CMET Welcomes New Faculty Members

Prof. Beris’ research is concerned with the modeling and simulation of flow processes, transport phenomena and flow-induced phase transitions in systems with a complex internal microstructure. Typical examples include the flow of polymer solutions and melts, turbulent flow, free-surface flows with surfactants, etc. His primary concern is the interrelationship between the flow and the microstructure.

The overarching goal of Prof. Jayaraman’s group’s research is to develop and use molecular theory and simulations to elucidate microscopic phenomena governing macroscopic properties in polymers, and use that understanding to design and engineer novel materials for various applications including organic photovoltaics, drug and gene delivery, etc.

Prof. Kloxin’s research efforts have focused on new photo-initiated click reaction schemes as well as the creation and characterization of covalent adaptable networks. Currently his research group utilizes a combination of click and reversible chemical motifs for the design and synthesis of nature-inspired polymeric materials.

Eric Furst and Kristi Kiick named 2014 ACS Fellows

Eric M. Furst and Kristi L. Kiick of the University of Delaware College of Engineering have been named to the 2014 American Chemical Society (ACS) Class of Fellows.

ACS is the world’s largest scientific society. Conferred annually since 2008, ACS Fellows are nominated by their peers for their outstanding accomplishments in scientific research, education and public service. Only 750 of the society’s more than 161,000 members from academia, industry, government labs and small business have been distinguished with this honor.

Eric M. Furst, director of the Center for Molecular and Engineering Thermodynamics (CMET) and professor of chemical and biomolecular engineering, is an expert in the physics and chemistry of “soft” materials such as colloids, polymers and biomolecular materials.

Kristi L. Kiick, deputy dean of engineering and professor of materials science and engineering and biomedical engineering, joined the UD faculty in 2001 and is an expert in the synthesis, characterization and application of biomaterials. Specifically, her research investigates new materials for drug delivery and tissue engineering, focusing on the development of cardiovascular, cancer and vocal fold therapies.
Lenhoff selected for University’s highest faculty honor

Abraham Lenhoff, Allan P. Colburn Professor of Chemical and Biomolecular Engineering at the University of Delaware, has received the 2014 Francis Alison Faculty Award. The award, the University’s highest competitive faculty honor, was established by the Board of Trustees in 1978 to recognize the faculty members who best demonstrate the combination of scholarship and teaching exemplified by the Rev. Francis Alison, founder of the institution that is now UD. The annual award also confers membership in the Francis Alison Society.

Lenhoff is internationally recognized for his expertise in applying the principles of thermodynamics, transport phenomena, biophysics and colloid science to protein separations and phase behavior, especially chromatography and crystallization.

“The main goal of our research is to analyze, control and exploit molecular interactions involving proteins and colloidal particles,” Lenhoff says. “The motivation is initially to obtain improved quantitative insights into existing processes, leading to more effective methods for designing and using them, but an auxiliary objective is to develop new products and operations.”

Lenhoff joined the University of Delaware faculty in 1984 and was named the Allan P. Colburn Professor of Chemical Engineering in 2002. He is the principal investigator on a multimillion-dollar Center of Biomedical Research Excellence (COBRE) program funded by the National Institutes of Health since 2000.

The center’s research focuses on membrane protein production and characterization, a field of growing importance in biomolecular engineering research. The project has brought together the efforts of many researchers on campus and is building the core facilities needed for membrane protein production, structural biology and bioimaging research at UD and the Delaware Biotechnology Institute.

“One of the challenges facing higher education today is applying our scholarship in a way that has profound impact on the issues that demand our attention,” says UD Provost Domenico Grasso. “Bramie Lenhoff is conducting research in an area with tremendous implications for the treatment of human disease. At the same time, he has made significant contributions to teaching and service here at the University for the past three decades.”

“Bramie Lenhoff epitomizes the qualities of an Alison Professor -- a world class scholar, a dedicated teacher and mentor, and a model university citizen,” said Donald L. Sparks, S. Hallock du Pont Chair, director of the Delaware Environmental Institute and chair of the Francis Alison Society. “We are delighted to welcome him to the Francis Alison Society.”

Sandler honored by his alma mater, shares insights from undergrad education

Stan Sandler is arguably one of the most decorated faculty members at the University of Delaware. He is a member of the National Academy of Engineering, and he has received numerous awards, including being named one of the top 30 chemical engineering authors by the American Institute of Chemical Engineers.

But Sandler remembers a time when awards were the farthest thing from his mind — as a freshman at City College of New York in 1958, his only hope was to “eventually exit the lovely Morningside Heights campus with a college degree.”

Sandler recalled that story and others from his life as the child of recent European immigrants when he was preparing to receive his latest honor, the Career Achievement Award from the Engineering Alumni Association of his alma mater.

It has been a career that has drawn inspiration from a quotation from American historian Henry Adams: “A teacher affects eternity; he can never tell where his influence stops.”

Sandler grew up in an apartment on the Upper East Side, and he remembers as a child playing with a chemistry set in the bathroom. “Small explosions fascinated me,” he said. “I guess that’s why I chose to study chemistry at Brooklyn Technical High School.”

“As I was nearing graduation,” he continued, “I dreamed of leaving home for college. That notion was quickly quashed by my family’s financial situation. My choices were limited to Brooklyn Polytech, Cooper Union, or CCNY. City College most appealed to me, and my parents were in favor of my choice, since attendance was free and I could live at home. After I won a New York State Regents Scholarship, I was actually paid $250 a year to attend CCNY.”

When Sandler was a student there in the late ’50s and early ’60s, the school did not have a graduate program, and the curriculum was not research-based. The faculty was made up of retirees from industry, some part-timers who continued to work in industry, and various consultants.

He recalled two “bright exceptions” — Columbia Ph.D. candidates Robert Pfeffer and Robert Graff. Pfeffer would go on to play a vital role in Sandler’s academic career.

As a grad student at the University of Minnesota, Sandler was required to take five preliminary examinations. He struggled through most of them but failed thermodynamics, which, ironically, would end up becoming his academic specialty.

A lesson from Pfeffer came to the rescue when Sandler was on his third — and last — attempt at the exam.

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“I had a kind of epiphany,” Sandler said. “The important principle I had learned from Bob Pfeffer was to begin each problem by writing down the same general equations and then eliminating the terms in each equation that were not applicable. What remained were the equations to be solved for the specific problem at hand. Suddenly it all made sense!”

When Sandler took the exam for the third time, he earned a perfect score.

About a decade later, he decided that since he had taught himself how to solve thermodynamics problems, he should share what he had learned with others. The result was the first edition of his textbook, Chemical and Engineering Thermodynamics, which is now in its fourth edition, has sold over 100,000 copies, and has been translated into a number of foreign languages.

In 1967, Sandler joined the University of Delaware, where he is now the Henry Belin du Pont Chair of Chemical Engineering. In addition to his teaching and research at UD, he has consulted on a number of projects, including the destruction of armed chemical weapons and the encasement of radioactive wastes left over from the production of plutonium for nuclear weapons during World War II and the Cold War.

“Bob Pfeffer had no reason to think that the undergraduate he encouraged would ultimately be involved in destroying weapons of mass destruction or in educating future generations of chemical engineers. The engineers I have taught will undoubtedly forge careers and take on projects that go far beyond anything I myself can imagine.”

From his experiences at CCNY, Sandler understands the tremendous influence that one person can have on another.

“My academic career continued beyond CCNY largely because one faculty member, in a department dedicated to the needs of its students, took a personal interest in my education,” he said. “A good teacher, who takes a well-organized, structured approach to a subject, can have an impact well beyond the specific course he or she is teaching.”

And with that, Sandler was back to the quotation with which he began: “A teacher affects eternity; he can never tell where his influence stops.”
UD’s Wagner Receives Thomas Baron Award and Bingham Medal

Norman Wagner, Robert L. Pigford Chaired Professor of Chemical and Biomolecular Engineering at the University of Delaware, received the Thomas Baron Award at the American Institute of Chemical Engineers’ (AIChE) annual meeting.

Given annually, the award recognizes outstanding scientific or technical accomplishments that have had significant impact in the field of fluid-particle systems or a related field.

Wagner, who directs the University’s Center for Neutron Science (CNS), is a world-renowned expert in the area of colloidal suspension rheology. He is credited with advancing understanding of fluid-particle systems comprised of colloidal dispersions and for developing new environments to study these systems under process flow.

This work has been so successful that these sample environments are now a standard part of the normal proposal process at the National Center for Neutron Research at the National Institute of Standards and Technology in the U.S. and the Institut Laue-Langevin, Europe’s premier neutron scattering facility in Grenoble, France.

Wagner and his students are also well-known for their work in understanding and developing protective materials based on shear thickening fluid (STF). Working in collaboration with U.S. Army Research Laboratory scientists, he developed liquid armor, a breakthrough technology that integrates shear-thickening fluid-particle systems with ballistic resistant fabrics to provide multi-threat resistance.

This technology is also under evaluation by NASA for use in astronaut and spacecraft protection, and he is co-founder of STF-Technologies, a company commercializing STF-Armor for puncture-resistant surgical gloves.

Wagner shared his liquid armor research as an invited participant in “We The Geeks,” a White House Google Plus Hangout series on exciting new developments in materials science and how they can change the world for the better.

Professor Wagner also received the Society of Rheology’s E. C. Bingham Medal Award during their 86th annual meeting in Philadelphia, PA. The Bingham Medal is awarded annually for outstanding contributions to the field of rheology.

Grad Students win Poster Prizes...

Doug Godfrin won a poster prize for his high impact work on Monoclonal Antibody Characterization at the American Conference on Neutron Scattering.

Jingsi Gao was awarded second place in the student poster session at the Society of Rheology’s 86th annual meeting. The title of her poster is “Rheology of dispersions in ionic liquids” with Dr. Mark Shiflett and Dr. Norman Wagner.

About CMET

Established in the Spring of 1992 as a research unit within the University of Delaware’s Department of Chemical Engineering, the Center for Molecular and Engineering Thermodynamics (CMET) serves as a focal point stimulating collaborative experimental and theoretical research and encouraging the development of new educational materials in all areas of thermodynamics, soft materials and structured and complex fluids.

CMET faculty, students and post doctoral scientists carry out their research in collaboration with and through the support of industrial and government sponsors. Current Center funding includes several multi-year grants from the National Science Foundation, the US Department of Energy, NASA, the National Institutes of Health and the Delaware Research Partnership Fund as well as a large contingent of industrial contracts, with budgets totaling over $2 million. Importantly, CMET also receives direct support from its industrial sponsors, which, among other things, helps to enable the purchase and maintenance of state-of-the-art laboratory equipment.

The Center for Molecular and Engineering Thermodynamics welcomes inquiries from prospective students, researchers and sponsors.