



## CHEMICAL AND BIOLOGICAL ENGINEERING DEPARTMENT SEMINAR SERIES

### ***Colloidal Sorting by Sedimentation***

Presented by: Darrell Velegol, Department of Chemical Engineering at Penn State University

Time: Wednesday, November 4; 3:15 – 4:30 pm

Location: Perlstein Hall Auditorium

#### **Abstract**

Separating one type of molecule from another – whether those molecules are petroleum-based or pharmaceutically-based for instance – is a classic chemical engineering problem. We might design distillation columns or membranes as the separating technology. But suppose now that we have a mixture of colloidal particles in suspension, say particles ranging from 0.1 microns to 10 microns in diameter. How do we separate those particles? Sedimentation separation seems like an obvious choice, since larger particles should settle more quickly than smaller particles. Shouldn't they? In this talk I examine how simple intuition has led our lab group astray several times, how Rayleigh and Benard are speaking to us even today, and how a surprising act of serendipity might lead us to effective separations.

#### **Biography**

Darrell Velegol attended West Virginia University for his BS in Chemical Engineering, and he earned his PhD in Chemical Engineering at Carnegie Mellon University in 1997 working with Professors John L. Anderson and Stephen Garoff. In 1998 Velegol won the Victor K. LaMer Award of the American Chemical Society for the best PhD in the field of Colloid & Surface Science. He continued with a post-doc in the Center for Light Microscope Imaging and Biotechnology at Carnegie Mellon, working under Professor Fred Lanni of the Biology Department. In June 1999 Velegol joined the Department of Chemical Engineering at Penn State, where he was promoted to Associate Professor in 2005. Velegol won an NSF CAREER Award in 2000, and in 2003 he led a group in winning an NSF NIRT grant on bottom-up particle assembly. Currently he works with 6 graduate students and numerous undergrad researchers. His research investigates the fabrication of colloidal assemblies and devices, with a specialty in understanding the interparticle forces and separation processes. His research group uses a wide range of experimental and modeling approaches. Velegol is a member of ACS, AIChE, AAAS, and ASEE. More recently, he has engaged in studying the "physics of community", pursuing questions in learning, creativity, motivation, trust and deceit, and other social science ideas using results from physics, chemistry, biology, and chemical engineering. Using this research, he aims to impact 7-12 education throughout Pennsylvania and beyond.