



College of Engineering
Department of
Mechanical & Industrial Engineering

The Sidney E. Fuchs Seminar Series

3:00-4:30pm, Friday, September 20, 2013
Frank H. Walk Design Presentation Room



Applications of Fluid Dynamics and Structural Mechanics Simulation for Petroleum Refining, Chemical Processing, and Equipment Design

by **Madhusuden Agrawal*** and **Yasir Bugrara****

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Petroleum and Chemical Process industries are driving energy reduction, sustainability and corporate profitability through innovation. Numerical modeling has become an important tool in the design, operation and performance optimization of equipment and processes involving in refining and chemical processing. Until recently, these applications required the construction and testing of physical prototypes — a difficult, expensive and time-consuming process. Computational Fluid Dynamics (CFD) and Computational Structural Mechanics (CSM) are extremely powerful tools to provide information and insight to engineers and scientists involved in all aspects of oil and gas industry. CFD and CSM modeling enabling process engineers to model a range of systems, including gas-solid systems, fluid-solid systems and solid handling equipment. ANSYS technology has the power to create multiphysics, multi-component, multi-scale simulations that address a wide range of industrial engineering challenges. This presentation will feature an introduction to CFD and CSM and showcase how these can be applied in refining, chemical processing and equipment designs applications, including:

- Reactor Design (Mixing, Separation), • Separation (Cyclones, Hydro, Gravity, etc), • Heat Exchangers, • Dryers, Burners, • Furnaces, and Crackers, • Filtration, • Erosion and Corrosion (Maintenance and Troubleshooting), • Powder Handling, • Polymer Processing, • Combustion (Pollution Control, Fractionation, Flares, etc), • Distillation, • Cracking, • Valves, chokes and regulators.

* Mr. Madhusuden Agrawal is a Principal Engineer at ANSYS, Inc. He has 20+ years' experience in numerical modeling of fluid flow and mass/heat transfer. His expertise covers the cutting edge industrial-strength CFD analysis, simulations and optimization in wide range of applications in oil & gas, chemical, biomedical, pharmaceutical, petrochemical, material and consumer products. Mr. Agrawal obtained his Master's degrees from Indian Institute of Technology, Kanpur India and MBA from Franklin Pierce College, NH USA.

** Yasir Bugrara is an Account Manager at ANSYS, Inc and a graduate of Boston University specializing in Computer Systems Engineering. In his 8 years of experience, Yasir has developed software, performed technical pre-sales, and has founded hosted business solutions for engineering software companies. In recent years, Yasir has become heavily involved with the Oil and Gas industry and is responsible for growing all sales and revenue for Louisiana and Downtown Houston.