

Industrial Assessment Center Celebrates 27 Years Helping Manufacturers Improve Operations and Developing the Next Generation of Energy Engineers



CSU IAC Program Members (from left): Andrew Costinett, Mike Kostrzewa, and Allan Kirkpatrick

In April, the Colorado State University Industrial Assessment Center will mark 27 years of helping manufacturers across Colorado and the Rocky Mountain West become more efficient and, just as importantly, training students to become the next generation of energy engineers. Dr.

Allan Kirkpatrick is the director of the IAC program, senior research associate Mike Kostrzewa, serves as the assistant director, and newly hired Andrew Costinett (Masters of Engineering '08) serves as a second research associate for the program.

Started in 1984 by Dr. C. Byron Winn, the CSU IAC is one of 26 programs at schools across the United States that are funded by the U.S. Department of Energy to conduct industrial assessments at small- to medium-sized manufacturing sites. The programs provide recommendations for improvement in the areas of energy efficiency, pollution prevention, and productivity. Undergraduate and graduate students are employed by the project to assist in the development of a report that is prepared for each plant detailing the areas and processes that use energy and generate waste; the amount and cost of these energy and waste streams; and suggestions to conserve energy, prevent/minimize waste generation and emission, and increase or improve production. The students participate in plant visits and get an understanding of the manufacturing processes from the supply dock to the shipping dock. Students must be able to recognize opportunities for improvement during a one-day plant visit and be able to understand what information is required for each opportunity. They must gather data verbally, by measurement, or by other means to quantify the amount of energy conserved or the waste reduction and the impact of their recommendations on production operations and product

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Debra Mann Joins the ME Faculty



Debra L. Mann

The mechanical engineering faculty welcomes the addition of Debra Mann as an instructor in the Manufacturing Instructional Laboratory. Mann

brings at least 15 years of teaching experience and seven years of industrial experience to the burgeoning activity of the MIL.

Most recently, Mann taught metalworking and woodworking in the technology education program at Poudre High School. Prior to that, she was in charge of the machining technology program at Front Range Community College for 14 years. During that time, the program received accreditation from the National Institute of Metalworking Skills.

Mann completed an Associate of Arts in machining technology from

Front Range Community College in 1990. She first entered the machine shop as an apprentice mold maker where she worked on aluminum molds for polystyrene packaging components. She worked the floor in industry for several years.

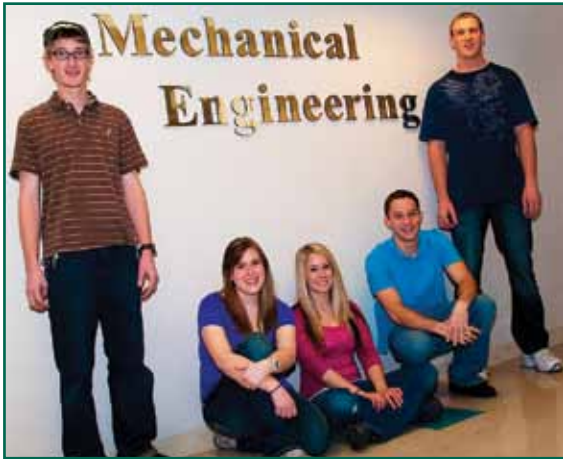
In 2000, she completed a Bachelor of Science in technology education and training at Colorado State University while teaching machining at Front Range Community College in Fort Collins.

In the MIL, Mann contributes to the daily operations by assisting with instruction of machine tools and manufacturing processes. She

provides individual and small-group instruction and teaches some laboratory lessons associated with MECH 200 – Introduction to Manufacturing Processes. She also assists with the production of research project work and participates in the upkeep and maintenance of equipment and the facility.

During the summer months, Mann enjoys gardening, home canning, camping, fishing, and hunting. She resides in west Loveland with her husband, Steve Mann, and spends time with her two sons and granddaughter.

CSU Tau Psi Launches Tutor Program



Tau Psi Officers (from left): Gary Marascola, Hannah Hudson, Caylee Johnson, Ryne Waggoner, and Travis Reynolds

Tau Psi, the Colorado State University chapter of the international honorary society Pi Tau Sigma, continues to uphold standards focused on integrity, leadership, and service by engaging in philanthropic work targeted at improving the University and the College of Engineering. Tau Psi, which is under the direction of Dr. John Williams, professor and faculty adviser, has recently started a tutoring program for students in the mechanical engineering department. Tutoring encompasses a variety of subjects required of the undergraduates in our department. Though the program is young, it is gaining momentum, becoming more widely known, and helping more students each semester. Many Tau Psi members go above and beyond the requirements of the organization and participate in additional volunteer work, reflecting the high values of those in the club.

Each year, the national organization hosts a conference attended by at least one representative from each chapter. Delegates have the opportunity to attend a variety of seminars, tours, and workshops to gather ideas that have been successfully implemented by other chapters. This year, Caylee Johnson and Ryne Waggoner attended the conference in Chicago, Ill. Attendees were given tours of mechanical engineering labs on the University of Illinois campus, including a fluids lab, a vibrations lab, and a virtual reality lab. Companies such as Illinois Tool Works, General Electric, and Caterpillar held workshops focused on staying competitive in a global market as well as the importance of globalization and innovation. Engineers working in industry explained how engineering theories can be applied to create competitive products for today's market. With the knowledge gained at this event, the Tau Psi chapter can continue to further its involvement at CSU and within the national Pi Tau Sigma organization.

From the Department Head



Susan P. James

I cannot think of a better way to kick off the spring newsletter, than with a story about the 27th anniversary of the Industrial Assessment Center. Byron Winn, Allan Kirkpatrick, and Mike Kostrzewa's leadership have been vital to this effort. The tremendous impact the IAC has had on industry over its long, successful history is matched only by the educational impact of the IAC on students' careers.

With this issue, we are also pleased to welcome Debra Mann as a new instructor in the Manufacturing Instructional Laboratory, while we bid a reluctant, but fond farewell to three professors who are embarking on new endeavors. Dr. Douglas Hittle retired from the department last year, and we look forward to seeing him at emeritus faculty events in the future. Dr. Xianghong Qian left to join the faculty at the University of Arkansas, and Dr. Venkatesan Manivannan left to return to industry. We wish them luck in their new endeavors.

Finally, this issue covers new tutoring programs being offered by the student honorary society, and explains how we have met the challenge of continuing budget cuts in these tight fiscal times. As always, I look forward to hearing from you all. Please send quick updates or longer stories for class notes. My door is always open; if you are in town, please stop by!

Susan P. James, Ph.D.

Class Notes will be featured in a future issue of
The Mechanical Engineer

Share Your News!

We enjoy hearing from our alumni. Please help us celebrate your personal and professional accomplishments. Send your update to:

E-mail: SupportEngineering@colostate.edu
FAX: (970) 491-3815

Online: www.supportEngineering.colostate.edu
(click on "Alumni & Friends")

Calendar of Events

Student Competitions:

- April 29 SAE Aero Design East
Marietta, Ga.
- April 29 ASME Human Powered Vehicle
Indianapolis, Ind.
- May 1 Formula SAE Hybrid
Louden, N.H.
- May 11 Formula SAE Race Car Competition
Brooklyn, Mich.

ME/College of Engineering/University Events:

- April 14 Engineering II Groundbreaking Ceremony
Building Site, Corner of Laurel Street and
Meridian Avenue
- April 14-15 E-Days and ME Senior Design Practicum
Project Demos
- April 15 MEAP Board Meeting
Lory Student Center 214-216
- May 13 Undergraduate and Graduate Commencement
Moby Arena

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New Engineering Building Will Use Green Energy Strategies



Engineering II Schematic Design: South Entry

Engineering II, a new 122,000-square-foot research and academic facility, will bring the faculty and students together in interdisciplinary teams focused on solving problems related to energy, environment, and health. The building will

consist of interdisciplinary research laboratories, teaching laboratories, classrooms, faculty offices, and the Student Success Center. Situated at the corner of Laurel Street and Meridian Avenue, it will be a signature building at one of the main entrances to campus. The building will be a model for how to reduce our impact on the environment. The high-performance design will utilize many energy-reducing strategies including variable day lighting, heat-recovery systems, and energy monitoring. The building, as currently designed, will have adequate LEED “Green Building Council” points to qualify as an LEED Gold project. Construction will begin in April 2011 with a planned completion date of June 1, 2013. Move-in and final equipment installation is scheduled for June to

August 2013, with the College of Engineering occupying the building to start the Fall 2013 semester. The following research pods will be located in the building: Biomedical Engineering, Environmental Engineering, and Bioanalytic Devices. Some mechanical engineering professors and graduate students participating in these research pods will be relocating to this new facility. Further, Engineering II will allow us to recruit and retain the very best faculty, staff, and students. It is critical for the continued growth of our research programs and will provide much needed new space for our growing student body and academic programs. Please visit <http://www.engr.colostate.edu/engr2> for more information about Engineering II.

Industrial Assessment Center Celebrates 27 Years

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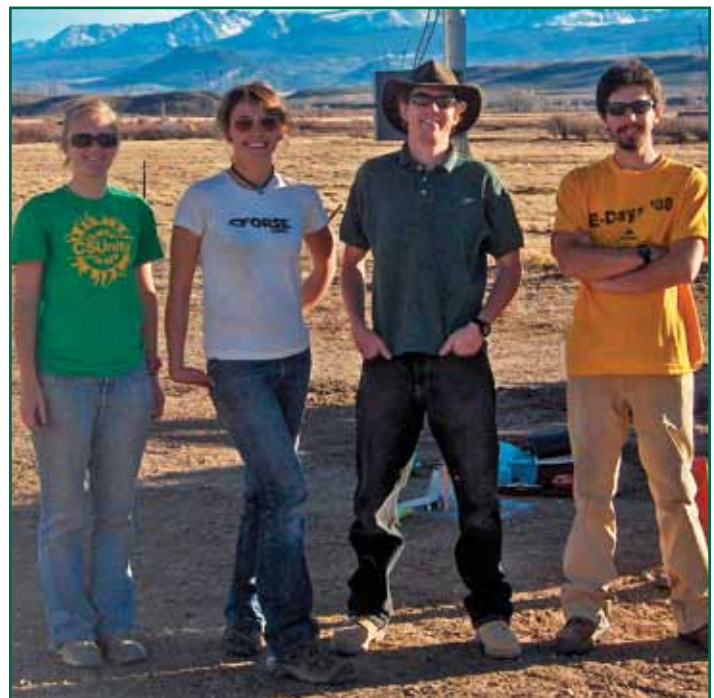
quality. After the plant visits, the students are responsible for researching each opportunity by locating and utilizing technical publications and by contacting equipment suppliers. The students must then write a description of the opportunity that includes a discussion of the proposed idea, equations and calculations for operating costs and cost savings, and a discussion of the equipment and costs required to implement the opportunity.

This is not a class, but it’s a way for students to put to use, in a real-world application, what they’ve learned in the class room. Over the life of the program, about 200 undergraduate and graduate engineering students have discovered and suggested more than 4,500 opportunities at about 650 manufacturing plants. The total energy savings recommended to these plants is nearly \$30 million per year, and the total recommended energy savings are 6.2 trillion Btus in electricity, natural gas, propane, and coal consumed at the plants. On average, about 55 percent of the opportunities suggested and 31 percent of the energy savings in these opportunities have been implemented within two years of student visits to the plant.

This model of applied learning for engineering students also has been successfully leveraged to develop three other programs: the Colorado Anemometer Loan Program, the Colorado Wind Application Center, and the Energy Efficiency Assessments in Agriculture programs.

The ALP program is funded by the Colorado Governor’s Energy Office to offer 20-meter and 30-meter tall weather stations to measure the wind energy potential for Coloradans interested in installing wind turbines. Student crews install the anemometer towers, then process the wind speed and direction data that is collected. The WAC project is a U.S. DOE program that takes that a step further and seeks to be the go-to source for information about taking the next steps and installing wind turbines. Right now, the WAC is doing this by helping to install home-scale wind turbines at rural Colorado K-12 schools to generate a little power and a lot of interest in wind energy. CSU engineering teams help to manage the projects at the schools and provide technical and permitting support for the projects.

The E2A2 project, funded by the Colorado Department of Agriculture and the U.S. Department of Agriculture, aims to take the IAC model of industrial energy audits to Colorado agricultural producers to develop opportunities for energy efficiency and conservation on the farm and in the field.



CSU ALP Install Team (from left): Laura Ruff, Jacqueline Hess, Hunter Vassau, and Kevin Gosselin

This year will be a transitional one for the WAC, as the DOE funds to support the program are no longer guaranteed after this year. Donations are always helpful to support this and the other applied field service projects. Additional funds are used to purchase field equipment and could be used to provide scholarships to students. Donation pages and more information can be found at <http://www.engr.colostate.edu/IAC/>, <http://www.engr.colostate.edu/ALP/>, <https://sites.google.com/a/rams.colostate.edu/csu-wac/home>, and <https://advancing.colostate.edu/ENG/GIVE>.

ME Department Manages Budget Cuts: More Good News than Bad News

One can hardly check the news these days without hearing about cuts to state budgets and, thus, cuts to state universities. This is as true in Colorado as it is in other states, and the cuts to state funding for Colorado State University have resulted in permanent budget cuts in the Department of Mechanical Engineering.

After two years of budget cuts, the department budget for the current fiscal year (2010-2011) is almost 10 percent lower than the budget in 2008-2009; and next year there will likely be an additional permanent budget cut.

Tuition has been steadily rising in an effort to partially mitigate the budget cuts. The bad news is that next year tuition and fees will likely increase for all students (undergraduates and graduates, in-state and out-of-state students). The good news is that the cost of studying mechanical engineering at CSU will remain lower than many other schools, including the University of Colorado and Colorado School of Mines. Furthermore, CSU will set aside more financial aid so that economically disadvantaged students can still afford to attend CSU. We hope that scholarship donations increase as donors see the state passing the costs of education on to students.

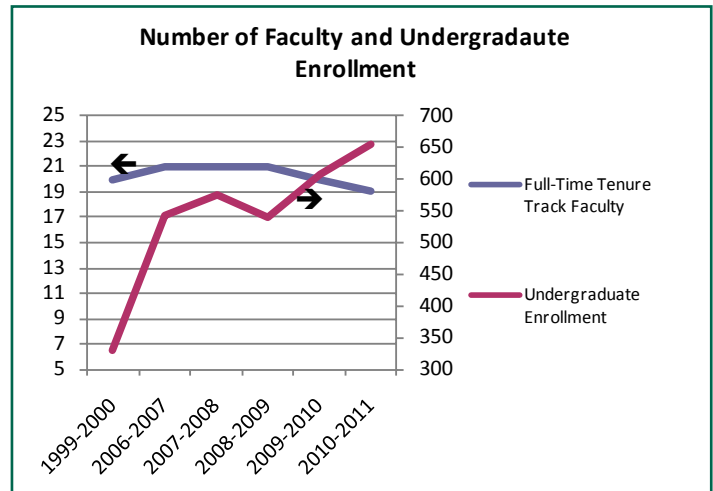
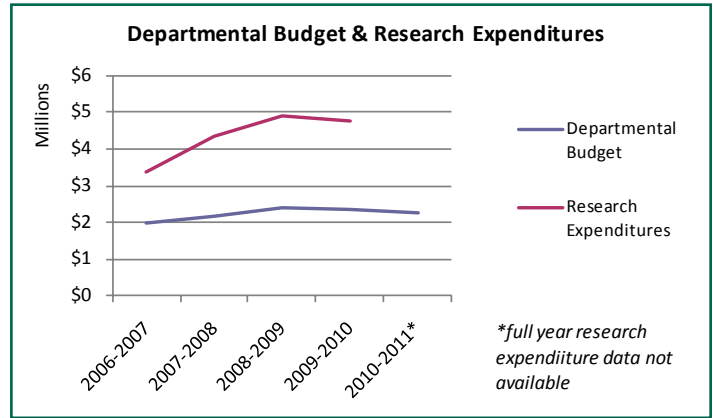
Meanwhile, the undergraduate student body continues to grow, setting new enrollment records almost every year (see figures).

Mechanical engineering is now the fifth-largest major on campus! The good news is that for the first time in CSU's history, the department will see some sort of incremental revenue as undergraduate enrollments increase, because the University recognizes the need to grow budgets as student numbers increase.

Research and scholarship have always been vital to our department's educational mission. The good news is that our faculty have never been more successful at winning research contracts. Our research expenditures have increased significantly over the last decade – approaching \$5 million per year in expenditures - nearly double what they were in 2001.

The almost \$5 million in research expenditures is considerably more than our resident instruction budget, which will probably fall below \$2.2 million with next year's budget cut. The good news is that research activities in the department support resident instruction in a variety of ways. Most of our graduate students are supported by the research projects of their faculty advisers. These projects also support our undergraduate mission because many students work in the research laboratories, getting vitally important exposure to the research process while still undergraduates. Our research also enhances our senior design course by providing design projects.

The mechanical engineering faculty and staff held a retreat



last summer (see photo below) to develop a new strategic plan for the department in the context of budget cuts and growing enrollments. We discussed a number of strategies to continue to enhance the quality of our education programs while increasing the impact of our research.

This includes a new short-term focus on raising student scholarships and fellowships, and a long-term focus on developing endowed professorships.

In summary, the bad news is that our departmental budget continues to decline; the good news is that in spite of that decline, funding for research by our tremendous faculty is increasing and is helping to offset these cuts, which is also good news for Colorado's economy. For example, 370+ new jobs were created in Colorado by Abound Solar, a direct result of Professor W. Sampath's two decades of research on thin film photovoltaics. With his unselfish, unwavering focus on solving the world's energy problems and ending energy poverty for billions of people in the developing world, Dr. Sampath continues to inspire all of us while promoting economic development. If we could create endowed professorships for a few faculty of Professor Sampath's caliber, the fiscal health of the Department of Mechanical Engineering would be more certain.



Mechanical Engineering Faculty and Staff Retreat, CSU Pingree Park, August 2010