

TRANSPORT

The University of Houston Department of Chemical and Biomolecular Engineering

Fall 2011

Faculty Developing **NEW PLATFORM** to Fight Malaria

ChBE Assistant Professor Jeffery Rimer and Professor Peter Vekilov received a two-year, \$150,000 seed grant from the U.S. Department of Defense and administered by the Alliance for NanoHealth to create an entirely new platform for developing antimalarial drugs.

Plasmodium falciparum, the parasite that causes malaria, has shown increasing resistance to existing drugs, meaning that even many of those who get treatment for the disease could end up victims. *P. falciparum* is typically introduced into hosts through a mosquito bite. Once the parasite enters the host's red blood cells, it consumes hemoglobin by breaking the macromolecule into smaller constituents.

Heme is a subunit of hemoglobin that is toxic enough to kill the parasite and prevent an infection from taking hold. However, *P. falciparum* has evolved to segregate

heme into crystals, cutting off heme's ability to kill the parasite.

Existing antimalarial medications presumably work by preventing the formation of heme crystals. Vekilov and Rimer's work focuses on uncovering the process of heme crystal formation and determining what kind of molecules could inhibit crystallization. Vekilov believes that heme molecules attach to crystals at sites on the crystal surface that are favorable for the addition of new heme molecules. If this is in fact how heme crystals grow, Vekilov and Rimer will design "tailored inhibitors" that prevent the growth from occurring. This research will lead to new antimalarial drugs that are developed in a more logical and cost-efficient manner.

Researcher **Wins NIH Vaccine Research Grant**

Navin Varadarajan, assistant professor of chemical and biomolecular engineering, won a two-year, \$361,000 grant administered by the Western Regional Center of Excellence for Biodefense and Emerging Infectious Diseases Research and funded by the National Institutes of Health to test potential vaccines for the chikungunya virus. While rarely fatal, chikungunya causes arthritic symptoms so severe that some victims cannot even walk. Spread by mosquitos, the disease's debilitating symptoms have led federal health and security officials to pinpoint it as a possible bioterrorism agent. Varadarajan is testing the ability of potential vaccines developed by this group to spur the immune system to attack human cells that essentially have been taken over by the virus, becoming reservoirs for it to multiply.



UH Researcher Receives Grant to **Develop New Oil Dispersants**

ChBE Department Chair Ramanan Krishnamoorti was awarded \$225,000 to develop safer, more efficient chemical dispersants as part of a major multi-institution grant project that will focus on the effects of the 2010 oil spill. The Gulf of Mexico Research Initiative (GRI) Research Board recently announced that eight research teams will be awarded \$112.5 million over the next three years. BP established the independent board to administer the company's 10-year, \$500 million effort to study the environmental and health impacts of the spill.

Chemical dispersants break apart surface oil slicks into microscopic drops that can sink into the water instead of drifting to shore. Massive amounts of dispersants were used on the water's surface as well as underwater at the site of the BP oil spill, prompting concerns over potential damage to fragile ecosystems. Krishnamoorti's efforts will involve the development of dispersants that are more biocompatible.

UH Dedicates Petroleum Engineering **Building**

Leaders from the University of Houston and the energy industry celebrated the official dedication of the newly remodeled petroleum engineering building in July. The facility was made possible thanks in large part to ConocoPhillips, which made a \$1 million gift to UH and the Energy Research Park in 2011, and intends to follow up with proposed future gifts of \$1 million each year in 2012 and 2013. Located at the UH Energy Research Park, the building is home to three classrooms, three undergraduate teaching labs, a computer lab, three faculty and graduate research labs, faculty and student offices, and a student lounge.

Chemical Engineering Certificates

Process design and chemical companies are seeking advanced/professional training for their employees to sustain the knowledge necessary to compete with the increasing demands of complex engineering and management.

The UH Executive Certificates of Chemical Engineering were created out of necessity for industry and as widespread applications for engineers through the chemical engineering field.

Process Engineering and Modeling

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www.chee.uh.edu/certificates



The Department of Chemical and Biomolecular Engineering

Welcomes New Faculty Members



Associate Professor **William Epling** joined the department this fall. He received his Ph.D. in chemical engineering from University of Florida in 1997. His research focuses on understanding and engineering the reaction process on and along a catalyst surface, including the preparation of novel catalyst materials, the fundamental characterization of catalyst surfaces, developing new analytic techniques, processes or devices, and preparing or manufacturing pilot-scale samples for testing and application, all of which results in the ability to obtain and translate in-depth fundamental catalyst knowledge to practical, industrially relevant application. Epling currently serves as the vice-chair of the Canadian Society of Catalysis.

Assistant Professor **Lars Grabow** also joined the department this fall. He received his Ph.D. in chemical and biological engineering from University of Wisconsin in 2008. In 2010 he held a postdoctoral fellowship at Technical University of Denmark, and in 2011 he worked as a physical science research associate at Stanford University. Grabow's research interests involve using computational methods to understand and predict chemical processes that occur on solid-gas and solid-liquid interfaces. Particularly, Grabow's work focuses on heterogeneously catalyzed reactions relevant for energy production, energy storage, pollution mitigation and the production of useful chemicals.

Petroleum Engineering Hires Noted Professor as **First Tenured** Faculty Member

University of Houston's Petroleum Engineering Program welcomes John Lee, a member of the National Academy of Engineering, as its first tenured faculty. He holds the Hugh Roy and Lillie Cranz Cullen Distinguished University Chair. Lee, who has been a professor at Texas A&M University since 1977, is arguably the most widely known petroleum engineering academic in North America. He is best known for his recent publications and presentations involving oil and gas reserves regulations and estimation and production forecasting in unconventional gas reservoirs. He served as an Engineering Fellow with the U.S. Securities & Exchange Commission (SEC) from 2007 to 2008, providing technical assistance to the SEC in its reserves reporting rules modernization effort.



Save the Date for the **60th** Anniversary UH Chemical Engineering Gala

Saturday, May 5, 2012

Join us for an evening of fun and awards.
More details to come.

Contact Us:

To RSVP, volunteer or nominate an outstanding alumni, *please email us at* uhchemereunion@gmail.com or leave voicemail at 409.276.5510.

Connect with UH Chemical Engineering

To make sure that your information is included on the Chemical Engineering Alumni database please contact Linda Keng at LKeng@uh.edu to provide her with your current physical address, email address and telephone numbers.



An article co-authored by **Jacinta Conrad** appeared in the Aug. 2 issue of *Proceedings of the National Academy of Sciences*.

Vincent Donnelly was the 2011 recipient of the John A. Thorton Memorial Award from the American Vacuum Society.

Demetre Economou received the W.T. Kittinger Teaching Excellence Award.

Micky Fleischer received a Distinguished Engineering Alumni Award from UH.

Raymond Flumerfelt received an Outstanding Teaching Award from the college.

Michael P. Harold and **Ramanan Krishnamoorti** authored an article featured in *Chemical Engineering Education* that discusses the past, present and future of the UH Chemical & Biomolecular Engineering Department: <http://chbe.egr.uh.edu/ChE-History>.

James Richardson received the 2011 Excellence in Applied Catalysis Award from the North American Catalysis Society.

Produced by UH Engineering Communications, 11/11.

Check out our new website at <http://www.chee.uh.edu/>

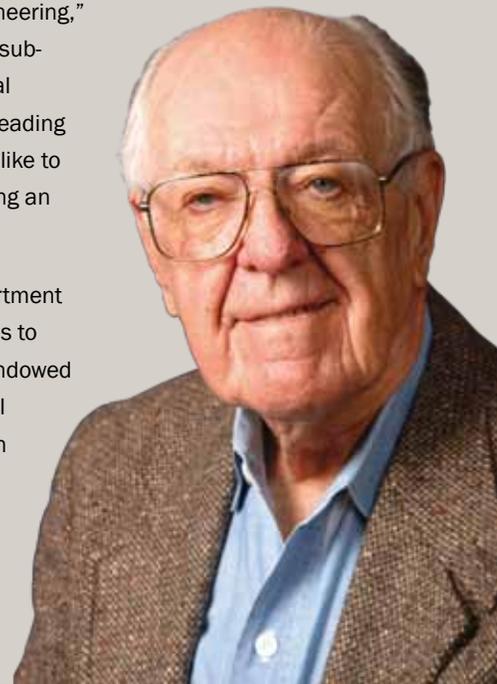
The **2011 Chemical & Biomolecular Engineering Annual Report** is now available online.

60th Anniversary Celebration of the Department of Chemical and Biomolecular Engineering (1952 – 2012): We are seeking alumni volunteers to help plan 2012 anniversary events and reunion! To RSVP, volunteer or nominate an outstanding alumni, *please email us at* uhchemereunion@gmail.com or leave voicemail at 409.276.5510.

Make a Gift to the **Neal R. Amundson** Endowed Chair of Chemical Engineering

Known as the “Father of Modern Chemical Engineering,” Dr. Neal R. Amundson’s impact on the field was substantiated by his pioneering research in chemical reaction engineering and his role as one of the leading engineering educators in the country. We would like to memorialize his impact to the field by establishing an endowment at the University of Houston.

To endow a chaired professorship, the UH Department of Chemical and Biomolecular Engineering hopes to raise \$1 million in Dr. Amundson’s honor. The endowed chair will provide additional support for chemical engineering faculty at UH. If you are interested in contributing to this fund, please contact Senior Director of Development Russell Dunlavy at 713-743-4209 or rtunlavy@uh.edu or ChBE Department Chair Ramanan Krishnamoorti at 713-743-4307 or ramanan@uh.edu.



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