Dr. Louis P. Bosanquet and Mrs. Janine Bosanquet
Mr. Jeffrey A. Smith and Mrs. Pamela A. Smith
Mrs. Cynthia Ann Davis Hardy and Mr. Michael Hardy
Mr. Stephen M. Miller and Mrs. Margaret Miller
Dr. William O. Hadley and Mrs. Kay Hadley
Mr. Jobie L. Jones and Mrs. Terri L. Jones
Mr. Robert G. Bell and Mrs. Eunice Bell
Mr. Robert S. Mayhew and Mrs. Karin Mayhew
Mr. George Andrew Huttick and Mrs. Julie Ann
Mr. William T. Hall and Mrs. Linda Hall
Ms. Sydney E. Bonham
Mr. Thomas H. Clark and Mrs. Ruth L. Clark
Dr. Daniel T. Fetzer and Mrs. Mary F. Fetzer
Mr. Dennis A. Denihan and Mrs. Constance S. Denihan
Mr. Robert L. Rose and Mrs. Phyllis K. Rose
Mr. Mark L. Mitchell and Mrs. Sabrina P. Mitchell
Mr. John L. Nehls and Mrs. Cheryl J. Nehls
Mr. David A. Boshers and Mrs. Tammy Lynn Boshers
Mr. William Michael Bennett and Mrs. Patti Bennett
Mr. Warren Everett Medley
Mr. Richard N. Layman
Mr. David W. Haskins
Mrs. Ann B. Anderson
Mr. Louis E. Ingram and Mrs. Nancy D. Ingram
Mr. William B. Hickam and Mrs. Christine Hickam
Dr. Starling E. Shumate II and Mrs. Peggy L. Shumate
Dr. Bamin Khomami and Mrs. Lora Khomami
Dr. H. Leslie LaNieve III and Mrs. Nadine LaNieves
Mrs. Jo A. Medlin and Mr. James Medlin
Mrs. Mary K. Nehls
Mr. Shek Chee Hong and Mrs. Tze Wei Hong
Mrs. Sue Martin
Mrs. Teresa Goins Curvin and Mr. Rodney Walter Curvin
Mr. Richard A. Murdaugh and Mrs. Shirley Murdaugh
Dr. James H. Haynes and Mrs. Mary A. Haynes
Mr. Jason N. Scott and Mrs. Freedom Gichner Scott
Mr. Joseph W. Fowler and Mrs. Patricia Sue Fowler
Ms. Jennifer Anne Allison
Mr. Terry T. Godsey and Kathleen Godsey
Mr. Troy C. Trotter
Mr. Daniel James Bouch and Mrs. Brenda Bouch
Mrs. Sue T. Utley
Mr. Jesse Alexander Key and Mrs. Mary Penn Drinkard Key
Dr. Paul Payson Hunt and Mrs. Helen Marie Hunt
Mr. Winston Bernard Rawlston and Mrs. Susan Elizabeth Rawlston
Mr. James R. McKinley and Mrs. Sandra McKinley
Mr. Clyde Hermon Bell and Mrs. Kazue Momeda Bell
Mr. James A. Rogers and Mrs. Danielle J. Rogers
Mr. Ted P. Fix and Mrs. Carol J. Fix
Mr. Mark J. Bendele
Mr. Douglas M. McDonald
Mr. Claude E. Buttram, Jr. and Mrs. Lucille R. Buttram
Mr. Mark Thomas Bridges and Mrs. Patricia Ernestine Bridges
Mr. Jimmy O. Lampley and Mrs. Mary E. Lampley
Dr. Robert T. Jubin and Mrs. Sandra K. Jubin
Mr. W. Quentin Gulley and Mrs. Madge Gulley
Dr. Robert M. Counce and Mrs. Sandra E. Counce
Dr. W. Wilson Pitt, Jr. and Mrs. Ann M. Pitt
Mr. Bernie Lemuel Arnold and Mrs. Christina E. Arnold
Mr. William Benjamin Luttrell and Mrs. Joy Luttrell
Mr. Everette Kerby Harris, Jr.
Mr. Christopher C. Walters and Mrs. Sherry Walters
Dr. Douglas F. Stickle
Mr. Tommy L. Brumfield and Mrs. Sally B. Brumfield
Mr. Bobby T. Logue and Mrs. Carole Logue
Dr. Joseph A. Byington and Mrs. Connie Byington
Mr. Kenneth M. Elliott and Mrs. Virginia Elliott
Dr. Craig A Hoyme and Ms. Debra P Hoyme
Dr. Richard L. Cox and Mrs. Kathleen J. Cox
Dr. Michael S. Bronstein
Dr. Helen G. Morrow
Mr. Curtis M. Tong
Mr. John H. E. Stelling, III, P.E.
Mr. Kenneth E Bowen and Mrs. Pamela E Bowen
Dr. Igor Quinones-Garcia
Mr. Anthony Perry Gouge and Mrs. Leslie Gouge
Dr. James E. Davis and Mrs. Patricia Davis
Mrs. James M. Smith
Mr. Frank W. Gardner
Mr. Joseph Bell
Mr. Jon A. Carmichael
Mr. Jerry W. Miller and Mrs. Mary Buchholz Miller
Mr. T. H. Lay and Dr. Patricia N. Tanghep
Mr. Tom Branham and Mr. T. D. Phillips
Mr. Steve P. Virdone and Mrs. Joelle W. Virdone
Mr. Leland C. Johnson and Mrs. Katherine Johnson
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W. M. Keck Foundation
Blue Water Partners, LLC
Dow Foundation
Tennessee Minority Entrepreneur Development Corporation
Exploring New Horizons
"The global energy crisis has made abundantly clear the need for, new, sustainable, economic and environmentally friendly means of energy production. This translates into unprecedented opportunities for chemical engineers, who are uniquely positioned among the engineering disciplines to tackle these enormous challenges."

As I enter my fourth year as Department Head of Chemical and Biomolecular Engineering at the University of Tennessee, it is readily apparent that it is a very exciting time to be a chemical engineer. The global energy crisis has made abundantly clear the need for new, sustainable, economic and environmentally friendly means of energy production. This translates into unprecedented opportunities for chemical engineers, who are uniquely positioned among the engineering disciplines to tackle these enormous challenges.

Here at the University of Tennessee, we are keenly focused on these future challenges, and, as indicated on the cover, are rapidly expanding our departmental horizons to face the changing energy environment. Last year, I reported the department’s efforts at establishing and leading a new center within the University of Tennessee-Knoxville, the Sustainable Energy Education and Research Center (SEERC). This center is now fully operational and funded, both through internal sources and competitive external grants. It is now providing seed grants to collaborative research groups to study novel methods of energy production and utilization, which hopefully will lead to further innovation and research productivity.

Our department has also taken the lead in the Sustainable Technology through Advanced Interdisciplinary Research (STAIR) program, which was funded in 2008 through a grant from the National Science Foundation. This program is dedicated to the recruitment and training of Ph.D. students in energy storage and battery technologies. Dr. Paul Dalheimer also joined us as a new assistant professor in the area of drug delivery with special emphasis on lung carcinoma, and has outstanding potential to become a leading innovator in this area.

Although there is still much more to accomplish, the department has already made significant strides toward gaining a national reputation in only three years. Over the next several years, continued effort will be expended to realize the department’s full potential. Great success is anticipated with continued innovation and relentless effort.
Research Focus: Dr. Eric Boder

Eric Boder, an associate professor in the Department of Chemical and Biomolecular Engineering (CBE), is a faculty member whose research is uncovering exciting new territory.

Boder has been at UT for two years. He received his Ph.D. at the University of Illinois and was awarded a National Science Foundation (NSF) CAREER Award in 2003.

Boder’s research areas are molecular biotechnology and bioengineering, protein engineering and directed evolution. The primary goal of his work is to change the properties of molecules in order to create proteins that might be useful as components in drug delivery devices or biosensors. He is collaborating with a former colleague at the University of Pennsylvania to study and engineer a protein that regulates the capability of immune cells to adhere to blood vessel walls at sites of inflammation, a capability that would be desirable for delivering therapeutics.

Boder is also engaging in multi-disciplinary research with several professors at the University of Tennessee. “I’m becoming involved in a sustainable energy project with a number of faculty here at UT, including Paul Frymier in CBE,” Boder said. “We are directing our efforts to develop a tool for producing hydrogen from sunlight using biological materials.” Boder added. “Although we still have a lot of interest in biomedical research, we’re diversifying thanks to the environment and colleagues at UT and ORNL.”

Boder’s primary sources of research funding are the NSF and the National Institute of Health (NIH). He has also received grants from the Whitaker Foundation and Merck Foundation.

“Historically, our research has been biomedical focused,” Boder added. “Although we still have a lot of interest in biomedical research, we’re diversifying thanks to the environment and colleagues at UT and ORNL.”

Boder is currently putting together a research publication that will outline his results with class II MHC, a protein fundamentally involved in regulating immune responses. The primary aim of this research is to develop a tool that will create a better understanding of which antigens might elicit an immune response and allow fine-tuning of those responses.

“Our hope is that our research will point the way to new ‘smart’ materials for use in biosensors and to enhanced approaches to vaccination,” Boder said. “We’ve got a lot of work ahead, but I’m very excited about the possibilities.”

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Dr. Paul Dalhaimer, who has recently joined the Department of Chemical and Biomolecular Engineering as an assistant professor, enjoys the constant challenges of his field.

“I became interested in science in general when I found out that time isn’t constant,” Dalhaimer said. “So originally I wanted to study mathematical physics but I realized that jobs would be scarce in that area. The chemical and biomolecular engineering field draws from chemistry, physics, mathematics and new biology. It is a very versatile—and sometimes overwhelming—discipline. I tried to make a safe bet and went with an eclectic field.”

Dalhaimer, who received his Ph.D. in chemical and biomolecular engineering at the University of Pennsylvania, was recently a postdoctoral Fellow in molecular, cellular and developmental biology at Yale University.

“During my time at Yale, I worked on a protein complex called Arp2/3. The complex forms a structure that gives the ‘push’ to the front edge of a mobile cell (e.g. amoeba) form a structure that looks like a tree in winter. In this analogy the trunk/roots point toward the center of the cell and the branches point outward in the direction the cell is moving” Dalhaimer explained. “Simply put, if cells didn’t have Arp2/3 complex our ‘tree’ would be a wooden pole: Arp2/3 is responsible for the branching. The lab that I was in used many techniques to study Arp2/3 complex: fluorescent tagging in yeast, x-ray crystallography of purified complex, molecular dynamics of the subsequent crystal structure and more.”

Dalhaimer became interested in becoming a university professor while a freshman at the University of Pennsylvania. He is excited about the opportunities that his new position offers.

“College is an unusual thing in that a student learns a massive amount of material in a short period of time but the student doesn’t really apply it then and there (my first job out of college was to figure out how large the bolts should be on the base of a sign so it doesn’t fall over: no chemical reactions). Graduate school is a little more ideal in the sense that one takes classes while being in a laboratory so the opportunity for application is there. In short we don’t know what the future graduates will do—I want them to gain a general savvy for problem solving that can be applied to most anything” Dalhaimer added.

Dalhaimer’s move to the state of Tennessee has offered him a new area of research.

“I have been told that Tennessee is the third most obese state in the country,” Dalhaimer said. “Part of the research in my laboratory works on the molecular mechanisms of obesity. Cells have organelles called lipid droplets that basically store fat. Excess numbers and size of lipid droplets in our cells cause health problems. We use fission yeast as a model system to study the formation of lipid droplets. We are interested in the atomic structure of the droplets, for this we are collaborating with Oak Ridge National Laboratory (ORNL). We also work on drug delivery vehicles that are actually not much different in application is there. In short we don’t know what the future graduates will do—I want them to gain a general savvy for problem solving that can be applied to most anything” Dalhaimer added.

Dalhaimer looks forward to working with the faculty, staff and students in the CBE department.

“My plan is simple: to provide my future students and post-docs with guidance and funding so that they can succeed and hopefully be found on the scientific map,” he said.

A long-term goal of our laboratory would be to discover and deliver drugs that reduce the size of lipid droplets in human tissue in a healthy way.”

Dalhaimer feels that the state of Tennessee offers many post-docs with guidance and funding so that they can succeed and hopefully be found on the scientific map, he said.
Outstanding Graduate Student Arash Abedijaberi

When he was growing up in Isfahan, Iran, Arash Abedijaberi had no idea that his academic pursuits would lead him to the doctoral program in the Department of Chemical and Biomolecular Engineering (CBE) at the University of Tennessee, but he has been here since 2007.

Before he made his journey to the United States, Abedijaberi attended a different UT: the University of Tehran. He received his bachelor’s and master’s in the prestigious Department of Biotechnology.

“I am very interested in doing research, teaching and seeking a faculty position,” Abedijaberi added. “I decided to work with only the best people in my field, and this was the main reason I decided to transfer to UT and continue working with Dr. Khomami.”

Abedijaberi completed a second master’s in environmental, energy and chemical engineering before following Khomami to The Hill. Abedijaberi’s interest in chemical and biomolecular engineering stems from his interest in and undergraduate study of biological systems. It was under Khomami’s guidance that Abedijaberi transitioned from the realm of biotechnology and chemistry into engineering.

“I always enjoyed studying about the genetics of biological organisms,” Abedijaberi said. “I felt in order to be able to use these systems for the human benefit, I needed to be an engineer, and I decided to change my field.”

Abedijaberi enjoys a challenge, and making the move into engineering certainly provided him with one.

“Initially, I received the lowest grade on the first exam and the highest on the last exam,” he said. “This is how I broke through my fear of chemical engineering as a biologist.”

Abedijaberi’s research focuses on the simulation of complex flows of Non-Newtonian fluids. Non-Newtonian fluids exhibit behavior unlike water, and Abedijaberi wants to predict their behavior on the industrial level.

He must describe these materials with nonlinear partial differential equations by using supercomputers and then develop numerical algorithms to solve these equations.

“Initially, I received the lowest grade on the first exam and the highest on the last exam,” he said. “This is how I broke through my fear of chemical engineering as a biologist.”

“My goal is to use the engineering insight I have gained in conjunction with my biological knowledge and background to do research as well as teaching,” Abedijaberi said. “I enjoy teaching very much, so my aim is to hold an academic job.”

“When he’s not in the lab, Abedijaberi participates in a number of extracurricular activities. He is active in the UT Outdoor Program — canoeing, rafting, caving, backpacking and camping. He is also the president of the Persian Club at the university.

Abedijaberi is a member of the American Institute of Chemical Engineers, Society of Rheology and American Physical Society. He receives the Helen Jubin Fellowship and the College of Engineering Ph.D. Fellowship, and he has won the Jim and Sandra McKinley Outstanding Graduate Student Award.

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“In my twenty years in academia, I have been very fortunate to work with many gifted graduate students in my research group. Rarely have I met an individual with as many multiple talents as Arash. He possesses outstanding analytical thinking ability and great leadership skills on top of an impeccable character and a pleasant personality. It has been a joy to watch Arash develop and mature as a scientist. I am looking forward to watching him go to the next stage of his career as an academician. I foresee a very successful journey.”

— Dr. Bamin Khomami
Outstanding Undergraduate Student Mark May

For some, the decision to study engineering comes naturally, and Mark May is one of those students. The senior in chemical and biomolecular engineering had a scientific background in chemistry and his aptitude and interest in analytical modeling led to a strong foundation in mathematics. Out of this was born a desire to study chemical engineering.

“I am fortunate to have an education-oriented home life,” May said. “My parents helped me develop a dedicated work ethic and appreciation of the value of learning.”

May calls his parents “the most intelligent man and woman” he knows. His father holds a Ph.D. in biochemistry and would use everyday examples such as preparing food in terms of organic chemistry, which not only fostered May’s interest in chemistry but in cooking as well. His four older siblings also guided his educational development.

“I attribute half of my accomplishments to good parents and the other half to supportive siblings,” May said.

May graduated fifth in his class from Hillsboro High School in Nashville, Tenn. in 2005. Engineering initially appealed to him because of the learning opportunities, job responsibilities and career potentials. His decision to attend the University of Tennessee was three-fold: it’s a large campus within a short drive from Nashville where he felt opportunities existed to excel.

“As a proud soon-to-be-UT-graduate, it is safe to say these opportunities did present themselves,” May added.

May completed three terms of the Office of Professional Practice’s Co-op program with Dow Chemical Company. He receives several scholarships, including the John Prados Scholarship and the Dennis and Connie Denihan Scholarship for Outstanding Performance, and is a member of Tau Beta Pi and AIChE.

“Any circumstance where I worked and studied with peers makes up a favorable engineering memory,” May said. “Most of the fun was having a laugh with my fellow students while putting a presentation together, and I’m glad we worked through chemical engineering with supportive camaraderie.”

His favorite past classes include fluid mechanics, organic chemistry and differential equations, and reactor design and kinetics tops the list this semester.

“Organic chemistry stands as my favorite undergraduate course because I enjoy learning new reactions and using that knowledge to supplement other classes, May said. “A common theme among my other favorite courses is solving physical phenomena and-chemical reactions through appropriate models.”

May’s affinity for solving physical phenomena will benefit him after graduation. “My goal is to positively impact local and global communities, whether through making reverse osmosis water filters or researching biosynthetic approaches for conserving energy,” May said. “These efforts will require staying true to several values: commitment to learning, embracing an open mind and making selfless decisions.”

May has decided that he’ll pursue graduate school upon his May 2010 graduation.

“My goal is to positively impact local and global communities, whether through making reverse osmosis water filters or researching biosynthetic approaches for conserving energy.”

“Bio-polymers and advanced materials are the motivation behind graduate school because bridging chemical engineering with biological systems is appealing,” May said. “I plan to take more biochemistry to facilitate those efforts.”

Regardless of where May ends up, he plans to spend summer 2010 living in Hawaii with his older brother.

“I intend to pick up a part-time job, learn to surf and go on shark diving cage tours,” May said. “I look forward to any opportunity to see sharks and seeing my brother won’t be so bad either.”
"The university provided an amazing environment that fostered learning and fun," Johnson added. "I still maintain a very close relationship with several of the professors and staff members who were at UT during the time I was working on my degree."

During his time at UT, Johnson served as the president of Tau Beta Pi Engineering Honor Society and also volunteered on weekends at the Ronald McDonald House.

The largest contributing factor to my selecting the University of Tennessee was the quality of the chemical engineering major at the University of Tennessee. Johnson was born in Atmore, Alabama, and lived in the state until he was in the 9th grade, when he moved to Columbus, Mississippi. After graduating from high school, Johnson decided to continue his education at UT.

Although Jerry L. Johnson has made the unusual transition from engineering to finance, he still values the lessons that he learned as a chemical engineering major at the University of Tennessee.

Johnson’s first introduction to principal investing, corporate strategy and foreign policy came when he accepted a position with McKinsey and Company in Atlanta, Georgia. McKinsey serves as an advisor to the world’s largest businesses, and Johnson was fascinated by chemical engineering because it involves operations, research, business and management. He hoped to be exposed to a variety of disciplines through a simple major.

"The university provided an amazing environment that fostered learning and fun" Johnson added. "I still maintain a very close relationship with several of the professors and staff members who were at UT during the time I was working on my degree."

In 2004, Johnson was appointed by President George W. Bush as a White House Fellow to serve as a special assistant to then-Secretary of Defense Donald Rumsfeld.

"The White House Fellowship was a unique opportunity to participate in government, working directly with a cabinet member," Johnson recalled. "Additionally, I had the opportunity to participate in an education program consisting of roundtable discussions with renowned leaders from the private and public sector, and trips to study U.S. policy in action both domestically and internationally."

Johnson received his M.B.A. from Harvard Business School (HBS) in 1998. During his time at Harvard, he led a year-long project with his fellow students to devise a strategy for BancBoston Capital to invest over $100 million in growing domestic markets. Following HBS, Johnson entered Wall Street to work with Donald, Lufkin and Jenrette.

"The key factor that led me to accept the position at RLU was the opportunity to be a part of the founding team of an asset management firm. Since I joined the firm, we have raised over $225 million in capital, established a world-class investment team, and we are actively deploying capital," Johnson said.

Although not directly involved in engineering on a day-to-day basis, Johnson believes his degree has given him a unique base for his current position.

"In my opinion, engineering is a way of thinking. My engineering degree provided a strong foundation that allows me to think analytically about any problem," Johnson commented. "I also enjoy spending time with his family. His wife, Cara Grayson Johnson, is an attorney, and the couple has two children – an 18-month-old daughter, Cayden Rose, and reside in Washington, D.C."

In 2007, Johnson joined RLU Equity Partners as vice president. The company is a private equity enterprise founded by billionaire businessman Robert L. Johnson and the Carlyle Group. RLU Private Equity acquires control positions in companies with enterprise values between $75 and $500 million. The firm invests in a broad range of sectors, including business and government services, transportation and media.

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Dr. G. M. Homsy

On November 14, 2008, Dr. George M. “Bud” Homsy, professor from the Department of Mechanical Engineering, University of California-Santa Barbara, spoke on “Interfacial Fluid Mechanics: New Twists on an Old Subject.”

Homsy discussed the effect of chemical reactions on fingering, spontaneous chemically driven tip-streaming of drops, chaotic advection driven by interfacial electrostatic forces and enhanced heat and mass transport in chemically stirred drops. He also covered the fascinating, counterintuitive and unexpected phenomena that continue to be discovered in the study of fluid flows driven by the forces associated with the presence of an interface.

Dr. Ronald G. Larson

Dr. Ronald G. Larson presented “Microfluidic Methods for Manipulating Biopolymer.” On April 7, 2009, he discussed his work and his colleagues develop microfluidic methods for manipulating biopolymers. These include imaging and breaking down single DNA strands and proteins using what is known as a flow field surface.

This is an important concept in the development of microfluidic devices for processing DNA and also helping to understand how certain proteins interact with DNA in cellular processes, such as DNA repair and copying. Using these new methods, Dr. Larson is exploring ways to use the DNA code through “manipulation flow” then apply the analysis of DNA-protein interactions to help prevent viruses from spreading.

Dr. G. M. Homsy

Renowned Lecturers Dr. G. M. Homsy & Dr. Ronald Larson

The Department of Chemical and Biomolecular Engineering hosted two College of Engineering Distinguished Lectures during the 2008 – 2009 academic year.
CBE Board of Advisors

The Department of Chemical and Biomolecular Engineering’s Board of Advisors consists of a distinguished group of academics, business professionals and industrial leaders from noted universities and international corporations. The purpose of the board is to ensure that the department is focused on its mission of education, research and service to the university and technical communities. The board meets once a year to examine and evaluate CBE’s undergraduate and graduate curriculums and to advise the department head and faculty with regard to these issues. The board provides insight as to the activities of peer departments at other universities and offers information about the requirements of relevant industries. The board also acts as a liaison between the department and the dean’s office and university administration, providing a candid assessment of the department’s strengths and weaknesses, as well as communicating the department’s directions, goals and resource requirements.

Current members of the CBE Board of Advisors are:

Dr. Victor H. Agreda is the Director of the Chemical Development Division at Eastman Chemical Company in Kingsport, Tenn. Agreda is a member of Tau Beta Pi and the American Institute of Chemical Engineers (AIChE) and is the Chair of the Eastman Acetyl Technology Council.

Dr. George Georgiou is the Joan and Keys Curry/Cullen Trust Endowed Chair and a professor in the Department of Chemical Engineering at the University of Texas-Austin. Georgiou is the recipient of the Marvin J. Johnson Award in Microbial and Biochemical Technology from the American Chemical Society and also received the Professional Progress Award for Outstanding Progress in Chemical Engineering from the American Institute of Chemical Engineers. He also received the University Cooperative Society’s Research Excellence Award for Best Paper at UT-Austin and the U. S. National Science Foundation Presidential Young Investigator Award.

Mr. James B. Porter Jr. is the former Chief Engineer and Vice-President of Engineering Operations at the DuPont Corporation, headquartered in Wilmington, Del. Porter, a University of Tennessee graduate, is a member of the Construction Industry Institute, the Engineer and Construction Contracting Associates and serves on the Board of Directors of AIChE. He is currently retired.

Dr. Eric Shaqfeh is Professor of Chemical and Mechanical Engineering at Stanford University in Stanford, Calif. Shaqfeh is a Fellow of the American Physical Society and also received the American Society of Engineering Education (ASEE) Research Award, National Science Foundation Presidential Young Investigator Award, the American Physical Society Francois Frenkiel Award and the David and Lucile Packard Fellow in Science and Engineering.

Mr. Bruce Combs is the Global Site Logistics Director, Base Plastics, for the Dow Chemical Corporation in Freeport, Texas. Combs, a University of Tennessee chemical engineering graduate, is the past president of the Society of Professional Engineers (SPE), South Texas section.

Mr. Robert Horvath is the former President and CEO of the American Chemical Society and is a member of the Board of Trustees of the American Chemical Society. He also received the American Chemical Society’s Research Award and the American Chemical Society’s Presidential Young Investigator Award.

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The Department of Chemical and Biomolecular Engineering Board of Advisors consists of a distinguished group of academics, business professionals and industrial leaders from noted universities and international corporations. The purpose of the board is to ensure that the department is focused on its mission of education, research and service to the university and technical communities. The board meets once a year to examine and evaluate CBE’s undergraduate and graduate curriculums and to advise the department head and faculty with regard to these issues. The board provides insight as to the activities of peer departments at other universities and offers information about the requirements of relevant industries. The board also acts as a liaison between the department and the dean’s office and university administration, providing a candid assessment of the department’s strengths and weaknesses, as well as communicating the department’s directions, goals and resource requirements.

Current members of the CBE Board of Advisors are:

Dr. Victor H. Agreda is the Director of the Chemical Development Division at Eastman Chemical Company in Kingsport, Tenn. Agreda is a member of Tau Beta Pi and the American Institute of Chemical Engineers (AIChE) and is the Chair of the Eastman Acetyl Technology Council.

Dr. George Georgiou is the Joan and Keys Curry/Cullen Trust Endowed Chair and a professor in the Department of Chemical Engineering at the University of Texas-Austin. Georgiou is the recipient of the Marvin J. Johnson Award in Microbial and Biochemical Technology from the American Chemical Society and also received the Professional Progress Award for Outstanding Progress in Chemical Engineering from the American Institute of Chemical Engineers. He also received the University Cooperative Society’s Research Excellence Award for Best Paper at UT-Austin and the U. S. National Science Foundation Presidential Young Investigator Award.

Mr. James B. Porter Jr. is the former Chief Engineer and Vice-President of Engineering Operations at the DuPont Corporation, headquartered in Wilmington, Del. Porter, a University of Tennessee graduate, is a member of the Construction Industry Institute, the Engineer and Construction Contracting Associates and serves on the Board of Directors of AIChE. He is currently retired.

Dr. Eric Shaqfeh is Professor of Chemical and Mechanical Engineering at Stanford University in Stanford, Calif. Shaqfeh is a Fellow of the American Physical Society and also received the American Society of Engineering Education (ASEE) Research Award, National Science Foundation Presidential Young Investigator Award, the American Physical Society Francois Frenkiel Award and the David and Lucile Packard Fellow in Science and Engineering.

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Thermodynamics of acetic acid (aq)

5. Journal Articles and Book Chapters Published


Morton III, immersed in surfactant-electrolyte banding in as-cast and relaxed Zr-based Temperature increases caused by shear


Kelton, and R. Kalyanaraman, deposited TiB on Si(001) by pulsed laser


Advaning the production and use of biogas from food waste. FD. Frymier and C.M. Fo, National Institute for Transportation and National Security Foundation, 05/01/2008 – 06/29/2009, $90,000.

S. Petrovan, Eastman Chemical Company, 05/31/2011, $168,871.


Collaborative research: Novel 3-D assembly and optical characterization, approach to cost-effective design, B. Khomami, Sustainable Energy Education and Research Center, University of Tennessee-Knoxville, 09/30/2010, $265,819.

$441,329.


$50,000.


B. Khomami, National Science Foundation, 06/15/2008 – 05/31/2009, $168,871.

$50,000.


S. Petrovan, Eastman Chemical Company, 05/31/2011, $168,871.


Collaborative research: Understanding polymer dynamics, and experimental investigation into hysteresis, B. Khomami, National Science Foundation, 05/01/2008 – 01/31/2010, $218,427.

S. Petrovan, Oak Ridge National Laboratory, 06/15/2008 – 05/31/2009, $191,073.

$50,000.


S. Petrovan, Eastman Chemical Company, 05/31/2011, $168,871.

B. Khomami, Sustainable Energy Education and Research Center, University of Tennessee-Knoxville, 09/30/2010, $265,819.

$441,329.


S. Petrovan, Eastman Chemical Company, 05/31/2011, $168,871.

B. Khomami, Sustainable Energy Education and Research Center, University of Tennessee-Knoxville, 09/30/2010, $265,819.

$441,329.


S. Petrovan, Eastman Chemical Company, 05/31/2011, $168,871.

B. Khomami, Sustainable Energy Education and Research Center, University of Tennessee-Knoxville, 09/30/2010, $265,819.

$441,329.
Current Grants, Contracts and Patents • Conference and Invited (*) Presentations

18. Estimate or extrapolation fundamental property information, R.M. Cossairt, U.T. Knoxville, October 20, 2008. 03/01/09 – 09/30/09, $194,000.

19. Enhanced nucleic acid detection in real time by antibody-functionalized nanoparticles, T. Kayarapoglu, University of Tennessee-Knoxville, Energy and Education Research Center, University of Knoxville, October 30/01/09 – 02/01/10, $45,467.

20. Magnetic moment resonance of rod-like from and control, R.M. Cossairt and E. Richardson, EPRI, 07/01/09 – 06/30/10, $50,000.

21. Nanofiber electrospinning extension -controlled, an integrated low-temperature molecular dynamics and quantum computing approach, T. Kepler, Oak Ridge National Laboratory, 08/15/09 – 03/15/10, $180,000.

22. Current Grants, Contracts and Patents • Conference and Invited (*) Presentations

23. Parallel design and processing architecture, J. Brandzi, T. F. Weng, R.M. Cossairt, University of Tennessee-Knoxville, September 1/19/09 – 09/30/09, $28,316.

24. Parallel data processing architecture, J. Brandzi, T. F. Weng, R.M. Cossairt, University of Tennessee-Knoxville, September 1/19/09 – 09/30/09, $28,316.


27. Dynamics of Branched Polymer Melts in Complex Flows, A Computational and Experimental Study, C. Urbain, T. Brandzi, J. H. J. M. ten Brinke, H. C. Öster, M. Kröger, and P. Gumbs, University of Michigan, August 26/09 – 09/03/09, $6,000.

28. Reversibility and wavefront flow of viscous fluids under mixed friction and curvature-driven forces, H. Ikeda, T. Kajiyama, K. Uraki, and P. Gumbs, University of California, Berkeley, August 24/09 – 02/01/10, $5,000.


30. EPRI, 07/01/09 – 06/30/10, $5,000.

31. Study of residuals from coal combustion, R.M. Cossairt, University of Tennessee-Knoxville, D. Keffer and P. D. Frymier, Sustainable Energy Education and Research Center, University of Tennessee-Knoxville, 08/31/09 – 06/30/10, $20,949.

32. Joint SEERC/STAIR Seminar Series, A. Balmes, M. Kerbent, T. Chun, and P. A. Ball, University of California, August 29/09 – 06/30/10, $1,682,484.

33. Senior design projects in management engineering, G. Duscher and P. D. Rack, Sustainable Energy Education and Research Center, University of Tennessee-Knoxville, 08/31/09 – 06/30/10, $60,000.


38. Study of nematic liquid crystal in a channel, W. Kang and S. Kwon, 4th International Conference on Rheology, Monterey, CA, USA, September 24/08 – 09/28/08, $7,135.


Conference and Invited (*) Presentations

20th International Conference on Biotechnological Engineering, Santa Barbara, CA, January 19, 2009.

- **Boder, 2nd International Conference switch and structure-function analysis, development of an allosteric adhesive**

- **Ackerman, D. Levary, R. Parthasarathy, complex bifunctional proteins, M.E.**

- **Keffer, Mechanical and Chemical property relationships in fuel cells**
  - State University, Jackson, MS, January, 2009.

- **Paddison, Department of Physics, of proton exchange membranes:**
  - of the global challenge, B. Khomami, Levich Institute of Polymeric Solutions: Progress and Compatibility?, P. D. Frymier, Centripetals.* Investigations of material structure-Property relationships in fuel cells**

- **H. Krishna, R. Kalyanaraman, J. Fowlkes, simulation, B.J. Edwards, University of**

- **Kalyanaraman, 2009 TMS Annual**
  - Laboratory, Oak Ridge, TN, April 8, 2009.


- **Kalyanaraman, 2009 TMS Annual**
  - Laboratory, Oak Ridge, TN, April 8, 2009.


Total Income/Revenue for FY 2009
$5.52 Million

- State E&G Budget: $3,225,296
- Gifts, Grants and Contracts: $2,292,420

Gifts and Pledges for FY 2009
$63,634 Thousand

- Pledges: $1,575
- Gifts: $62,059

Gifts, Grants and Contract Expenditures for FY 2009
$2.29 Million

- Salaries & Benefits: $800,490
- Facilities & Administration: $945,143
- Operating Expenses: $59,919
- Equipment: $123,764
- Tuition, Scholarships & Fellowships: $250,312
- Other University Accounts: $619,792
- New Faculty Startup Funds: $929,571
- Facilities & Administration: $349,143
- Other Non-Recurring E&G Funds: $393,906
- Other University Accounts: $619,792
- Summer School Funds: $24,000
- Engineering Course Fees: $66,710
- Other Non-Recurring E&G Funds: $399,006
- Research Incentive Funds: $160,329

Educational and General Income Revenue for FY 2009
$3.23 Million

- State E&G Budget: $1,716,690
- Gifts, Grants and Contracts: $2,292,620
- Pledges: $3,575
- Gifts: $59,459

58.5%
41.5%
94.3%