



MEN NEWS



University of Idaho

Mechanical Engineering Fall 2006



FSAE CAR HIGHLIGHTED IN MAGAZINE

An outstanding and complimentary article by Joni Kirk on the UI's Formula Society of Automotive Engineers Competition car appeared in Volume 4, Issue 5, of the *IQ Idaho* magazine. "Setting the Wheels in Motion; Turning Dreams into Reality," highlights students Mike Thompson, Jake Leachman and Kameron McKeenan along with Professor Edwin Odom in their immersion into the Formula SAE Competition car which evolved from a "capstone" design project. Capstone, a requirement providing seniors a transition from engineering coursework to engineering practice, can make a huge and unexpected impact on their subsequent careers. Through project work, many students find a turn in their expected career path. A good example is Brian Auer, recipient of both bachelor's and master's degrees at UI, who expected to work in the automotive field. Instead he chose a position at Ethicon, a Johnson & Johnson company, where he invents, designs and creates electro-mechanical devices for minimally invasive treatment of medical conditions.

Professor Odom limits his work on the car while carefully monitoring students' progress. He is lauded by students for helping with complex design concepts while pushing them to try new ideas and do things right. Perhaps most importantly, he is credited with making them think.

COLLEGE WELCOMES NEW DEAN

University of Idaho College of Engineering welcomes Dr. Aicha Elshabini, beginning her tenure as Dean of Engineering in June of this year. Elshabini earned a bachelor's degree in electronics and communications from Cairo University in Egypt; a master's degree in microelectronics from the University of Toledo in Ohio; and a doctorate in electrical engineering from the University of Colorado at Boulder. She has conducted research with Motorola, Hewlett-Packard, Texas Instruments, Intel, Xerox, NASA and various military groups. Her research and academic advancements were recently recognized through receipt of the Daniel C. Hughes Jr. Memorial Award for lifetime achievement in microelectronics.

Prior to her arrival at UI, Elshabini served 26 years as a department head and faculty member in the Electrical Engineering Departments at the University of Arkansas and the Virginia Polytechnic Institute and State University (Virginia Tech). Under her leadership, the UI College of Engineering is undergoing strategic planning and development efforts incorporating high school students, student organizations and each of the college's four engineering programs around the state. The college will celebrate its centennial in 2007.

"Creating meaningful curriculum and watching students grow into professional engineers is an amazing and satisfying experience," said Elshabini.

SABBATICAL IMPROVES WATER CENTER LAB

Dr. Ralph Budwig's sabbatical work during the 2005-06 school year focused on design and implementation of an instrumentation system for the new UI high-gradient sediment flume located at the Water Center in Boise. The system is intended to complete the Center for Ecohydraulics Research Stream Laboratory, making it fully functional for research and teaching. The completed laboratory will enable researchers to generate extreme stream conditions in a controlled environment and will be used to investigate relationships among flow structure, turbulence, sediment transport, nutrients, contaminants, and fish habitat in streams.

Intended for use by graduate and undergraduate students as well as research assistants and for course laboratory experiences, the facility is also available to students K-to-16 for visits and demonstrations. For more information, contact Dr. Ralph Budwig at rbudwig@uidaho.edu or 208/885-5265.

This newsletter was printed on a Xerox Phaser 8550 donated to the Mechanical Engineering Department by Xerox.

Stan Loughmiller, ME Master's student, demonstrates the UI custom-designed and installed instrumentation platform



ROUND 'N ABOUT (Faculty Activities)

Michael Anderson, on sabbatical during the 2006-07 academic year, is working on micro-heat engines at Washington State University in Pullman.

Steve Beyerlein continues to serve as program coordinator for the college-wide capstone design program that now includes biological & agricultural engineering (BAE), computer and electrical engineering (ECE), and mechanical engineering. In this effort he collaborates with graduate students in the Idaho Engineering Works, as well as with Russ Porter, Joe Plummer, Edwin Odom, Don Elger, Joe Law (ECE), Brian Johnson (ECE), and Tom Hess (BAE). Plan to come to campus on April 27, 2007 to see this year's crop of capstone design projects first-hand. We would be happy to add you to our pool of exhibit and presentation judges for this exhibition. Contact Steve at sbeyer@uidaho.edu if you are interested.

Through an ongoing National Science Foundation grant coordinated by Washington State University, Steve has had an opportunity to benchmark our program against leading capstone programs across the country at University of Florida, Rensselaer Polytechnic Institute, Harvey Mudd, Kettering, Leigh University, and Seattle University.

Under Steve's guidance the summer lean manufacturing short course continues to evolve and grow in popularity. An all-day factory simulation workshop, hands-on exercises in the ME shop, tours to Advanced Input Systems and Flexcel, and an a-arm mini-project were highlights of the summer 2006 offering.

Karen Den Braven has been named Director of the Center for Clean Vehicle Technology in NIATT at UI. The Center develops, tests, and evaluates technologies that reduce the impact of vehicles on the environment, including technology for the new generation of vehicles as well as those used for recreation in environmentally-sensitive areas such as national parks.

From 2001 to the present Dr. Den Braven has supervised the Clean Snowmobile project team, focusing on development of a two-stroke direct-injection snowmobile engine. Recent testing has shown that the UI engine exceeds the EPA 2012 snowmobile emissions standards, and should get around 20 miles per gallon on the trail. Dr. Den Braven has applied for a

sabbatical to be spent with a snowmobile manufacturer furthering research into two-stroke engine technologies.

A grant written by Dr. Karen Den Braven and Dr. Mike Kyte (NIATT Director) has contributed to continuation of research by the University Transportation Centers Program (UTC). The theme of the program is advanced technology for sustainable transportation. The National Institute for Advanced Transportation Technology has been a member of the University Transportation Centers Program since 1991.

The mission of UTC is to develop engineering solutions (knowledge and technology) to transportation problems for the state of Idaho, the Pacific Northwest, and the United States, and to prepare UI students to be leaders in the design, deployment, and operation of our nation's complex transportation systems.

During the past eight years, the UTC investment of \$6.2 million has been used to develop a comprehensive program of education, research, and technology transfer. UTC funds are also used to support two of NIATT's research centers, the Center for Traffic Operations and Control, and the Center for Clean Vehicle Technology.

Don Elger is involved in several cooperative ventures. With Barbara Williams, Bio/Ag Engineering, and Clayton Crowe, WSU Mechanical Engineering, the 9th edition of *Engineering Fluid Mechanics* is in preparation. The overarching goal guiding the new edition is promotion and support of effective student learning in fluid mechanics courses.

Tom Hess from Bio/Ag Engineering and Dr. Elger are leading two capstone projects that develop "go-to students" by engaging them in designing systems to produce safe water for the Maasai people in Kenya. Jennifer Miller was the "go-to student" last spring when she traveled to Africa to demonstrate the filter to the Maasai. In the long term, we plan to make the University of Idaho a National Center for technology and design of safe water systems for people in third world countries.

Steve Beyerlein, Don Blacketter, and Don Elger are creating capstone projects that develop "e-students" by engaging them in inventing new technology and moving these technologies forward through entrepreneurial practices.

Edwin Odom is working on improvements to the Design Suite floor, planned for completion during the spring break. He is also working on the upgrade of the Advanced CAD Lab, named IDEAWORKS, which will be a new laboratory with our most capable

numerical analysis programs to solve our most complex problems.

Karl Rink was awarded an initial contract with the Indian Head Division of the Naval Surface Warfare Center entitled "Hermeticity of Selected Propellant-Actuated Devices." This work, directed towards the identification of manufacturing flaws and defects in energetic devices, is an important part of a larger ongoing effort to quantify the effects of leak rate and moisture ingestion on performance degradation of energetic devices.

Karl was also recently elected chairman of the American Institute of Aeronautics and Astronautics (AIAA) Energetic Components and Systems technical committee for the term 2007-2009.

Judi Steciak, in a joint project with Boise State University's Department of Material Science and Engineering, is designing, modeling, fabricating, and testing meso-scale thrusters made from Low Temperature Co-fired Ceramics (LTCC) for micro-scale satellites. LTCC in its green state is a flexible ceramic tape that can be cut with scissors (although we use LASERS and micro-milling machines). Devices are built in layers, compressed, and fired in a furnace. The resulting device is durable and inexpensive to manufacture. We are using a mono-propellant (hydrogen peroxide decomposed over a silver catalyst) as the working fluid. The project, funded by the Air Force Office of Scientific Research, was presented this summer as a work-in-progress at the 31st International Symposium on Combustion held in Heidelberg, Germany.

In collaboration with the National Institute for Advanced Transportation Technology and Automotive Resources, Inc., Dr. Steve Beyerlein and Dr. Steciak continue to research and develop catalytic igniters for burning extremely fuel-lean mixtures in internal combustion engines used for transportation. The project, funded by the US Department of Transportation, contributes to the need for clean and efficient combustion of existing and future transportation fuels. The Small Engine Laboratory in Moscow supports igniter development in engine and demonstration vehicles. The Combustion Laboratory in Boise is set up to better understand details of ignition. Students presented work-in-progress at the Spring 2006 Meeting of the Western States Section of the Combustion Institute (hosted by the University of Idaho at BSU) and published a paper for the Society of Automotive Engineers.



FORMER DEAN AND ME PROFESSOR RETIRES

Dave Thompson recently moved to Albuquerque, New Mexico where he will serve as Visiting Scholar at the University of New Mexico until he retires from UI as Professor and Dean Emeritus on July 1st of 2007. Professor Thompson began his teaching career at the University of Texas at Arlington as a part-time instructor of thermodynamics in 1964. He was a test engineer for the F111 aircraft at General Dynamics, then obtained his doctorate from Purdue University. Professor Thompson joined the faculty at Louisiana State University where he spent 24 years. In 1993 he joined the University of New Mexico as Professor and Chair, working to build their research and academic programs to historic levels. In 1999, the University of Idaho recruited him to be Dean of Engineering, and his effort to build engineering programs was successfully repeated. During Dave's tenure as dean, research expenditures soared from 4M\$/year to 14M\$/year while undergraduate students increased by 30% and graduate students by over 60%. In 2004, Dr. Thompson went on administrative sabbatical and then returned to teaching and research in Mechanical Engineering in 2005.

Professor Thompson is now focusing full-time efforts on research in hand biomechanics, with a special interest in the Neandertal hand. He knows that there are new lessons to be learned from these 70,000-year-old bones, and hopes to transition these lessons to the clinical treatment of modern human hands. He and Margaret, his wife of 42 years, are also enjoying the New Mexico sunshine, the arts of Santa Fe, hiking in the Sandia Mountains, the multicultural foods of the region, and are busy planning their retirement home. When their home is com-

pleted, he will resume the second bare-metal restoration of his 1959 Porsche 356A that he started in Moscow. After that, he may look for another old Porsche or a 1940's truck to add to his list of restorations. Professor Thompson has written that he and Margaret (and their dog Emma) dearly miss their friends and colleagues in Idaho and wish them all the best. Dave and Margaret may be reached at dthomp@thompson.cx.

ASME ON THE MOVE

Jessica Sampson and Michela Moreland, officers of the local American Society of Mechanical Engineering (ASME) section, have been active this year at the international level to bring new ideas to UI ASME, making the organization more pertinent and useful for UI members. The two energetic students traveled to both international meetings: San Francisco in the summer and Chicago in the fall. These gatherings afford members the opportunity to exchange ideas with students from other chapters, as well as compete in competitions and attend career fairs.

The UI ASME chapter is looking forward to hosting the Student Professional Development Conference on campus March 30-31. This major event is expected to draw 150 attendees including representatives from industry, alumni, and students from more than ten schools. The UI chapter will have an opportunity to show off its organization and activity level.



Jessica (left) on the trolley in San Francisco

Jessica, graduating in December 2006, will be missed by the ASME organization as she has been a major "mover and shaker." She plans to enter graduate school to specialize in prosthetics and orthopedics. We wish her the best.

ME News is the newsletter of the University of Idaho Mechanical Engineering Department, PO Box 440902, Moscow, ID 83844-0902. Phone (208) 885-6579. Any opinions expressed herein are those of the writers and do not necessarily represent the official position(s) of the university or its Board of Regents.
Editor: Elaine Queener

Keep in touch!

We want to hear from you!

Mail to: University of Idaho Mechanical Engineering Department, EPB 324K, Moscow, ID 83844-0902, (208) 885-4279 or e-mail to: medept@uidaho.edu

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Position _____

UI degree and year _____

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SNAPSHOT DAY

is an important one for engineering students during fall semester. It is the day when we get a look--a snapshot--at the myriad senior design projects underway this academic year. The projects are as varied as the students and sponsors, including interdisciplinary, electrical and computer engineering, and mechanical engineering projects. Here's a partial list: Water Filter for the Maasai of Africa, Infant Sleep Monitor, Next Generation Traffic Controller, Thermal Management System for HMMWV, Maritime Energy Management, Lithium-Ion Battery Charger, Crystal Measurement System, FSAE vehicle, Instrumented Cylinder Head for Clean Snowmobile, Rover Nocturnal Vision System, Adolescent Leg Strength Test Fixture, Knife Sharpening Fixture for French Fry Plant. The final exhibition of these projects, some of which will be ongoing, is the Engineering Expo to be held Friday, April 27, 2007.

For more information about and description of the projects, go to <http://seniordesign.engr.uidaho.edu>.

ME STUDENT EARNS ATHLETIC AWARD

Jason Giuffre, a four year letter winner with the track and field program, has been selected as a 2005-06 recipient of the Western Athletic Conference Stan Bates Award. The award signifies the conference's most outstanding male and female student-athletes and includes a \$2,000 postgraduate scholarship. Giuffre, a three-time All-Academic Big West Team member and a 2006 WAC All-Academic Team member, is a mechanical engineering major who will graduate in May 2007 with a 3.77 gpa.

WORDS FROM THE CHAIR

Dear Friends,

As the calendar year draws to a close, I thank you again for the many ways you support our program. As you can see from the newsletter, we have had many exciting and rewarding events within Mechanical Engineering. The most memorable highlights of the year for me are closely tied to our outstanding students – especially our graduating seniors who continue to amaze me with their capstone projects. The technical level at which they perform is a credit to them, as well as to their faculty advisors. I am extremely pleased with the way in which we are now working the Business, Electrical and Bio-Ag departments into highly interdisciplinary projects. Three teams that included ME students participated in the UI Business Competition where the African Water project earned first place honors for their plan presentation. UI students also excelled in the 2006 SAE Formula Car competition and the Clean Snowmobile Challenge. Both teams will compete again in 2007. Our 2006 graduating class was the largest on record with 74 BSME graduates and we are expecting 80 graduates in 2007.

Our student Chapter of ASME was once again named Outstanding Student Section for our Region. We are pleased to announce that the 2007 ASME Regional Student Professional Development Conference will be hosted by our

UI section in March of 2007. Our fall freshman class was also a record for ME. We enrolled more than 100 new students in our Introduction to Mechanical Engineering course. Even with this increase in students, our average ACT and SAT scores increased, so we are seeing improvements in both quantity and quality.

Our research continues to grow and expand. Research expenditures attributed to ME faculty was more than \$3M last year, supporting over 60 graduate students at the MSME, MEME, and Ph.D. levels. ME faculty members have had wonderful success in garnering a number of large research contracts including an extension of NIATT's University Transportation Centers grant and funding for autonomous vehicle research. I commend ME faculty members for continuing to integrate their research with our undergraduate program. As I conduct exit surveys with our seniors, they spontaneously comment on the quality of instruction received and are pleased with the opportunities they had to work on relevant research projects.

I would be remiss if I failed to note the challenges we face in meeting the needs of students and the faculty. We are continuously looking for partners to help us fund scholarships, senior design projects,

research, and infrastructure. Many of you have helped in one or more of these areas. As always we have infrastructure improvements in mind that will enhance both our graduate and undergraduate programs. This next year's focus will be development of our Advanced CAD Laboratory. Our dream for this lab is a teaching tool that allows students to use the most versatile and advanced software available to the next generation of engineers. The lab will be equipped with multiple high-end computers to support software programs including CATIA, Genesis, SolidWorks, Ansys, Algor, and CFDDesign. Upon completion, the facility will be another hallmark allowing us to prepare graduates to meet the increasing demands employers place on our students. I encourage you to consider how you might partner with us as we move forward.

Again, thank you for your support. I invite you to come to Moscow to get reacquainted with the program. The 2007 year marks the College of Engineering's Centennial (<http://www.engr.uidaho.edu/>). We are proud to uphold 100 years of tradition and excellence. Please join us at Centennial Events including our 2007 EXPO on April 26-27. I look forward to seeing you soon.

Best regards, Don Blacketter

Change Service Requested

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