

# TRANSPORT

The University of Houston Department of Chemical and Biomolecular Engineering

Fall 2010



## Win at Regional Chem-E Car Competition Sends UH Team to Nationals

It may not have been as sleek as other entries, but the “Cougalac” stole the show at the Chem-E Car Competition held at the American Institute of Chemical Engineers (AIChE) Southwest Regional Conference last spring. Named after its bulky relative, the Cadillac, the 26-pound car earned a team of eight chemical engineering students from the University of Houston a first place win and a ticket to the national competition.

Designed to work on a pressure system, the car relies on the decomposition of hydrogen peroxide using a catalyst (ferric chloride) that builds pressure in two tanks of the car. This pressure feeds oxygen to a pneumatic drill, which—much like a normal car—turns a gear that spins the front axle and moves the wheels of the vehicle.

To capture first, the Cougalac had to travel 50 feet carrying a water payload of 500 milliliters before coming to a complete stop near the finish line. It beat its competitors in two runs, winning UH the right to represent the region at the national competition in Salt Lake City, Utah, in November.



Professor Mickey Fleischer (fifth from left) with the 2010 Chem-E Car Team.

## College Names Outstanding Engineering Students



University of Houston senior Fernando Alquicira and junior Gurwinder Singh were named the Cullen College's Outstanding

Students for the 2009-10 academic year. Both Alquicira and Singh were chosen from a pool of 13 students selected from each of the college's seven programs. They were honored, along with other outstanding students from the area, at a recognition lunch on the Prairieview A&M University campus during National Engineers Week (Feb. 15-21). Singh (right) is pursuing his bachelor's degree in chemical engineering.

## Engineers Without Borders Travels to Nicaragua

Five undergraduates from the University of Houston chapter of Engineers Without Borders spent spring break 2010 in Nicaragua as part of the group's first official project outside the United States. While there, they traveled about an hour outside of the capital, Managua, to Telpochapa, La Uva and Bara Sonal. Using information gathered during their trip, they will complete a plan to help build the area's first elementary school and formulate recommendations to improve agricultural and sanitation practices.



## Message From the Chair

**O**n behalf of the Department of Chemical and Biomolecular Engineering, I would like to extend a warm welcome to our new faculty members — Jacinta Conrad, Megan Robertson, Navin Varadarajan and Thomas Holley. Jacinta, Megan and Navin are tenure track assistant professors with research interests in colloidal materials, sustainable polymers and biotechnology, respectively. Tom takes over as the director of our Petroleum Engineering Program from Raymond Flumerfelt, the interim director for the past year and a half. Ray has been instrumental in making our new undergraduate degree in petroleum engineering a success and we appreciate his time and efforts.

The undergraduate laboratory has been the centerpiece of the undergraduate student experience for years and we are in the process of remodeling and restructuring it. As a first step, the senior lab was remodeled last summer and now offers distance education media capabilities. Thanks to the generous support of BP, a wind energy testing experiment will now be a part of the senior undergraduate laboratory experience. We'd like to thank alumni Gabe Cuadra and Lizzie Nguyen for helping coordinate this initiative at BP. This will complement other "green" energy experiments such as synthesis and testing of biodiesel and the fuel cell test station that are already a part of the laboratory.

The growth of large centers is vital for the growth of the research in the department. The Texas Diesel Testing and Research Center, directed by Mike Harold and Mickey Rooks, recently underwent a major expansion, doubling its size and increasing its capabilities to research and test retrofit devices that reduce the amount of harmful pollutants emitted from heavy-duty diesel engine exhaust. The expansion, funded with a grant from the Texas Commission on Environmental Quality, cost more than \$9 million and took roughly a year to complete. Located in what is now the University of Houston Energy Research Park, the diesel center now occupies 12,000 square feet and houses more office and functional laboratory space as well as advanced emission testing equipment.

The petroleum engineering program will be shifting its activities entirely to the UH Energy Research Park, where an existing building is undergoing significant remodeling and will be ready for occupation in January 2011. The facility will host the academic program (i.e., classrooms and labs), the faculty and staff, and the three research laboratories for petroleum engineering faculty when it is completed in April 2011.

Ramanan Krishnamoorti  
*Dow Chair Professor and Department Chair*



## BP Annual Gift to Support Wind Lab, Students

As part of an annual contribution to the University of Houston, BP representatives and chemical engineering alumni Gabriel Cuadra ('88) and Lizzie Nguyen ('06) presented a \$85,500 check to Dean Joseph Tedesco (second from left) in support of educational initiatives at the Cullen College. The largest portion of the gift will support the college's Wind Energy Undergraduate Laboratory Experiment. BP has committed \$50,000 to the UH Department of Chemical and Biomolecular Engineering to construct a wind tunnel for students to learn the fundamentals of converting wind energy to electrical power.

# ChBE

## Alumni Reception

### April 2011

Please send comments or suggestions to  
Veronique Tran at  
vtran4@Central.UH.EDU



## New Faculty



### Jacinta Conrad

Jacinta C. Conrad joined the department

as an assistant professor this spring. After receiving a Ph.D. from Harvard University in 2005, she worked as a postdoctoral research associate in the Department of Materials Science and Engineering at the University of Illinois at Urbana-Champaign under the direction of Professor Jennifer A. Lewis. Conrad's research has focused on investigating the flow properties of complex fluid systems. More specifically, she characterized static and dynamic heterogeneities in colloidal glasses, and investigated the phase behavior and rheological properties of colloidal gels. Currently she is working on problems involving fundamental and applied properties of colloidal flow. In the future she will work to exploit microfluidic and microfabrication techniques to produce novel microstructured materials for transport studies and energy applications and to elucidate the interplay between confinement and flow properties for complex fluids and soft materials. Applications of this research include biofluid transport, bioremediation and water purification.



### Thomas K. Holley

Thomas K. Holley was appointed the new director of the Petroleum Engineering Program this spring. He received his Ph.D. in physics from the University of Wisconsin in 1982 while working with his advisor, Professor Chun C. Lin. After the completion of his degree, he took a job at Shell Oil Company, where he enjoyed a successful career in research, teaching, recruiting and management. His initial goal the Petroleum Engineering Program is solidifying the undergraduate program, including hiring full-time faculty to lead a sustainable research program, remodeling a facility in the UH Energy Research Park to house both undergraduate teaching classrooms as well as research laboratories, and revising and then implementing the undergraduate curriculum. This task is the initial phase of a six-year plan to grow a full-fledged Petroleum Engineering department at the Cullen College.



### Megan Robertson

Megan L. Robertson joined the department as an assistant professor this fall. She received her Ph.D. in chemical engineering from the University of California, Berkeley in 2006, advised by Professor Nitash P. Balsara. Her

graduate research focused on the design of block copolymer surfactants for the preparation of nanostructured materials from immiscible polymers. Following graduation, Robertson worked as a senior scientist at Rohm and Haas (now part of Dow Chemical) in Spring House, Pa. on the structural characterization of colloidal dispersions under shear and the emulsion polymerization of polymer latex. She then went to the University of Minnesota as a postdoctoral research associate in the Department of Chemistry, advised by Professor Marc A. Hillmyer. Her postdoctoral research focused on improving the physical properties of polymers derived from renewable, non-petroleum sources. Her research at UH will focus on the interface between polymer chemistry and physics to produce nanostructured polymeric materials for a variety of applications. More specifically, she will focus on the derivation of materials from renewable sources and biodegradable materials for biomedical applications.



### Navin Varadarajan

Navin Varadarajan joined the department as an assistant professor this fall. He received his Ph.D. in chemistry from The University of Texas at Austin in Dec. 2006. His dissertation work was done under the supervision of Professor

George Georgiou and Professor Brent Iverson and focused on a combination of molecular biology, biotechnology and chemistry applied specifically to protease engineering. After obtaining his degree, he stayed at UT as a post-doctoral researcher working on proteases that selectively recognize post-translational modifications (sulfo-tyrosine and 3-nitro tyrosine) and also simultaneously worked on engineering single chain fragments specific for light-modulated antigens. Prior to joining UH, he was a post-doctoral researcher at the Massachusetts Institute of Technology Chemical Engineering Department, where he worked with Professor Chris Love to develop high-throughput immunological assays to study Human Immunodeficiency Virus - 1/HIV-1 infection. His research interests include the development of high-throughput screens designed to characterize a wide range of functions ranging from the properties of proteins in single cells to antigen mediated cellular cytotoxicity.



# Payatakes Lecture

## Guest Speaker

Nicholas A. Peppas, The University of Texas at Austin

## Dinner

Thursday, November 4 • JW Marriott Houston • 5150 Westheimer, Houston, TX 77056 • 713-961-1500

## Lecture

Friday, November 5 • 2 p.m. • UH Cullen College of Engineering • Lecture Hall L2D2

**Alumni Notes** Submit a class note at <http://www.egr.uh.edu/news/submissions>

**Reuven Hollo's** (1980 BSChE) company Aries Resources LLC has formed a new venture with Energy Special Situation Funds called Aries Energy LLC. The company was formed for the strategic purpose of acquiring and developing mature oil and gas properties.

**Hanskarl Borck** (2003 BSChE) and Beth Kungel Borck welcomed son, Konrad Wesley Borck, in June 2009.

**Carol Schmidt** (2007 BSChE) was named the 2010 Young Engineer of the Year by the South Texas Section of the American Institute of Chemical Engineers. Last year, she served as chair for the organization's young professionals group, and continues to help as their advisor. She is a process engineer for Waldemar S. Nelson and Company Inc., where she works on offshore oil and gas platform design projects.

## In Memoriam:

The Foundation for Research and Technology - Hellas (FORTH) mourns the loss of Professor **Alkiviades Ch. Payatakes**, its Director and Chairman of the Board of Directors, who died after a valiant battle with cancer.

Alkis Payatakes was born in Athens, Greece, on August 22, 1945. He started his academic career at the UH Department of Chemical Engineering in 1974, and then became a professor in the Department of Chemical Engineering of the University of Patras in Greece in 1981. He served FORTH as Director of the Research Institute of Chemical Engineering and High Temperature Chemical Processes, as acting chairman of the Board of Directors and since 2005, as chairman of the Board of Directors and director of FORTH's central administration.

His contributions to FORTH's progress and growth and to research in Greece overall have been of great importance.

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