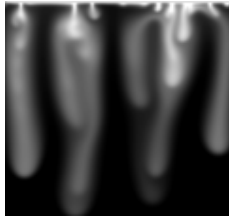




2009 Mechanical Engineering Special Seminar



The Department of Mechanical Engineering is pleased to host



Amir Riaz

*Research Assistant Professor
University of Maryland*

“Multiscale Modeling Approach for Multiphase Flow in Disordered Media”

October 9, 2009 | DEWALT Seminar Room, 2164 Glenn Martin Hall | 2:00 pm

Abstract: Understanding and prediction of multiphase flow behavior, related to many energy and environmental science applications, through either direct numerical simulation or model equations, requires sophisticated numerical techniques and multiscale modeling approaches that must honor the full complexity of the relevant physics. In order to appreciate this complexity the problem of carbon dioxide sequestration in the subsurface environment is considered. Injection of supercritical CO₂ into the subsurface brine aquifers represents a complex multiphase, multiscale flow modeling challenge involving the interplay of viscous, capillary, gravitational and diffusive effects in the presence of aqueous CO₂ and brine phases, a solid porous rock and a gaseous CO₂ phase, across a wide range of length scales. A specific problem related to the physical mechanisms affecting the pattern formation characteristics of the system is analyzed with respect to the developed length and time scales of flow instabilities at various scales, along with the discussion of appropriate numerical and modeling techniques used. Shortcoming of the current modeling approaches arising due to hydrodynamic instability would be highlighted and an approach towards the development of improved numerical methods and multiscale modeling techniques will be presented.

Biography: Amir Riaz is an Assistant Research Professor at the Department of Mechanical Engineering, University of Maryland College Park. His research is related to the development of improved mathematical models and numerical algorithms to characterize the physics of multiphase flows across a range of scales. Dr. Riaz received his doctorate in mechanical engineering from the University of California, Santa Barbara. He subsequently pursued a postdoctoral fellowship and was later employed as a research associate both at Stanford University in the Department of Energy Resources Engineering.

For more information, please visit: www.enme.umd.edu

Dr. Raiz will be hosted by Professor Jim Duncan of Mechanical Engineering