Professor Wilson K. S. Chiu has received three esteemed awards in the last five years. The latest was the Army Research Office (ARO) Young Investigator Award in 2005 for his proposed work in the area of optimization of solid oxide fuel cells for field use by Army personnel. Dr. Chiu comments that “the electrode microstructure of existing fuel cells is not fully optimized, and it is here that improvements can bear fruit.” His efforts will focus on optimizing the manner in which fuel is transported, distributed and consumed within the fuel cell, and on more efficient and swift removal of byproducts. He had previously received a National Science Foundation CAREER Award (2001) as well as the Young Investigator Award from the Office of Naval Research (2001) for his research on optical fiber coatings. Dr. Chiu was promoted to Associate Professor in 2005.

Professor Kenneth Reifsnider was admitted to membership in the Connecticut Academy of Science and Engineering, and was elected, along with Professor Ranga Pitchumani, as a Fellow of The American Society of Mechanical Engineers. Professor Reifsnider holds the Pratt & Whitney Chair in Design and Reliability, and is a member of the National Academy of Engineering (NAE), one of the most prestigious honors granted to engineers. He is the Director of the Connecticut Global Fuel Cell Center (www.ctfuelcell.uconn.edu).

Mechanical Engineering Alumni Updates

Yuwen Zhang, Ph.D. ’98

Dr. Yuwen Zhang, Associate Professor in the Department of Mechanical and Aerospace Engineering at the University of Missouri – Columbia, researches phase change heat transfer, transport phenomena in powder and/or gas based solid freeform fabrication, heat and mass transfer analysis associated with heat pipe science and technology, and microscale heat transfer. He received the Office of Naval Research Young Investigator Award (2002), and has authored over 50 journal papers. He is also co-author of a textbook with Professor Amir Faghri, scheduled to be published in 2006: Transport Phenomena in Multiphase Systems with Phase Change. Dr. Zhang describes the Mechanical Engineering graduate program at UConn as a “very rigorous graduate program, evidenced by its high standard on the Ph.D. qualifying exam, core course requirements, and publication requirements for Ph.D. students. The research experiences that I gained at UConn helped me to land the very prestigious Office of Naval Research Young Investigator Award. It was my great pleasure to study and work under the supervision of Dr. Faghri.”

Continued on page 3
Dear Alumni and Friends,

It is a pleasure to share some of our recent achievements in the Department of Mechanical Engineering in this vanguard issue of our newsletter. Our success owes much to the initiatives instituted during Professor Ted Bergman’s tenure as Department Head. After leading the department for six years, in summer 2004 Professor Bergman donned the hat of Associate Dean for Research and Outreach in the School of Engineering. It was a personal honor to succeed him as Department Head, and the department continues to build on the productivity and momentum of his tenure.

We are proud that our undergraduate and graduate programs continue to rank #1 among public universities in the New England region (U.S. News & World Report 2004 and 2005), with our graduate program ranking #3 among all New England universities, public and private. Research productivity is climbing, with the department’s latest annual research expenditures reaching $4.4M, up nearly 16% from fiscal year 2004. The department also welcomed three new faculty members since fall 2004, who are profiled in this issue. New initiatives have been launched to recruit quality students and to increase the diversity of our graduate population. I invite you to take an interactive tour of our graduate program and faculty research at www.engr.uconn.edu/me/graduate.

The department has also witnessed a remarkable growth in undergraduate enrollment: freshman and total enrollment have more than doubled in the past five years, and this trend is anticipated to continue. The department is continuing its success in outreach and student recruitment efforts with participation in Engineering 2000 (a one-week residential program to engage high school students in engineering) and the da Vinci project (a program to help 7th to 10th grade math and science teachers and administrators learn more about the engineering opportunities available to their students). Our programs feature dynamic interaction with industry, research experiences for undergraduates, and a curriculum that addresses emerging technologies to meet the needs of the evolving engineering profession. A generous donation of hardware and software received from National Instruments, along with funding received from other initiatives, has significantly enriched our teaching laboratories. Under the direction of Professor Thomas Barber, the industrially-sponsored senior design project program grows stronger each year; our demonstration day last April featured 21 industrially-sponsored projects, including a design for a portable soldier cooling system, an improved elevator rail system, and a compact eddy current lithography systems damper. More information about the program is contained at our website: www.engr.uconn.edu/me/seniordesign.

As you can see, the valuable support of our alumni and friends has placed the department in a position of strength. I hope you enjoy the update and latest news on our faculty, students, and alumni contained in this newsletter. To learn more about the department’s current activities, visit us online at www.engr.uconn.edu/me, or stop by and visit us on campus. I invite you to stay in touch by email as well—it is a pleasure to hear from you, and we would love to share your news with other alumni. On behalf of the faculty, staff, and students of the department, I wish you and your family the very best for the New Year.

Sincerely,

Ranga Pitchumani
Distinguished Professor and Department Head

Linkages is published for the alumni, faculty, students, corporate supporters and friends of the Department of Mechanical Engineering at the University of Connecticut. Suggestions and information are welcome. Send correspondence and address corrections to Linkages at the address below or email ejerome@engr.uconn.edu.

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Dean of Engineering and United Technologies Endowed Chair Professor in Thermal-Fluids Engineering, Amir Faghri, was presented the American Society of Mechanical Engineers’ 2005 James Harry Potter Gold Medal for “significant and innovative research contributions to the field of thermodynamics of multiphase systems, with application to heat pipes, fuel cells and phase-change energy storage systems.” The medal is the most celebrated award presented in thermodynamics, recognizing eminent achievement or distinguished service in the science of thermodynamics in mechanical engineering and awarded for sustained research and teaching in thermodynamics.

Professors Nejat Olgac, Jiong Tang, Amir Faghri, and Ranga Pitchumani each received grants in 2005 from the National Science Foundation in support of their research activities. Professor Olgac will develop a novel framework consisting of analytical tools for optimizing a milling process that uses non-uniform pitch cutters, and will validate the analytical findings experimentally. Professor Tang’s research is aimed at fundamentally advancing the state-of-the-art of frequency-response-based structural health monitoring by developing a new multifunctional adaptive piezoelectric sensory system. A new miniature passive direct methanol fuel cell (DMFC) system to be developed by Professor Faghri and his research group will use passive methanol delivery and storage, innovative thermal management for operation at extreme environmental conditions, and methanol concentration control; the passive approach has no moving parts and significantly reduces the cost and volume/weight compared to active systems.

Professor Pitchumani’s research will focus on fabrication of metallic and ceramic microdevices using a novel technique of nanoparticulate slurry microcasting.


Alumni Updates continued

Nader Jalili, Ph.D. ’98

Dr. Nader Jalili, Assistant Professor in the Department of Mechanical Engineering at Clemson University, investigates dynamic modeling and vibration analysis of flexible and distributed structures, real-time control of flexible structures, piezo-based actuators and sensors with application to structural vibration control, shape modulation and mechatronics. One of Dr. Jalili’s major research thrust areas is on active vibration control, including the development of small piezo-based motors, brakes, and actuation systems utilizing smart materials. He has developed a new research laboratory on Smart Structures and Nanoelectromechanical Systems at Clemson University. He is the recipient of many national and international awards, including the National Science Foundation CAREER Award (2003), the Ralph E. Powe Junior Faculty Enhancement Award from the U.S. Department of Energy (2002), and the Clemson University Board of Trustees Award for Faculty Excellence (2002, 2003, and 2004). Dr. Jalili’s Ph.D. advisor was Professor Olgac.

Two Mechanical Engineering alumni, Richard Ballantyne (B.S. ’65 and M.B.A. ’66) and Kevin Kulak (B.S. ’85) were inducted in 2005 as members of the University of Connecticut Academy of Distinguished Engineers and Hall of Fame for their “sustained and exemplary contributions to the engineering profession.” Richard Ballantyne served as Vice President, General Counsel and Secretary of Harris Communications (a $3 billion revenue equipment communications company) until his recent retirement. Kevin Kulak is Managing Director of JPMorgan Chase & Co., New York; he designs and originates debt and equity securities for corporate clients.
Dr. Tai-Hsi Fan
Assistant Professor

Dr. Fan joined the Mechanical Engineering Department in 2005 attracted by a “fast growing academic environment with plenty of collaboration opportunities on campus.” He earned his Ph.D. from Georgia Tech in 2003, and following graduation was a visiting researcher at the Max Planck Institute for Polymer Research in Mainz, Germany. He received his B.S. in Aerospace Engineering from Tamkang University, Taiwan in 1992, and his M.S. in Mechanical Engineering from Pennsylvania State University in 1996. From 1996 to 1999 he was a design engineer at Chen-Tech Industries in Irvine, California.

Dr. Fan works on interdisciplinary research projects in vesicular membrane transport processes, fluid flow interactions with soft matter, and micro/nano-fluidics in confined geometries. His recent work in scaling structure and chemical processes for secretion cells is aimed at providing a diagnostic tool that could investigate the abnormal regulation of secretion processes with high spatial and temporal resolutions. Dr. Fan hopes this work will “supply medical doctors with a novel diagnostic instrument which will help them provide better therapeutic strategies for nervous and endocrine system disease.” Dr. Fan is also interested in the analysis of equilibrium and non-equilibrium behaviors of natural and biofunctional synthetic systems at the continuum level, such as the transport phenomena involved in liposome-based drug delivery systems.

Dr. Horea Ilies
Assistant Professor

When Dr. Ilies came to UConn in 2004 he brought with him a broad base of industrial experience from Ford Motor Company, where he was involved in research, manufacturing, and product design and development. He holds a Ph.D. degree in Mechanical Engineering from the University of Wisconsin, Madison, and he received M.S. degrees in Mechanics and Mechanical Engineering from Michigan State University and the Technical University of Cluj, Romania.

Dr. Ilies’ current research in geometric and physical computing, shape synthesis and geometric reasoning, and theoretical and computational tools for conceptual design is aimed at boosting the computational support for preliminary design. “Most of the past efforts in computer aided design and geometric modeling have focused on the detailed modeling and analysis of completely specified, infinitely rigid parts and assemblies,” says Dr. Ilies. “However, the earlier stages of product design did not receive as much attention from the research community, partly because mechanical design is fundamentally an ill posed and difficult problem. A formal understanding of the conceptual design process along with appropriate computational support would increase the efficiency of mechanical design by orders of magnitude.” His goal is to improve our current understanding of the relationship between function and form in mechanical design, and to develop models, representations and algorithms for conceptual design. “This knowledge is essential in making advances toward the ‘Holy Grail’ of engineering design, to ultimately enable computers to evolve from assisting the mechanical design process to generating and creating mechanical designs automatically.”
New Faculty Profiles continued

Dr. Ugur Pasaoğullari
Assistant Professor

Dr. Pasaoğullari joined the Mechanical Engineering faculty team in 2005 with enthusiasm for the University’s “world class program in fuel cell research, centralized at the Connecticut Global Fuel Cell Center, which has the capability and the national recognition to foster rapid and effective dissemination of research to the real world.” Dr. Pasaoğullari completed his Ph.D. in Mechanical Engineering at Pennsylvania State University in June 2005. He earned his B.S. degree in Mechanical Engineering with high honors from Middle East Technical University, Ankara, Turkey in 1999 and his M.S. degree in Mechanical Engineering from Pennsylvania State University in 2003.

Dr. Pasaoğullari’s current research in heat and water management, two-phase transport, and flooding of polymer electrolyte fuel cells (PEFCs) provides promising support for the use of PEFCs as a next generation energy conversion technology, particularly as a replacement for internal combustion engines in the automotive industry. “There are still challenges regarding the performance and durability of these systems, as they are competing with internal combustion engines that have been in development for more than a hundred years,” Dr. Pasaoğullari comments. “The greatest challenge is to understand the phenomena leading to performance losses and reduced lifetime; how they occur and how they might be eliminated. Thermal and water management are especially important in this regard as they strongly affect performance and durability. Once we are able to resolve these problems, PEFCs will have the potential to change the way energy is converted, opening up a new era in energy conversion and enabling the transition to a hydrogen economy.”

See other faculty profiles at www.engr.uconn.edu/me/me_faculty.htm

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Alumni Comment on the UConn Mechanical Engineering Program

We recently contacted a group of alumni to ask them about their experiences with the undergraduate program. Here are a few of their comments:

“Great education. I felt very well prepared when I graduated and became a practicing engineer. And I believe the fundamentals in the ME program prepared me well for graduate work in environmental engineering and chemical engineering (thermodynamics, fluids, even topics like statics).”

*John Andrew Bergendahl ’85*

“My four years at UConn instilled a basic learning and respect of engineering principles that I put to good use every day.”

*Edward Donald Carlson ’94*

“UConn’s Mechanical Engineering education provides basic skills to carry you through life.”

*Eric Hahne ’89*

“Overcoming the challenges of the UConn engineering program was the best first step to a successful career I could have ever imagined. Going through the program, at times, I thought it was too demanding. Looking back at it, I see just how much that difficulty made the material stick and prepared me for entry into the work force and the years that followed. UConn has an outstanding engineering program that I vigorously promote in my professional life.”

*Matthew Olander ’94*