JOHNS HOPKINS
Center for Environmental
& Applied Fluid Mechanics

Weekly CEAFM Seminar: Spring 2012

Friday, February 24, 2012
11:00 a.m. – 12:00 p.m.
Gilman 50 (Marjorie M. Fisher Hall)

"Transport of Suspended Particles in Periodic Systems: Applications to Microfluidics for Separation Sciences."

Presented by
Dr. German Drazer
Chemical & Biomolecular Engineering
Johns Hopkins University

Abstract:
We are interested in the complex behavior that takes place in the motion of suspended particles in periodic systems, both when Brownian motion is important as well as when transport is nearly deterministic. A resurgence of interest in these systems comes from the rapidly growing field of microfluidics. In particular, we are interested in the development of separation devices that rely on the unique features of transport in periodic structures. A typical system in our studies consists of suspended particles moving either through a periodic array of obstacles or on top of a periodic pattern fabricated in the bottom surface of a microfluidic channel. In all cases, we investigate how to take advantage of the repetitive effects present in periodic systems to promote and amplify the separation of a mixture of suspended particles. In particular, we focus on vector separation systems in which different species move in different directions within the device. We present analytical and experimental results that show the potential that periodic systems have to induce the spontaneous fractionation of a mixture of particles.

Bio:

German Drazer is currently an Assistant Professor of Chemical and Biomolecular Engineering at Johns Hopkins University since 2005. He received his Bachelor, M.S. and Ph.D. in Physics from the Instituto Balseiro in Argentina. He did postdoctoral work with Profs. A. Acrivos and J. Koplik at the Levich Institute in the City College of New York.

His work is at the interface between Transport Phenomena -Fluid Mechanics- and Statistical Physics -Stochastic Processes- and investigates the transport of suspended particles in complex systems, with a focus on developing microfluidic separation devices with improved capabilities over conventional systems.