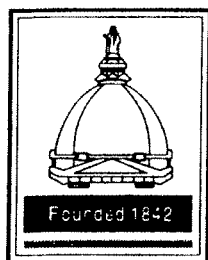


# AEROSPACE & MECHANICAL ENGINEERING



**2010 COLLOQUIUM 2011**  
**SEMINARS ARE OPEN TO THE PUBLIC**

**INFORMAL COFFEE PERIOD BEFORE THE SEMINAR IN ROOM 365 FITZPATRICK HALL**  
**UNIVERSITY OF NOTRE DAME, NOTRE DAME, INDIANA 46556**

**SPEAKER:** **Professor Theodore (Ted) J. Heindel**  
Art and Priscilla Bergles Professor of Thermal Science  
Interim Chair, Department of Mechanical Engineering  
Iowa State University  
Ames, Iowa

**TOPIC:** **CHARACTERIZING FLUIDIZED BED HYDRODYNAMICS**  
**USING X-RAY FLOW VISUALIZATION**

**DATE:** Thursday, September 9, 2010

**TIME:** 3:30 p.m.

**PLACE:** 136 DeBartolo Hall

## *ABSTRACT*

Fluidized beds are found in many process industries including the combustion, pyrolysis, and gasification of solid fuels such as coal or biomass. One application of current interest is in the gasification of biomass, where the resulting synthesis gas can be used to replace natural gas or upgraded in a Fischer-Tropsch process. The hydrodynamics in a fluidized bed drive gas-solid contact and have a significant influence on fluidized bed performance. Although fluidized bed hydrodynamics are key to effective reactor operation, they are still poorly understood due to limited optical access and the inability of measurement techniques to acquire data at the requisite length and time scales. X-ray imaging is one noninvasive method that can be used to characterize and quantify fluidized bed hydrodynamics. This seminar will provide an overview of a unique X-ray flow visualization facility that can complete 3D X-ray computed tomography (CT) imaging of a multiphase flow to measure the local time-average phase fractions anywhere within the imaging region. Several different fluidized bed conditions have been imaged and selected results will be presented. The use of X-ray stereography imaging to track individually injected model biomass particles in a 3D fluidized bed will also be summarized.