AEROSPACE & MECHANICAL ENGINEERING

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UNIVERSITY OF NOTRE DAME, NOTRE DAME, INDIANA 46556

SPEAKER: **Prof. Tarek I. Zohdi**
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TOPIC: **MODELING AND SIMULATION OF NEW MATERIALS FOR ENERGY-RELATED APPLICATIONS**

DATE: Tuesday, October 23, 2012

TIME: 3:30 p.m.

PLACE: Lower Level Auditorium, Geddes Hall

RECEPTION: 3:00 – 3:25 p.m. – Coffee House, Geddes Hall

ABSTRACT

Recently, several energy-related applications have arisen that involve the dynamic of response of new material systems. In many cases, there is significant multifield coupling, which requires methods that can capture the unique and essential physics of these systems. In this presentation, I discuss the modeling and simulation of three such applications:

(1) Electromagnetic composites, with applications motivated by strongly coupled electromagnetic and thermo-mechanical fields that arise in particulate-doped materials from Joule heating, which alter the pointwise dielectric properties such as the electric permittivity, magnetic permeability, and electric conductivity, hence affecting the overall material response.

(2) Charged particulate jet sprays and droplets, with applications motivated by microtechnology (electrostatic copiers, inkjet printers, powder coating machines and a variety of small-scale manufacturing processes), where a successful analysis requires the simulation of flowing particulate media involving simultaneous near-field interaction between charged particles and momentum exchange through thermo-mechanical contact.

(3) Functionalized optical coatings, which arise in a variety of emerging energy applications such as photovoltaic conversion, thermo-electric conversion, electrochromic actuation, artificial photosynthesis, etc., where the capture and trapping of light on a surface is a critical first step in a multistage process. The functionalization of the coatings is achieved by adding small-scale features, such as fine-scale rods, to trap incoming light.

NOTE: ***If you are interested in meeting individually with Prof. Zohdi, please contact Linda at 631-5431***