Computational Modeling of Interfacial Flows in Micro/Biofluidics

Tuesday,
October 01, 2013,
3:30P.M.

Lower Level
Auditorium,

Geddes Hall

Refreshments served
at 3:00 p.m. in the
Geddes Hall
Coffee House

Microfluidics typically refers to flow through channels between 100nm-100 microns in microfabricated silicon, glass, or polymer systems and is a rapidly growing field being driven by new technological applications in the medical, materials, biological and chemical sciences. With the rapidly growing enabling technologies in fabrication, devices have shrunk, and the strategy of "smaller is better" has begun to transform the world of fluidics as it has transformed the world of electronics. It is now possible to "print" miniature networks of channels with cross-sections typically on the order of tens of micrometers across – the width of a human hair. The ultimate goal is to create automated chemical laboratories called lab-on-a-chip that would fit on the palm of one's hand. As the scale decreases, the effects driving and dominating fluid motion change radically. At micron scales, fluids are primarily dominated by surface tension and viscous forces. The physics of microfluidic systems are well-described by continuum theory and flow is almost always laminar. Therefore computational fluid dynamics (CFD) can be used as a design tool and has a potential to replace most of the laboratory experiments in microfluidics systems.

In this talk, I'll describe a front-tracking method developed for computations of interfacial flows encountered or inspired by bio/microfluidics applications.

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If you are interested in meeting individually with Dr. Muradoglu, please contact Linda at 631-5431.