

ME Graduates Receive Faculty Appointments

Aris Babajimopoulos



**Assistant
Research
Scientist
U-M
Department of
Mechanical
Engineering**

Aris Babajimopoulos (PhD ME '05) joined the U-M

Mechanical Engineering faculty in January 2006 as an assistant research scientist in the W.E. Lay Automotive Laboratory.

Babajimopoulos' main research interest is homogeneous charge compression ignition, or HCCI. During his doctoral work he developed a methodology for modeling HCCI combustion using computational fluid dynamics and a multi-zone chemistry solver with detailed chemical kinetics. He has also investigated the mixture formation process in HCCI engines, particularly in cases where advanced valve timing techniques, such as negative overlap or re-breathing, are used to trap large amounts of hot, residual gases.

Currently he is investigating the potential of a free piston linear alternator, which directly converts chemical energy from fuel into electricity, as a viable, cost-effective option for use in a series hybrid electric vehicle. The new project is funded by General Motors and involves the development of computational models characterizing the entire vehicle system. The models are then used to evaluate and optimize overall system performance.

Babajimopoulos completed his graduate studies at U-M as well as a post-doctoral research fellowship. "Being a member of such an outstanding research team and interacting with brilliant professors, researchers and students has been the greatest learning experience," he said. In addition, "being close to Detroit and the automotive industry and working closely with their R&D groups provide ideal conditions for conducting research that is both relevant and cutting-edge."

Hosam Fathy



**Assistant
Research
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U-M
Department of
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Hosam Fathy (PhD ME '03) assumed the position of

assistant research scientist in U-M's Department of Mechanical Engineering in May 2006.

After earning his doctorate, Fathy worked with Emmeskay, Inc., as a consultant in the automotive R&D industry. In that role he helped develop models and modeling tools for automotive system design and hardware-in-the-loop simulation. He returned to U-M to pursue postdoctoral studies in 2004. "It was amazing while I worked in industry how much of the material we were building on came out of U-M," he said.

Fathy is now the associate director of Professor Jeffrey Stein's Automated Modeling Laboratory, where he develops algorithms that simplify dynamic system model development. His work has been applied to automotive systems, including power trains and vehicle dynamics. He also uses these modeling tools for engine-in-the-loop simulations conducted by Prof. Zoran Filipi's and Prof. Dennis Assanis's teams in U-M's Automotive Research Center.

In earlier doctoral work with Professors Panos Papalambros and Galip Ulsoy, Fathy optimized the design and control of a system simultaneously and applied his algorithms to passive and active vibration attenuation in elevators and automobile suspensions. As a graduate student he worked at The United Technologies Research Center (UTRC, Otis Division) and with Ford's Scientific Research Laboratory.

Fathy is glad to be back at U-M. "One thing I always found impressive about U-M is the quality of the students. There's an

atmosphere here of camaraderie and competition, which makes it very stimulating. Another nice thing is how many people at any given time are working in any given area and the number of perspectives they have. You can learn so much just by going to the seminars on campus; it's like a perpetual conference."

John Ferris



**Associate
Professor
Virginia
Polytechnic and
State University**

John Ferris (PhD ME '95; MS ME '92) joined the faculty of Virginia Polytechnic and State University in August 2005 as an

associate professor in the Department of Mechanical Engineering.

Prior to his position at Virginia Tech, Ferris worked as a senior technical specialist in Advanced Chassis Development at ZF Technologies in Northville, Michigan, where he developed a virtual proving ground. His research program involved developing a high-fidelity, in-vehicle, road data acquisition system, including vehicle sensors and MEMS, analog signal conditioning and digital signal processing.

During his time at ZF Technologies, Ferris mentored graduate students from Europe completing their internships. He also taught technical seminars on ride quality perception, performance and vehicle handling and tire dynamics.

Ferris says he was drawn to the Department of Mechanical Engineering at Virginia Tech, "because they integrate classroom theory and practical hands-on experience. They conduct original research in vehicle systems and safety and believe in strong partnerships with both government and industrial partners." It's a "perfect fit," he added, "for my background in academia and industry."

During his first year at Virginia Tech, Ferris created and taught a new graduate class, Stochastic Processes. He also revised and taught another graduate course, Digital Signal Processing. As a new faculty member he is focused on building research partnerships with members of government, the military and the automotive industry.

Ferris' research goal is to establish the Vehicle Terrain Performance Laboratory as a world-recognized laboratory for improving vehicle system performance by studying the interactions between vehicles and terrain — both on- and off-road. Researchers will also incorporate haptics, bio-dynamics and psychometrics into their work. "The lab has adopted a holistic approach toward research, investigating all aspects of vehicle-terrain interactions and using a broad range of measurement, analysis and modeling tools. This allows researchers to broaden their expertise while gaining a deeper understanding of the fundamental issues involved in improving vehicle system performance," he said.

Tim Jacobs



**Assistant
Professor
Texas A&M
University**

Tim Jacobs (PhD ME '05, MSE '02, BSE '99) has accepted a faculty appointment at Texas A&M University beginning

in fall 2006. He will be part of the thermal-fluid sciences group and will teach courses in thermodynamics, heat transfer, combustion and fluids.

Jacobs will continue his research in advanced energy systems, including internal combustion engines, gas turbines, alternative fuels and catalyst systems. More specifically he hopes to investigate the fundamental characteristics of novel modes of diesel combustion and the system interactions between diesel engines and aftertreatment catalyst devices. "My goal for long term research," he said, "is to branch into

advanced powertrain systems that contribute to sustained energy usage in the transportation sector. Such systems could include hybrid designs, the use of fuel cells as electrical accessory power units and hydrogen fuel."

A "tremendously enjoyable educational career at the University of Michigan" sparked Jacobs' desire to continue academic engineering research and the education of others. "...In my experience, teaching makes me a better researcher, and thus vice versa."

He chose Texas A&M because it "effectively fosters the dual life of being a researcher and an educator." Above all, he says, is the "strong collegiality" within the mechanical engineering department. "As a beginning young faculty member, these positive intra-department personal relations provide comfort to me, as I'm sure to stumble from time to time."

Jacobs credits his time in the ME department at U-M, where he worked with Professor Dennis Assanis, for his decision to join academia. "Without this wonderful experience, I doubt I would have stayed for a graduate degree and thus would have missed out on an opportunity to become a faculty member myself. U-M is an exciting place to be regardless of your engineering discipline, and that has influenced me to become passionate about what I do in life."

Charles J. Kim



**Assistant
Professor
Bucknell
University**

Charles J. Kim (MSE ME '02; PhD ME '05) joined the faculty of Bucknell University in

August 2005 as an assistant professor.

Kim's primary area of research is the design synthesis of compliant mechanisms. At Bucknell he has further developed the methodologies in his doctoral dissertation.▶

“A Conceptual Approach to the Computational Synthesis of Compliant Mechanisms.” Kim was advised by U-M Professor Sridhar Kota and Yong-Mo Moon, an assistant professor of mechanical engineering at Worcester Polytechnic Institute. Kim also has been working on the design of surgical instrumentation and the design of appropriate technologies for developing countries.

Bucknell’s strong focus on undergraduate education was a natural fit for Kim. “At the university, college and department levels teaching is the first priority,” he said. “Among undergraduate institutions without PhD programs, the College of Engineering at Bucknell ranks among the elite and, as a result, the quality of the students is high. Expectations of research are also high considering the time appropriated for scholarly activities.”

At Bucknell, Kim has taught junior-level solid mechanics and mechanical design and will teach sophomore dynamics and the senior capstone design course in 2006-2007. During his graduate studies at U-M he served as a graduate student instructor for several courses and the primary instructor of two.

Chuan Li



Associate Professor
Nanyang Technological University

Chuan Li (PhD MEAM '97; MS MEAM '93) has been promoted to the rank of associate professor in the

School of Mechanical and Aerospace Engineering at Nanyang Technological University in Singapore.

Li joined the faculty of Nanyang Technological University in 2000 as an assistant professor. His research interests include stability analysis of dynamic systems, thermal-mechanical coupled stability analysis, heat transfer, residual stress analysis in casting processes and power electronics packaging design. The subject of his dissertation at U-M was thermoelastic contact stability analysis.

Prior to joining the NTU faculty, Li worked as an engineer for DaimlerChrysler Corporation

in Detroit in Jeep/Truck Engineering - Powertrain CAE/Simulation. He also spent a year working with Ford Motor Company in Dearborn, Mich., as a product development engineer with Visteon’s Alternative Power Systems division.

Li began his teaching career during his doctoral studies at U-M, when he served as a teaching assistant for Introduction to Dynamics and Introduction to the Mechanics of Materials. He says he is appreciative of his own education at U-M in shaping the educator he is today. “It means a lot to me, way beyond receiving a diploma. The ME faculty granted me an opportunity to realize what I know and, even more importantly, what I don’t know.”

Li earned his bachelor’s degree in hydraulics and ocean engineering from National Cheng Kung University in Tainan, Taiwan.

Geoff Rideout



Assistant Professor
Memorial University of Newfoundland

Geoff Rideout (PhD ME '04) has joined the Faculty of Engineering and Applied Science, Memorial University

of Newfoundland, as assistant professor. His appointment became effective in January 2006.

Rideout’s research program at Memorial University encompasses investigations of automated model generation and simplification, with applications to interdisciplinary areas such as robotic, land and sea vehicles. His work more generally includes dynamic system modeling, automated modeling, bond graphs and vehicle dynamics.

Rideout is not new to teaching. During his doctoral work at U-M he served as a graduate student instructor mentor through the Center for Research on Learning and Teaching. At Memorial University he will teach courses in his areas of expertise: mechanical component design, theory of machines and mechanisms, modeling and simulation of dynamic systems, and machine dynamics.

He is looking forward to teaching at the institution where he spent his undergraduate years, as well as to the university’s “balanced emphasis on teaching and research.” After completing his undergraduate studies, he earned a master’s degree at Queen’s University in Kingston, Ontario.

Receiving his PhD from U-M was “instrumental” in helping Rideout secure his new faculty position. “I found U-M professors accessible and helpful despite their status and the demands placed on them, and generally good teachers as well. The breadth of graduate course offerings was an advantage that U-M provided. The high-quality infrastructure and support staff made it easy to get work done. Orientation sessions were thorough, and there was always someone to help with any question. My office space as a graduate student was also generous, in an open-concept lab where communication with other grad students was easy.”

When applying to the Natural Sciences and Engineering Research Council of Canada for academic grants, Rideout recalled, “Some of my reviewers noted that I had U-M training, and that it was a predictor of future research success.”

Xiulin Ruan



Assistant Professor
Purdue University

Xiulin Ruan (MS EE '06; PhD ME '06) joins the faculty of Purdue University in January 2007 as an

assistant professor in the School of Mechanical Engineering.

“The new energy center and nanotechnology center at Purdue’s College of Engineering have been formed, and I will be affiliated with them,” said Ruan, who is looking forward to his appointment. “The School of Engineering also has an active heat transfer research group, which I will participate in.”

His area of focus is heat transfer physics. “With the knowledge of atomic scale behavior of energy carriers — phonon, electron, photon, fluid particles — one can design new functional materials or structures with the

desired size effect. These new materials will play a crucial role in energy-related applications in the next decade. I will work on how to enhance conversion efficiency through the use of nanostructures.”

Ruan will teach undergraduate courses in thermodynamics, fluid mechanics and heat transfer and, at the graduate level, radiation heat transfer, lasers and optics. He will also develop a new Heat Transfer Physics course.

“My time at Michigan certainly has had a tremendous impact on me,” he said. “My advisor, Professor Massoud Kaviany, gave me sufficient freedom to explore fundamental and innovative problems, while I can still benefit a lot from his expertise and insight. I also assisted in writing a research proposal based on my work to the National Science Foundation, and it was funded. These trainings, normally only available to postdocs, were unusually valuable for a PhD student.”

Fu Zhao



**Assistant
Professor
Purdue
University**

Fu Zhao (PhD ME '05; MS EE '01) joins the School of Mechanical Engineering at Purdue University as an assistant

professor in January 2007.

Currently Zhao is a post-doctoral research fellow at U-M's Environmental and Sustainable Technologies Laboratory, headed by Associate Professor Steven Skerlos.

Zhao's research is in the area of sustainable engineering, particularly developing technologies to minimize the environmental impact of industrial aqueous systems. His dissertation took metalworking fluid systems, widely used in the machine tool industry, as a case study. He presented novel technologies, including green formulation, membrane filtration and molecular-biology-based microorganism detection, to improve the sustainability of these systems. He is also interested in using supercritical carbon dioxide and ionic liquids as alternative carriers to water to improve environmental performance.

Given the interdisciplinary nature of his work, encouraged by Skerlos and the U-M experience, said Zhao, Purdue presents exciting opportunities. “Through the creation of nine multidisciplinary initiatives, including Global Sustainable Industrial Systems, that break the established boundaries among engineering disciplines, Purdue Engineering gives researchers the chance to address national priorities and perform field-defining research.”

At U-M, Zhao taught the senior design course twice and found it “very rewarding.” He will teach several design courses at Purdue and will develop a new graduate course, Life Cycle and Sustainability Engineering, focused on building the conceptual, methodological and scientific foundation for students to understand and minimize the environmental impact of engineering decisions.

“Sustainability can only be achieved if engineering students are equipped not only with technologies and tools,” he said, “but knowledge about how to use them in an environmentally-friendly manner.”

Promotions



Yong Hoon Jang (PhD ME '99) has been promoted to associate professor in the School of Mechanical Engineering at Yonsei University in Seoul, Korea.

