

### ME Awarded Industry/University Cooperative Research Center



Attendees at the Next Generation Photovoltaics Industrial Advisory Board meeting held in June 2010 at the CSU Foothills Campus. Solar panel displayed in the foreground.

The Department of Mechanical Engineering has been awarded a five-year \$400,000 National Science Foundation grant to create an Industry/University Cooperative Research Center known as the CSU Center for Next Generation Photovoltaics. The director of the new CSU center is Professor W. Sampath, and the co-director is Professor V. Manivannan. The mission of the CSU center is to develop the next generation of photovoltaic devices to provide economically viable solutions to global needs for clean energy.

The center has professors and students from the colleges of Engineering and Natural Sciences

as principal investigators, including Professors Manivannan, Hiroshi Sakurai, and Sampath from the ME department, and Professor James Sites from the Department of Physics. Mechanical engineering department graduate students include Paul Kobayakov, Kevin Walters, Scott Smith, and Jason Kephart. The center also has an industrial advisory board with representatives from Abound, 5N Plus, Pilkington, Ion Edge, and MBI Corp.

The CSU Center for Next Generation Photovoltaics capabilities include advanced processing of cadmium telluride, or CdTe, devices and alloys, material analysis, and device testing. The center will be *(continued on Page 3)*

### James and Dorsey Launch New ME Diversity Scholarship

Professor Susan James and Judy Dorsey are proud to announce the formation of a new scholarship in the department, aimed at enhancing the diversity of the undergraduate student body. James, newly appointed department head and first female faculty member in the department, and Dorsey, department alumnus and local engineering business owner, first conceived the idea for the scholarship in discussions about the importance of diversity in engineering and strategies to enhance it. James and Dorsey recently met at the site of the Brendle Group's future home in a landmark building at 212 W. Mulberry St. in Old Town Fort Collins (see photo

at right). The project is a showcase of sustainable design, incorporating renewable energy technologies, new lighting and energy efficiency upgrades, improvements to the mechanical systems, and sustainable materials, including reclaimed urban wood. It was an ideal venue to finalize plans to launch the new diversity scholarship because it demonstrates what women in engineering can do when applying their talents to community-based sustainability challenges.

When James, who joined the faculty in 1994, was named the head of the department in July 2010, she became the first female department *(continued on Page 4)*



Sue James (left) and Judy Dorsey

## ME Mentors Assist CORE Center



Chriselda Engel (center) and ME mentors and students

In Spring 2010, as part of CSUnity, the mechanical engineering mentors and academic adviser Chriselda Engel gathered with a team of students for an all-day service project at the CORE Center in Fort Collins.

The CORE Center, or Community Organizing to Reach Empowerment, is a partnership involving community entities and individuals and families in skills development to achieve economic,

social, and academic success. Services provided at the CORE Center range from After School Club for young children to adult literacy programs.

Mechanical engineering students joined fellow engineering students and CORE staff to paint walls, wash windows, organize, and much more. The service project was gratifying for all involved, and the volunteers came away with a deeper understanding of the CORE Center's role in our community.

## From the Department Head



Susan P. James

I'm very excited to send out this newsletter, which is the first since I became department head in July. I have to start by thanking Allan Kirkpatrick for his decade of wonderful service as department head. It will be a challenge to follow in his footsteps – fortunately, his stewardship has left me a vital and vibrant department. In this newsletter, you'll read about several exciting new initiatives in the department and how we're helping shape the future of mechanical engineering education. The common themes of diversity, giving back to community, and solving today's and tomorrow's global challenges run throughout these stories.

Professors Sampath and Manivannan are partnering with industry to meet our global needs for clean energy in their new National Science Foundation-sponsored CSU Center for Next Generation Photovoltaics. The faculty and I are donating to the new ME Diversity Scholarship Fund because it will be good for students, our department, and the engineering workforce. Members of our undergraduate mentoring group are giving back to their community. All these themes are recognized by the ASME Vision 2030 project, which Allan Kirkpatrick has been an integral part of since July 2009.

I hope you enjoy this issue. Please keep in touch; I'd love to feature your stories in upcoming issues.

Susan P. James, Ph.D.



ME Senior Design 09/10  
Bamboo Bike Structural Testing



ME Senior Design 09/10  
SCAMP – Cryogenic Firefighter



ME Senior Design 09/10  
Afghanistan Solar Water Purifier

## Calendar of Events

### ME/College of Engineering/University Events

10/14	Annual 50th and Prior Reunion Dinner Fort Collins Hilton
10/15	COE Reunion Breakfast Internet Café/Engineering Building
10/15	MEAP Board Meeting Lory Student Center 214-216
12/17	Fall Engineering Graduate Commencement Moby Arena
12/18	Fall Engineering Undergraduate Commencement Lory Student Center Main Ballroom
3/31	COE Scholarship Recognition Luncheon Lory Student Center

4/15	Engineering Days/ME Senior Design Practicum Project Demos
4/15	MEAP Board Meeting Lory Student Center 214-216
4/16	COE Alumni & Friends Awards Dinner Lory Student Center

### Student Competitions (dates/locations to be announced)

- SAE Aero Design West
- ASME Human Powered Vehicle
- SAE Formula Hybrid Competition
- Formula SAE Race Car Competition

## Stephen Light and Charles Kovac Receive the 2010 Distinguished Alumni Awards

Two Colorado State University mechanical engineering alumni were recognized at the Spring 2010 Alumni Awards Banquet. Stephen R. Light, B.S.M.E. 1968, was given the College of Engineering Distinguished Alumni award; and Charles Kovac, B.S.M.E. 1979, received the Mechanical Engineering Department Distinguished Alumni award.

Light is a former member of the Mechanical Engineering Advisory Panel and a CSU 1870 Club member. He is the chairman, chief executive officer and president of Xerium Technologies Inc. in Raleigh, N.C. Xerium is a global manufacturing company whose products are used in the production of paper. Xerium employs approximately 3,200 people, and posts annual revenue of

\$600 million, 70 percent of which is earned outside of the United States. Xerium's shares are traded on the New York Stock Exchange. Light was previously president and CEO of Flow International, a publicly traded manufacturer of ultrahigh pressure waterjet cutting equipment, one of which is used in our Engines and Energy Conversion Lab, and OmniQuip Textron, a manufacturer of mobile construction equipment. Upon graduating from CSU, Light joined General Electric Co. and served in numerous management positions. Light credits his academic and social education at CSU with contributing measurably to these career opportunities.

Kovac is the vice president and group executive of Wabtec Corp., a freight locomotive services com-

pany in Wilmerding, Pa. From 2003 to 2007, he was the vice president and general manager of AMETEK's Global Household and Specialty Motors Division. Prior to joining AMETEK, Kovac spent 12 years with the Woodward Governor Co., as the vice president and general manager of the Industrial Controls Group (1996-1999), the managing director of Woodward's European business (1992-1996), and as director of engineering and business unit manager (1988-1992). Prior to his many roles

at Woodward Governor Co., Kovac was the founding member and general manager of the San Diego branch of the McBride Electric Co., a leading national electrical contractor specializing in value-added service work and national account programs. He began his career as a project engineer for the Ralston Purina Co.

Congratulations to both of these ME alumni for their contributions to CSU and the mechanical engineering profession.

**To nominate an individual for a 2011 Distinguished Alumni Award, please visit the Distinguished Alumni Awards website at [www.engr.colostate.edu/alumni-friends](http://www.engr.colostate.edu/alumni-friends) and click on "Nominate an Alum." The deadline is January 31, 2011.**

**For additional information, please contact Shannon Mosness at (970) 491-7028 or by e-mail at [shannon.mosness@colostate.edu](mailto:shannon.mosness@colostate.edu).**



*Emeritus Professor Byron Winn (left) presents the COE Distinguished Alumni Award to Stephen Light.*



*Charles Kovac (right) receives the ME Distinguished Alumni Award from Emeritus Professor Byron Winn.*

## Industry Research Center *(continued from Page 1)*

located at the CSU Engineering Research Center, in newly refurbished laboratory space.

Sampath is designing the next generation CdTe devices that are projected to have efficiencies of 20 to 30 percent. The efficiency improvements will be due to incorporation of electron reflectors and multijunctions. While Sampath develops more efficient PV devices, Manivannan is using a technique known as ellipsometry to help characterization of prototype devices, and Sites is using another technique called electroluminescence for device characterization.

The center will leverage work done at CSU in this area since 1991 in CdTe thin film photovoltaics. During this time, Sampath and his collaborators, Kurt Barth and Al Enzenroth, have invented an innovative method for low-cost and high-volume manufacturing of CdTe PV devices. They are now commercializing their innovative process.

Abound, a CSU spinoff company founded by Sampath, Barth, and Enzenroth, is now in large scale manufacturing and production of 2' x 4' CdTe PV modules, each module producing 70 watts, with an efficiency of about 10 to 12 percent. The

manufacturing plant is in Longmont, Colo., with a manufacturing capability of 130 megawatts per year. Abound recently received a \$400 million loan guarantee from the U.S. Department of Energy to support tripling of their manufacturing capabilities.

The CdTe market share is growing the fastest in the PV marketplace due to its favorable performance/cost ratio. CdTe PV module manufacturing cost, presently about \$1/watt, is predicted to decrease to about 60 cents/watt by 2016, maintaining an advantage of about half the cost of another PV device - crystalline

silicon, which currently costs about \$2/watt.

The NSF IUCRC program expands the innovation capacity of our nation's competitive workforce through partnerships between industries and universities. Currently, there are 52 such IUCRC centers supported by NSF in the United States. The centers support precompetitive research needs identified by each center's Industrial Advisory Board, and the IUCRC center projects are industry driven, as industry partners match NSF federal contributions.

## Class Notes

**Ed (William E.) Odell ('58)** and wife, Carolyn, retired in 1994 and moved to Glenwood Springs, Colo. After travelling for several years, he returned to the part-time labor market and spent a year helping at the Glenwood Caverns Adventure Park and three more years as a teller in a local branch of U.S. Bank. He says that "since I failed retirement the first time, I was told I had to take it over, so I re-retired in May 2010 to resume retirement travel." He has five children, four of whom are in Colorado and one in Illinois, and five grandchildren, two in Colorado, one in Alaska, and two in Illinois.

**John Serfling ('74)** recently retired after 31 years working for Xcel Energy and its predecessors. His M.E. comes in handy working on the house and the classic cars he owns.

**Steve Cowles ('81)** worked for Rockwell, Honeywell, and Cray Research as an automation design engineer after graduation. In 1989, he founded Peak Robotics Inc. and has continued as president and 100 percent owner. Located in Colorado Springs, his company, which employs 10, designs and builds standard and custom-designed robots for the life sciences market, providing the manufacturing in-house using a variety of machine tools. Cowles has been married since 1983 to a CSU engineering alumna. They live in Woodland Park, Colo., with their two adopted children, fully enjoying the Colorado outdoors lifestyle and searching for water somewhere in Colorado to take their newly acquired boat!

**Tom Schlicht ('88)** is working as a senior facilities engineer for Chevron Corp. He and Mary, his wife of 14 years, live and work in Balikpapan, Indonesia. Tom invites you to e-mail him at tom.schlicht@chevron.com or find him on Facebook.

**Tom Edwards ('89)** currently resides in Naperville, Ill., and is the president of Technics Inc. Technics designs and builds systems for monitoring and blending petroleum products in the oil and gas industry.

**Jeff Young ('89)** and wife, Annie, have three children, ages 2, 4, and 6. They reside in Lakewood, Colo.

**Adam Wilson ('99)** currently resides in Anchorage, Alaska, with his wife and 1-year-old daughter. He

works for RSA Engineering Inc., a mechanical and electrical engineering consulting firm specializing in HVAC, plumbing, and power design for commercial buildings in the Arctic and is working on a school remodel project for the village of Diomedes, located on Little Diomedes Island in the Bering Sea.

**Kerrie (Thompson) Grant ('99)** celebrated 10 years with IBM in January 2010. She and her husband, Shayne Grant, welcomed their daughter, Natalie, on Jan. 14, 2010.

**Dennis Schmitt ('05)** received his PE license for the state of Colorado in December 2009 and relocated from the Encana Denver office to the corporate office in Calgary, Alberta, Canada, accepting a promotion within the company. He is currently the group lead of engineering and technical support for the Facility Asset Management Team. He supervises a team of technologists and engineers who provide technical support and guidance to the Canadian Division property teams on topics such as natural gas engine and compressor optimization and troubleshooting, electrical engineering design support, electrical infrastructure safety compliance inspections, facility engineering support, and specifications/document control management and support.

**Justin Taylor ('05)** works at Joest Racing, a German contractor for Audi, as an assistant race engineer on their Le Mans Prototype race team. Since 2005, his team has won the Le Mans four of the five years entered and the American Le Mans Series Championship every year. He lives in Denver with his fiancée, Elizabeth Burrow ('03), who is a CSU alumna.

**Carl Kaiser ('09)** is a research engineer for the Woods Hole Oceanographic Institute in Woods Hole, Mass., developing remotely operated and autonomous deep submersibles for the National Deep Submergence Laboratory. As of July 2010, he was aboard the RV Thomas Thompson, 300 miles off the coast of Oregon supporting diving operations to study hydrothermal vents at 4,000 meters.

**Nick Stringari ('09)** worked in an aerodynamic wind tunnel for Colorado Premier Training. He is attending Colorado State University at Pueblo to receive his M.B.A.

## ME Diversity Scholarship *(continued from Page 1)*

ment head since the department was formed in 1883. "One of the main reasons I chose the academic career path, was to encourage more women to become engineers. When I became department head, this scholarship was the first effort for which I wanted to seek donations," James said. "Diversity is good for students, faculty, and the profession. To engineer solutions for a diverse global economy, we need every perspective we can get, so I've been working hard to increase the student body's diversity with outreach and mentoring."

Dorsey has been a long time supporter of the department. "I'm excited to donate to this new scholarship fund. It feels good to know my scholarship donation is being leveraged by other investments the department is making to increase diversity, such as mentorship and retention programs. I hope it will help increase the number of women and minorities who graduate with mechanical engineering degrees from Colorado State University. This profession offers us a great way to give back to our communities – often a strong motivation for diverse students. James is seeding

the fund with regular monthly donations of her own, which she says she will continue through her tenure as department head. Dorsey has also committed to the fund along with several of the mechanical engineering faculty. The department promotes and encourages academic success among all its students and recognizes the special challenges faced by women and minorities. Spurred by the underrepresentation of these groups in the department, last year a new mentoring program was launched for these students. In addition, a retention program, focused particularly on freshmen and sophomores, implemented a few years ago has succeeded in retaining these students in the department.

Donations to the fund are encouraged to be allocated 80 percent to the endowment and 20 percent to expendables for immediate scholarships. Of course, donors may direct their gift as they wish. Any student can apply for the scholarships – selection criteria will include dedication to improving diversity in ME, demonstrated ability to successfully complete the degree, academic excellence and financial need.



*ME Senior Design 09/10  
ASME Human-Powered Vehicle*



*ME Senior Design 09/10  
Hydraulic Hybrid*



ME Senior Design 09/10  
Formula SAE Racecar



ME Senior Design 09/10  
Composite Engine Valves



ME Senior Design 09/10  
SAE Aero Design East



ME Senior Design 09/10  
Neonatal Transport for Newly Industrialized Countries

## 2010-2011 ME Scholarship Recipients

### Scholarship Name – Recipient(s)

AAW-Front Range Woodturners Scholarship – *Nathan W. Savig*

Advanced Energy Hollis Caswell Scholarship – *Kasey A. Ackerman*

Melvin R. and Mary Lou Black – *Eric S. Dischinger*

Engineering Scholars – *Brent Brady, Chelsey L. Lewis, Tyler D. Faucett, Jennifer E. Lee, Matthew J. Wenger*

Engineering Dean's Scholarship – *Adam D. Allevato, Andrew C. Aldridge, Jacob P. Hartman, Matthew G. Johns*

Walery Richard Gawronski Memorial – *Laura M. Ruff*

Johannes and Seraina Gessler Scholarship for Study Abroad – *Timothy R. Parry*

Ival V. Goslin – *Amanda M. DeCann, Tim Schollenberger, Kevin A. Westhoff*

Guire Family Memorial – *Nicholas A. Riedel*

Graham W. Howard Memorial – *Forrest N. Craft*

Frank Kimball Memorial – *Anthony P. Nicholson*

Kirkpatrick Family – *Allison L. Kotewicz*

Mechanical Engineering Alumni/Faculty – *Patrick D. Barrett*

Micro Motion Engineering – *Ryne M. Waggoner*

Charles E. Mitchell Scholarship – *Seth L. Davies*

Robert Mock Memorial – *Gary G. Marascola, Caleb L. Cordova*

Allen Porter Mowry Memorial – *Michael D. Brooks*

A. J. Parfet – *Thomas J. Scaffidi*

Robert L. and Bonnie J. Walker – *Amanda N. Marchiani*

Delano F. Scott Scholarship – *Garrett W. Idler*

Walter Scott, Jr., Scholarship – *Gregory J. Broughton*

Shrake Culler Scholarship – *Kevin L. Troyer*

Sjostrom Family – *Matthew D. Ruter, Kiran Kambly*

J. T. Strate Educational – *Caylee L. Johnson*

Union Pacific COAMP/WMEP Scholarship – *Chelsey L. Lewis, Anthony P. Nicholson*

C. Byron and Donna T. Winn – *Betsy M. Farris*

Claude W. Wood – *Laura K. Banta, John B. Coughlin, Seth L. Davies, Benjamin J. Ebersole, Laura M. Imbler, Bruce A. Mayberry, Shawn D. Salisbury, Kristal A. Whelan*

Hans Kurk Zimmerman – *Nathan G. Spotts*



ME Senior Design 09/10  
Novel Water Purification

## ASME Vision 2030 – Creating the Future of Mechanical Engineering Education

In July 2009, the ASME Center for Education formed an engineering education task force, the ASME Vision 2030 project. The chair of the task force is Dr. Robert Warrington of Michigan Tech, and Dr. Allan Kirkpatrick of the Colorado State University Department of Mechanical Engineering was chosen as editor. The Vision 2030 task force has organized engineering education conferences in numerous locations and, as the photo of Drs. Allan and Susan Kirkpatrick indicates, the last meeting was in May 2010, in Istanbul, Turkey.

The task force has two primary objectives: (1) to help define the knowledge and skills that mechanical engineering or mechanical engineering technology graduates should have to be globally competitive in the 21st century; and (2) to provide recommendations of changes in mechanical engineering education curricula that would help provide graduates with the necessary expertise for successful professional practice.

and serve as motivators for significant changes to mechanical engineering curricula.

The task force noted that the most important aspect of the mechanical engineering discipline is its “way of thinking,” i.e., its structured approach to problem solving. Mechanical engineers use the principles of energy, materials, and mechanics to design and manufacture systems, machines, and devices of all types. Today, the range of applications of the mechanical engineering discipline has expanded greatly to include biological and information-based systems, advanced materials and micro/nano-devices, and many others. Many contemporary engineering problems are considered to be multidisciplinary in nature, involving more than classic mechanical engineering expertise and traditional knowledge domains.

The challenges of sustainable engineering, energy, and human health were areas that the Vision 2030 task force identified as ones where mechanical engineers can



*Drs. Allan and Susan Kirkpatrick , Istanbul, Turkey, May 2010*

on improving human health and alleviating poverty in the developing world. Many students find such activities attractive and very rewarding, as they provide a venue to apply their mechanical engineering skills to improve the quality of life for people in less fortunate circumstances. Mechanical engineering education curricula at most schools do not explicitly include these sorts of service components.

**It is clear that understanding the social, political, and environmental considerations of an engineering problem will become even more important to engineers and mechanical engineering education.**

The task force outlined curricular structures to strengthen two aspects of the undergraduate mechanical engineering and mechanical engineering technology curricula: practical experience and curricular flexibility. In multiple surveys of industry, the missing skill most cited was “practical experience,” and “new ME applications” was cited by engineering educators as a missing curricular component. The survey results indicated that successful mechanical engineers in industry will be individuals who, in addition to technical knowledge, also have depth in communication, management, global team collaboration, creativity, and problem solving.

To strengthen the practical experience component of the students’ skill sets, the task force recommended that the ME curriculum contain a multiyear design/build spine in which there would be a semester-long design course in each of the freshman, sophomore, and junior years, and a two-semester yearlong senior capstone design course. Professional skills, such as problem solving, teamwork, leadership, entrepreneurship, innovation, and project management, would be central features of the design spine. To provide more curricular flexibility to incorporate new applications and emerging technologies, departments would designate a set of classes as their mechanical engineering core, which all students would be required to complete. This core would consist of the first course in the fundamental ME discipline areas, so there would be a de-emphasis of some elements of the current curricula. Please note that the CSU Department of Mechanical Engineering has had a multiyear design spine since the early 2000s, culminating in the Senior Design Practicum.

With incorporation of the recommended curricular improvements, mechanical engineers will be well suited to move into an expanded scope of duties beyond their traditional roles, as being demanded by these changing business models and the rapid expansion of technology, communication, and worldwide engineering talent.



*The Blue Mosque, Istanbul, Turkey*

The role and scope of the mechanical engineering profession has been transforming rapidly. Both what mechanical engineers do and how they do it are changing owing to the expansion of the discipline’s boundaries, increased need to attend to global issues, increased professional and diversity expectations, and rapid technological innovation. These important factors impact the mechanical engineering profession

provide their ‘way of thinking’ to develop innovative and sustainable solutions to these important challenges. It is clear that understanding the social, political, and environmental considerations of an engineering problem will become even more important to engineers and mechanical engineering education. There are many opportunities for mechanical engineering education to participate in activities focused