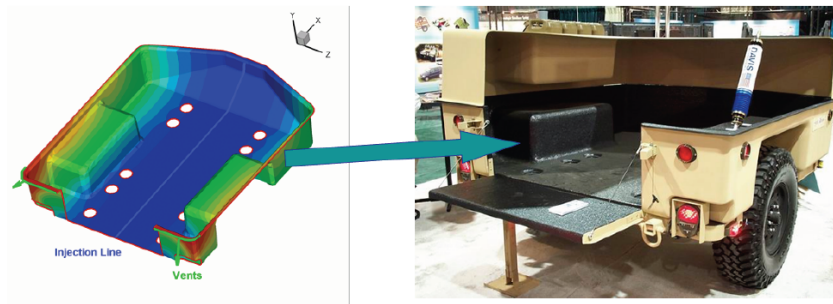
Multi-scale Modeling and Simulation of Composite Manufacturing Processes

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This talk will focus on how the science base of materials processing, which integrates material parameters with transport phenomena at various scales during manufacturing, can be used to create multi-physics models and implemented in simulations to describe the effect of material, geometric and process parameters on the final quality of the part. Use of process models and simulations to improve composite manufacturing processes to fabricate light weight composites structures for transportation, wind and energy storage applications will be presented. The simulations can be seamlessly interfaced with optimization, functional design and process control tools to improve the yield of the process despite the variability in the incoming materials and process parameters. Automation can be introduced with equipment designs that rely on sensors and simulations interfaced with actuators to address variability and disturbances in the process. Examples where this has been demonstrated on a laboratory scale will be presented for Liquid Molding processes such as Resin Transfer Molding, Vacuum Assisted Resin Transfer Molding and Compression Resin Transfer Molding.

Suresh G. Advani is George W. Laird Professor of Mechanical Engineering and Associate Director, Center for Composite Materials at the University of Delaware. He received his Ph. D from University of Illinois at Urbana-Champaign in 1987. His research interests are in rheology; fluid mechanics and heat transfer as applied to composite processing and alternate energy sources such as fuel cells and hydrogen storage. Advani has published over 300 journal papers and delivered over 100 invited lectures. He is the lead author of a text on Process Modeling in Composite Manufacturing Processes. Professor Advani is a Fellow of American Society of Mechanical Engineers and is the North American Editor for the journal Composites Part A: Applied Science and Manufacturing. Professor Advani recently received the Outstanding Researcher Award for 2015 from American Society of Composites.