

The University at Buffalo Department of
Chemical and Biological Engineering
Presents

The 17th Annual Graduate Student Research Symposium

“Single Molecule Tracking at Wet Interfaces”

Daniel K. Schwartz

Chair of the Department of
Chemical and Biological Engineering
and the Alfred and Betty Look
Professor of Engineering at the
University of Colorado Boulder

Friday, October 3, 2014

Center for the Arts, 1st floor
UB Amherst Campus

Student Lectures 1:00 p.m.

Keynote Presentation 2:00 p.m.

Screening Room

Student Poster Competition and
Alumni/Student Mixer 3:30-6:00 p.m.

Atrium

RSVP cbe-chair@buffalo.edu

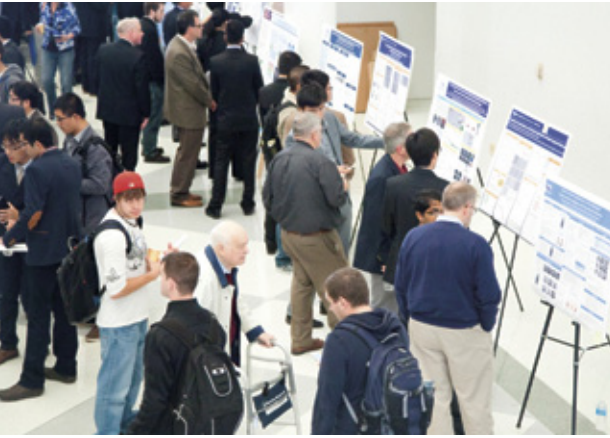
The School of Engineering and Applied Sciences



University at Buffalo The State University of New York

REACHING OTHERS

The UB Department of Chemical and Biological Engineering



Graduate Student Research Symposium

Over the years the UB CBE Graduate Student Research Symposium has evolved into an exciting, comprehensive event that showcases the high quality, multidisciplinary research that is conducted in our department, and spans diverse areas such as molecular engineering of novel materials, nanotechnology, bioengineering, and molecular modeling. Every year our faculty and graduate students welcome the opportunity to present their work to their peers from CBE, other UB departments, our alumni, and representatives from local business. The Symposium has grown in ambition and scale, featuring over 60 posters, two lectures from senior graduate students, and a keynote lecture from an accomplished colleague. This year we are particularly pleased to welcome Dr. Daniel Schwartz from the University of Colorado Boulder. Our Symposium will include a poster contest and alumni/student mixer from 3:30-6:00 p.m.



CBE is proud to present our 2014 PhD candidate speakers:

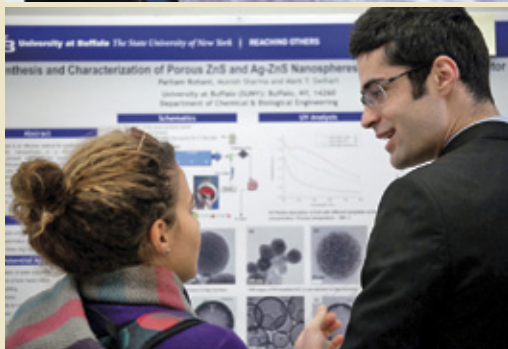
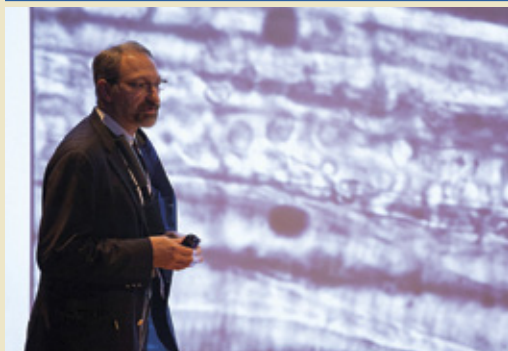
- **Charles Jones**
"Hybrid Bio-synthetic Gene Therapy Vector Development and Dual Engineering Capacity"
- **Panagiotis Mistriotis**
"Rejuvenating Senescent Mesenchymal Stem Cells: Implication for Vascular Tissue Engineering"

The UB Department of Chemical and Biological Engineering

This Symposium is a collaborative effort supported in part by the CBE Graduate Student Association, the UB CBE Advisory Board, our graduate student speakers, CBE faculty, and various colleagues in and around UB who serve as judges for the all-important student poster competition. Many thanks to all our graduate students who work so hard on their research, and for their excellent poster and oral presentations during the symposium. Ultimately, this Symposium is a showcase for the excellence that we strive for in our scholarship and graduate education. We look forward to many more years of this celebration of our research accomplishments.

Join us for the 2014 17th Annual Graduate Student Research Symposium

Friday, October 3rd at 1:00 p.m.



Friday, October 3rd at 3:30 p.m.

UB CBE POSTER CONTEST AND ALUMNI/STUDENT MIXER 3:30-6:00 p.m. Center for the Arts Atrium

- Meet Daniel Schwartz • Learn what's new • Connect with your colleagues •
- Wine • beer • soft drinks • hors d'oeuvres •

R.S.V.P. cbe-chair@buffalo.edu or call 716.645.1174



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NEXT UP: OCTOBER 3RD, UB CBE POSTER
COMPETITION AND ALUMNI/STUDENT MIXER

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“Single Molecule Tracking at Wet Interfaces”

Daniel K. Schwartz

Chair of the Department of Chemical and Biological Engineering and the Alfred and Betty Look Professor of Engineering at the University of Colorado Boulder

Abstract:

Interactions between molecules and surfaces lead to complex and highly-varied interfacial behavior, where heterogeneity may arise from spatial variation of the surface/interface itself or from molecular configurations (i.e. conformation, orientation, aggregation state, etc.). These phenomena greatly impact technologies and applications including biomaterials, separations (chromatography and membrane filtration), heterogeneous catalysis, and biosensing, among others. The direct observation of adsorption, interfacial diffusion, and desorption of individual fluorescent molecules permits the characterization of heterogeneous interfacial behavior in ways that are inaccessible to traditional ensemble-averaged methods. Moreover, spectral information can be used to simultaneously track molecular configuration (aggregation or folding state). Single-molecule tracking experiments have traditionally been limited by small sample sizes (e.g. a few hundred molecules), leading to poor statistical significance and a lack of sensitivity to rare populations. However, new advances in high-throughput tracking methods now enable hundreds of thousands of molecules to be followed in a given experiment. This approach has recently been used to characterize heterogeneous molecule-surface interactions including: multiple modes of diffusion and desorption associated with both internal and external molecular configuration, intermittent interfacial transport, spatially dependent interactions, and others.

About Daniel K. Schwartz:

Dan Schwartz is Chair of the Department of Chemical and Biological Engineering and the Alfred and Betty Look Professor of Engineering at the University of Colorado Boulder. He has been a professor at CU-Boulder since 2001. He was previously an Assistant and Associate Professor of Chemistry at Tulane University from 1994-2000. Dan received his Bachelor's Degree (in Chemistry and Physics) and his PhD (in Physics) from Harvard University in 1984 and 1991 respectively, and subsequently performed postdoctoral fellowships in Chemical Engineering at UC Santa Barbara and Physical Chemistry at UCLA. Dan's research interests focus on interfacial phenomena with specialties in surface modification, single-molecule microscopy, biomaterials, surfactant phenomena, biotechnology, liquid crystals, biosensing, and biomimetic catalysis. He has published more than 160 peer-reviewed manuscripts that have been cited over 5000 times. His recognitions include the NSF CAREER award, the Dreyfus Foundation Teacher-Scholar award, the CU-Boulder Faculty Assembly Award for Excellence in Research, and election as a Fellow of the American Physical Society and a Fellow of the American Chemical Society. Dan has been a Senior Editor of the journal *Langmuir*, the American Chemical Society's journal of surfaces and colloids since 2004. He was the founding Director of the Tulane Science Scholars program (an enrichment program for High School students) and of the Summer Research Experience for Undergraduates Program in Functional Materials at CU-Boulder. He also developed a general education course at CU-Boulder, Creative Technology, that has communicated state-of-the-art technology concepts to more than 6,000 non-science undergraduates to date.



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