CENTER FOR COMPUTATION & TECHNOLOGY
Interdisciplinary | Innovative | Inventive

LOUISIANA STATE UNIVERSITY

Search

Events

Other - Enabling Process Innovation through Computation (EPIC) Seminar Series

Filtered Two-fluid Models for Fluidized Gas-particle Suspensions

Sankaran Sundaresan, Princeton University

Sponsored by LSU College of Engineering and LSU Chemical Engineering

Patrick F. Taylor Hall 1502
September 25, 2015 - 03:30 pm

Abstract:

Gas-particle flows in turbulent fluidized beds and risers exhibit large fluctuations in velocities and local suspension density. These fluctuations are associated with the random motion of the individual particles and with the chaotic motion of particle clusters. These clusters occur over a wide range of length scales and their dynamics span a broad range of time scales. This broad range of scales has made it difficult to construct efficient flow models required for practical analysis of flows in turbulent fluidized beds and risers. Our research seeks to develop filtered hydrodynamic models for such systems.

Constitutive relations for the drag coefficient and particle phase stresses appearing in the filtered model equations have been formulated by systematically filtering the computational data generated through highly resolved simulations of fluidized suspensions in simple flow geometries. These will be described in the presentation, along with our efforts to validate the approach against experimental data.

Watch the seminar online at: http://lsu.webex.com/meet/nandakumar

Speaker's Bio:

Prof. Sundaresan received his Ph.D. in Chemical Engineering from the University of Houston in 1980, and joined the faculty at Princeton University. At Princeton, he has studied different classes of multiphase flows - trickle bed reactor hydrodynamics, fluid-particles flows, and bubble dynamics in gas-liquid bubble column reactors. Through a combination of experiments, simulations and theory, his research group has studied the origin of instabilities and the hierarchy of non-uniform structures that arise in granular flows and multiphase flows. The current emphasis of his work is on fluid-solid flows, some of which he will touch upon in today's presentation.