Selected Mechanical Engineering Awards 2008 - 2009

Faculty
Jan Achenbach was elected “Member at Large” of the International Union of Theoretical and Applied Mechanics (only 3 from the USA)

Jian Can was appointed to the Board of Directors of Society of Manufacturing Engineers North American Manufacturing Research Institute, chair of the ASME Manufacturing Engineering Division

Isaak M. Daniel received the Best Paper Award from the Society for Experimental Mechanics for the paper entitled “Thermo-mechanical Enhancement of Fiber Composites with Cationic Nanoparticles”

Horacio Epureanu was elected fellow of the Society for Experimental Mechanics

Miro Hartmann received an NSF CAREER award

Walther Herget received the 2008 Industrial Design Excellence Gold Medal Award

Dean Hsu received the Wallace H. Clapper Foundation Early Career Award in Translational Research, the John G. Begorley Outstanding Young Manufacturing Engineer Award of SME, the UCLA School of Engineering Distinguished Young Alumnus Award, and the NSF CAREER award

Yangyang Huang received a 2008 Guggenheim Fellowship

Sridhar Krishnaswamy was re-appointed to a second three-year term as associate editor for the Journal of Applied Mechanics

Heinrich Petzold was appointed to associate editor of ASME Journal of Fluids Engineering

John Rubinstein received the Brown Engineering Alumni Medal in 2008 and was elected fellow of the ASME

Graduate Students
Christiane Tschirhart Barber won second place for her student poster at the STLE/EKAME International Joint Tribology Conference in Miami, Florida in October 2008

Aaron Grécu was awarded the 2008 STLE (Society of Tribologists and Lubrication Engineers) Scholarship by the Chicago Section. This $4,000 scholarship is awarded to one student each year studying in the field of Tribology and/or lubrication engineering, in the Chicago area

Owen Lee was awarded a 2008 Presidential Fellowship, the most prestigious fellowship awarded by Northwestern University

Minny Shin received the 2008 Student Intern/Co-op Contribution Award (SCCA) for her work during her summer internship as part of a team developing thin film flexible solar modules

Tom Voss won the best student paper award for “Thermo-induced Velocity Fields for Point Ports Sliding on a Rigor Oscillating Plate” at the 2009 Robotics, Science and Systems (RSS) conference in Zurich, Switzerland

In 2008, Christine Tschirhart Barber won second place for her student poster at the STLE/EKAME International Joint Tribology Conference in Miami, Florida.

In March, Professor John Rubinstein was honored at the Gala of Honor of the ASME.

Mime Department on the Web

http://www.mech.northwestern.edu/webcourse/

Notes from the Chair

W elcome to the new, redesigned ME newsletter. Here we introduce you to our new faculty, mention a few of the faculty and student awards, highlight several outstanding activities, and present one selected research highlight. We hope you enjoy these articles about the innovations and advances in ME at NU. If this issue stimulates you to find out even more about our ME activities, please check out our redesigned website which is continually being updated with the latest news and videos.

Robert R. McCormick School of Engineering and Applied Science
Northwestern University

SUMMER 2009

McCallum

Mechanical Engineering

C ircuit that can wrap around your arm. A camera

Based on the human eye. Electronic newspapers

These fascinating technologies are not yet available to the public, but a partnership between Yangyang Huang, the Joseph Cummings Professor in civil and environmental engineering and in mechanical engineering, and John Rogers of the University of Illinois at Urbana-Champaign has brought them closer to reality.

Electronic components have historically been flat and unimpressive because silicon, the principal component of all electronics, itself is inflexible. Any significant bending or compression renders an electronic device useless. Huang and Rogers have new ideas on how to reshape this hurdle. This pair has created stretchable circuits and a camera with a curved sensor array that is based on the design of the human eye, which gives a photograph a wider field of view with a greater range of focus.

To create their fully stretchable integrated circuits, the researchers began by applying a layer of polymer and then a coating of plastic as a substrate. The integrated circuit was then coated on the surface using both conventional techniques and nanoscale printing methods. Researchers then assembled the polymer layer, leaving the complete circuit system with the plastic coating as a stretchable substrate.

Next, this flexible, stretchable circuit is bonded to a piece of silicon rubber that is prestreched, like a rubber band. When released, the rubber springs back to its original shape, compressing the circuit. This compression leads to a complex pattern of folding that allows the circuit to be folded or stretched in different directions to conform to a variety of complex shapes or to accommodate mechanical deformations during use. Huang’s research group is responsible for the mechanical analysis that guides the design of these circuits.

This type of mechanical analysis also allowed Huang and Rogers to create a kind of camera based on the human eye — work featured on the cover of the journal Nature in August 2008. This application... (continued on reverse)
New Assistant Chair Joins The Department

D idi Button began work in September 2008 in the new non-tenured faculty position of assistant dean. Deidre comes with industrial experience, a PhD from Northwestern, and enthusiasm to tackle issues ranging from terminal masters programs to ABET to publicity in outreach.

Deidre is responsible for a number of priority projects. One of the first tasks she worked on was the editing of the brochure for McCormick, both the new “e-brochure” sent out by requests through the web site and also the regular printed brochure showcasing the ME department and faculty. Deidre has also been developing brochures for the different specialties within the ME program. In addition, Deidre is responsible for oversight of the department web site and helps to decide what to put in the veterinary for videos made for McCormick.

Deidre works with many different groups of people. She has cheerfully substituted for undergraduate advising when faculty are unavailable and based on these experiences is planning a larger help-session for students next year. She has arranged visits and fall tours for existing faculty from other institutions as well as prospective students and their families. She was recently involved in the organization of the annual meeting of the ME Advisory Board.

Additional duties include: organization of ABET accreditation, review of graduate admissions, publicity and candidate solicitation for the PREE-RIME undergraduate research abroad program, helping faculty with educational outreach portions of proposals, and submission of nominations of students for fellowships.

Professor Balogun Joins The Department

W hen Olawale Balogun became an assistant professor of mechanical engineering and civil and environmental engineering in the fall of 2008, he was well prepared for Northwestern, having first come to the university as a postdoctoral fellow in 2007. Balogun earned the PhD from Boston University.

Balogun and his graduate students are working to develop advanced optical tools to assess the structural integrity of engineering structures and predict their service reliability and performance. He is currently developing an optical microscopy system that can be used for the noninvasive mapping of local mechanical and thermal properties in micro- and nanoscale materials used in microelectronic devices, high-temperature coating applications, sensors, and energy-storage devices. Balogun is also interested in the application of the microscopy system for the mapping of deeply buried nanoscale defects in microelectronic devices.

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While the optical microscopy system Balogun is developing is based on the characterization of small-scale structures, he is also interested in the development of optical sensors for monitoring the structural health of large-scale civil infrastructures, including bridges, dams, and levees. In the meantime, Balogun is collaborating with a faculty member at McCormick to develop optical fiber and photonic sensors for monitoring the dynamic mechanical responses of civil infrastructures. "The goal of this undertaking is to develop diagnostic and predictive tools for estimating the fundamental lifetime of aging civil infrastructures," he says. "This is a new and exciting area of research that directly impacts society.

Professor Gerber Joins The Department

E lizabeth Gerber joined the Department of Mechanical Engineering as an assistant professor in the fall of 2008. She is affiliated with the Engineering Institute for Design and Innovation with projects in design and innovation work, project and service design. She also has courtesy appointments with the Kellogg School of Management and Department of Industrial Engineering and Management Sciences.

Gerber earned her BS in Product Design and PhD in Management Science & Engineering at Stanford University. She was also a post-doctoral researcher at the Human-Product Interaction Design at Stanford where she helped to start up a new design school. One says that she was drawn to Northwestern because of the collaborative and entrepreneurial attitude held by the faculty and students.

Gerber has already helped her Northwestern team to win the top two prizes in the Rice University Design Challenge. The team of two graduate students who won the $10,000 award were told about the competition by Gerber, who also informed them on their iPhone and software system while one of the students was revising Gerber’s design course. The Motor Creative award, a $5,000 prize, was won by a team of undergraduate students participating in a new program developed by Gerber called Design for America. The students designed an interactive stuffed bear with doctors to help children understand their disease.