LSU | College of Engineering
Department of
Mechanical & Industrial Engineering

Joint Sidney E. Fuchs / EPIC Seminar

3:30-4:20pm, Friday, February 7, 2014
Frank H. Walk Room (ELAB Building)

Quantifying the Uncertainty in Multiphase CFD Predictions

by Madhava Syamlal*

Focus Area Leader, National Energy Technology Laboratory

To accelerate the development of technology, such as for example CO_2 capture, decisions about the scale-up of commercial reactors need to be made on the basis of information obtained from pilot scale units 20–100 times smaller. Physics-based computational tools can be used to generate the desired degree of confidence in the scaled up design. Multiphase computational fluid dynamics (CFD) is one such tool that can be used for the design and troubleshooting of fluidized bed reactors, ideal candidates for sorbent-based CO2 capture. To make design decisions based on multiphase CFD predictions, it is essential that the uncertainty in predictions be quantified. Recent progress in developing uncertainty quantification methods for multiphase CFD will be presented in this seminar by discussing the two papers Gel et al. (2013) and Storlie et al. (2013).

Gel, A., Li, T., Gopalan, B., Shahnam, M., Syamlal, M., "Validation and Uncertainty Quantification of a Multiphase CFD Model", Industrial & Engineering Chemistry Research, 2013, doi:10.1021/ie303469f.

Storlile, C.B., Lane, W.A., and Ryan, E.M., "Calibration of Computational Models with Categorical Parameters and Correlated Outputs via Bayesian Smoothing Spline ANOVA," submitted to the Journal of the American Statistical Association, July 2013.

* Dr. Syamlal leads the Computational Science and Engineering Focus Area at NETL, responsible for the development of science-based simulations that span a broad range of scales for accelerating energy technology development and serves as Director of the Carbon Capture Simulation Initiative. He received degrees in chemical engineering: B.Tech from IIT (BHU), and MS and PhD from IIT, Chicago. He has been the architect of the widely used open-source multiphase CFD code MFIX and led the development of multiscale simulation capabilities linking process and device scales and the C3M chemical kinetics software. He is the recipient of numerous awards such as DOE Secretary's Achievement Honor Award and AIChE's Fluidization Process Recognition Award.

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