THE 5TH ENERGY FOR THE 21ST CENTURY SYMPOSIUM

MAY 1, 2015

Sponsored by the Energy Research Initiative

9:30 AM: Join us for Coffee in the Munnerlyn Atrium

10:00 AM: Professor Robert Enick, University of Pittsburgh

*Increasing the Viscosity of CO₂ and Natural Gas Liquids for Improved Oil Recovery or Improved “Dry” Hydraulic Fracturing*

*Professor Robert Enick* is the NETL RUA Faculty Fellow, Bayer Professor and Vice Chair for Research at the Department of Chemical and Petroleum Engineering, University of Pittsburgh, Pittsburgh, PA where he also received his BS, MS and PhD in Chemical Engineering and MS in Petroleum Engineering. He is the recipient of United States Advanced Research Projects Agency-Energy (ARPA-E) and United States Department of Energy National Energy Technology (NETL) awards aiming to increase the amount of oil produced through use of carbon dioxide (CO₂) flooding, a process in which CO₂ is injected into an oil reservoir for extraction.

Professor Enick on his research: “If a thickener could be identified that could increase the viscosity of the CO₂ to a value comparable to that of the oil in the underground layers of rock, then the need to inject water would be eliminated and more oil would be recovered more quickly.”

11:00 AM: Professor Peter Vollhardt, UC Berkeley

*Saving the Planet: Toward a Sun-charged Thermal Molecular Battery*

*Professor Peter Vollhardt* obtained a Vordiplom in Chemistry at the University of Munich and a PhD from University College London. After a postdoctoral fellowship at the California Institute of Technology, he joined the College of Chemistry at the University of California, Berkeley. He also became Principal Investigator of the Materials and Chemical Sciences Division, Lawrence Berkeley Laboratory and Principal Investigator at the Center for Advanced Materials, Lawrence Berkeley Laboratory. He was Assistant Dean to the College of Chemistry from 1996 to 2004. His research interests are Organic and Organometallic Chemistry — Transition metals and novel synthetic methodology enable the synthesis of complex natural and unnatural products.

Professor Vollhardt on Chemistry: “I get excited about high-energy molecules that encounter unusual reagents and conditions to elicit unprecedented behavior, and then about elucidating in great (some of my co-workers would say excruciating) detail the pathways that describe such behavior.” 😊

12:00 PM – 1:30 PM: Lunch and Posters in the Munnerlyn Atrium

1:35 PM: Dr. Safa Motesharrei, University of Maryland


Dr. Safa Motesharrei is a Systems Scientist at SESYNC, and a PhD candidate in Physics (Econophysics) at the University of Maryland (UMD), College Park. He has Bachelor degrees in Electrical Engineering and Physics, Masters degrees in Physics and Mathematics, and PhD in Applied Mathematics/Public Policy from UMD. The focus of his work is on integration of the
Human System and Population into the Earth System Models. Together with Jorge Rivas (Institute of Global Environment and Society) and Prof. Eugenia Kalnay, Dr. Motesharrei has developed a minimal dynamical model of Human and Nature, HANDY, which is the first mathematical model of this kind that shows not only ecological strain, but also economic stratification, can lead to a societal collapse. The paper on HANDY was published in the Journal *Ecological Economics*, and received widespread attention from media around the world, including *The Guardian* and *NPR*. Within a few weeks from its publication, the paper on HANDY became the most downloaded article of *Ecological Economics*, and also generated a fair amount of controversy as this theoretical paper was misinterpreted and hyped by several media outlets. Dr. Motesharrei also plays a leading role in the development of the five-sector Human-Earth System model, which includes Population, Climate, Water, Agriculture, and Energy. This project has received support from NASA.

2:35 PM: Coffee and Dessert in the Munnerlyn Atrium. Poster Session Continues

3:00 PM: IGERT Students [http://www.rochester.edu/igert/index.html](http://www.rochester.edu/igert/index.html)

*Africa Solar Outreach Trip Highlights*

Our second and third cohort of IGERT students each spent a month teaching and learning in Ghana over the past two summers. Their trips were nothing less than a life-changing experience. Our students learned about the energy landscape and culture of Ghana, and taught basic hands-on science in schools that lacked science curriculum. They'll tell you about science demonstrations for secondary school children; exciting food, culture and history experiences; and workshops to assemble solar panels at technical schools, then install them in remote villages.

The *NSF Integrative Graduate Education Research and Traineeship (IGERT)* program was developed to meet the challenges of educating U.S. Ph.D. scientists and engineers who will pursue careers in research and education, with the interdisciplinary backgrounds, deep knowledge in chosen disciplines, and technical, professional, and personal skills to become, in their own careers, leaders and creative agents for change. The program is intended to catalyze a cultural change in graduate education, for students, faculty, and institutions, by establishing innovative new models for graduate education and training in a fertile environment for collaborative research that transcends traditional disciplinary boundaries. It is also intended to facilitate diversity in student participation and preparation, and to contribute to a world-class, broadly inclusive, and globally engaged science and engineering workforce.

All speakers in Sloan Auditorium (Goergen 101)