

MAE LEADERSHIP

SEMINAR

SERIES
DISTINGUISHED
SPEAKER

THURSDAY,
NOVEMBER 18

4:00 PM

KNOX 04



Dr. Francine Battaglia

Professor and Department Chair
Mechanical and Aerospace
Engineering

Director, Advanced Simulations for
Computing Energy Transport
(ASCENT) Laboratory
University at Buffalo

AN OVERVIEW OF MODELING EFFORTS FOR ENERGY TRANSPORT APPLICATIONS

ABSTRACT

Advances in the application of computational fluid dynamics (CFD) to simulate energy systems such as burners, injectors, reactors and building ventilation are a critical focus of research today. Successful implementation of more detailed physical CFD models can help industrial practice for improved process design, scale-up, and optimization. Computational chemistry techniques can be used to provide new insights into relevant reactions and be used to improve the databases needed to predict rate chemical kinetics. Likewise, detailed models of mesoscopic phenomena, such as multiphase flow, can provide insight into the interactions between reactions and interphase transport processes. Development of these micro/mesoscopic models are needed to integrate transport and chemical processes into macroscopic flow models for a wide range of temporal and spatial scales. This seminar will demonstrate progress with modeling a variety of systems for which energy transport is critical. The models used will be briefly presented but the focus will be on the validation and capabilities of the models. Examples will include a fluidized bed reactor for gasification of coal-biomass feeds, a three-stream airblast injector, a non-premixed bluff body burner, and small- and large-scale building simulations for natural ventilation.

BIO SKETCH

Dr. Francine Battaglia is a professor and chair of the Mechanical and Aerospace Engineering Department at the University at Buffalo (UB). Dr. Battaglia's areas of expertise are in computational fluid dynamics and computational model development in single- and multi-phase turbulent reacting flows with applications in gasification processes, alternative energy production and building energy utilization. She has published over 130 refereed journal and conference proceedings papers and co-authored a textbook on natural ventilation. She received a Ph.D. in mechanical engineering from the Pennsylvania State University. Dr. Battaglia is the Editor for the ASME Journal of Fluids Engineering, and is a Fellow of the American Society of Mechanical Engineers (ASME) and the American Society of Thermal and Fluids Engineers (ASTFE).



University at Buffalo

Department of Mechanical
and Aerospace Engineering
School of Engineering and Applied Sciences