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H2020-MSCA-RISE Project No. 3734485

Invited Lecture on

Integrated Computational Materials Engineering (ICME): Past, Present, and Future

**2 pm, October 30, 2019, AUT, Thessaloniki, GREECE
Meetings Room, Hydraulics Division, Dept. of Civil Engineering**

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ABSTRACT

Integrated Computational Materials Engineering (ICME) has recently been advocated by the National Academies as a potential to transform manufacturing related to materials processing in the US. ICME entails cradle-to-grave history modeling and multiscale modeling of a material through its manufacturing process and in-service life. A hierarchical multiscale modeling framework will be discussed in the context of using internal state variable (ISV) theory at the macroscale where downscaling constraints start. A discussion of different length scales will be presented related to rate and temperature dependent plasticity and damage evolution in ductile metals along with the modeling of the Process-Structure-Property-Performance (PSP) sequence. This modeling concept will be shown to address a broad range of engineering problems.

Dr. Horstemeyer's presentation will address the historical developments that led to the notion of ICME. He will also address current applications of ICME from both a science and engineering perspective. Finally, he will make conjectures about the future using ICME concepts.

SHORT BIO

Mark F. Horstemeyer is the current Dean of Engineering at Liberty University (2019–present). He was the Giles Distinguished Professor at Mississippi State University (MSU) and professor in the Mechanical Engineering Department at Mississippi State University (2002–2018), holding a Chair position for the Center for Advanced Vehicular Systems (CAVS) in Computational Solid Mechanics; he was also the Chief Technical Officer for CAVS. Before going to MSU, he worked for Sandia National Laboratories for fifteen years (1987-2002) in the area of multiscale modeling for design. Professor Horstemeyer has a Funding ID of \$44.0 M, has supervised 32 Post Docs, 57 PhDs, 60 MS and 46 UG students, has given more than 150 invited lectures, organized 15 International Conferences/Workshops, and published 490 scientific publications (h-factor=62).