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

Hydrodynamic, Interfacial Phenomena and Energy Utilization in Multiphase Systems

Geoffrey Evans, University of Newcastle, Australia

Digital Media Center 1034
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Abstract:

Multiphase systems are ubiquitous in industrial applications aimed at the generation of products either by chemical/biological reaction or physical separation based on density, electrical charge or surface properties such as hydrophobicity. The physical processing of these multiphase systems is carried out at all scales of operation and within an endless variety of vessel shapes and ancillary devices. Underpinning each process is a complex interaction between phases involving hydrodynamic, heat and mass transport. At Newcastle, we are focusing on visualizing, quantitative measurement and theoretical and computational modelling of the phenomena that are taking place at the phase boundaries in multiphase systems.

In particular, we are developing both modelling and measurement techniques to evaluate both spatial and temporal distribution of energy dissipation rates. This information is then being fundamentally related to the rate of heat/mass transfer, dispersion, breakup-coalescence, and hydrodynamic stability. Finally, these relationships are being used as the foundation for the development of systems that provide ideal energy dissipation rate at desired locations and at desired length scales.

Our latest research, including innovative measurement approaches as well as analytical, CFD, DEM and DNS modelling approaches, will be presented for fluidised beds, novel mineral flotation approaches, and high temperature reactors.

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

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Speaker's Bio:

Professor Geoffrey Evans received his PhD in 1990 from The University of Newcastle, Australia. He has been actively involved in fundamental and applied research into multiphase systems over the last 20 years. During that time he has worked on a wide range of projects which have concentrated on free surface phenomena and phase interaction between bubbles, particles and the liquid phase. Specifically, the research has focused on bubble formation and growth, bubble nucleation, bubble breakup and coalescence, two phase flow, mixing and agitation, emulsions, and plunging and submerged jets. More recently, his research has included surface forces, particle-particle and bubble-particle interactions, as applied to a number of particle technology applications. The research has involved a combination of experimental measurement, theoretical modelling and computational fluid mechanics, and has been applied to a number of practical applications, including petrochemical, mineral and pyro-metallurgical processing, and water treatment.

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