



spring 1998

volume 1, no.1

Senior design courses: Just like industry

The ME faculty has long supported a tradition of teaching our senior design courses in a way that makes the experience a model of what happens in the real world. One of the great strengths of Colorado State's ME curriculum is the emphasis on fundamentals and how they apply to real-world problems.

For the past two years, the faculty has made changes to further enhance this approach. The senior design course now focuses on three major projects. This year's projects are the Human-Powered Vehicle, Formula SAE Race Car, and the Walking Machine.

Each project has three teams. The platform team takes charge of the device to be built and operated this year. The development team handles an advanced design being developed for next year, and the skunkworks team heads up the very advanced design for the future. In addition to being team members, students are part of a technical division. Nine divisions focus atten-

tion on topics such as composite materials and fabrication, manufacturing engineering, controls, thermal/fluids issues, and solid mechanics.

Each project lasts a full year. Teams are expected to produce real results on a timeline. The platform teams are expected to represent the department well in their respective national or regional competitions.

The senior design courses provide students with excellent experience in planning, teamwork, cooperation, written and oral communication, and performing on a schedule. Team members also solicit funding and donations of parts and materials, giving students valuable experience in sales and promotion. Working within organizational structures, waiting for deliveries, and solving technical and personnel problems are all important parts of the learning experience. Senior design courses allow students to apply their knowledge in a very real way. ■



Design team member Kerrie Thompson with CSU's award-winning 1997 Walking Machine.



The 1997 student design team with their Formula SAE Car.

New department head firmly grounded

In August 1996, Tim Tong was hired from an international pool of candidates to fill the position of department head of mechanical engineering. A month later, Tong undertook a special assignment in Washington, D.C., where he served as the director of an NSF program on thermal transport and thermal processing. To enable him to fulfill his NSF commitment, which was

made prior to his Colorado State appointment, Tong asked Fred Smith and Allan Kirkpatrick to share the department head duties in his absence.

Last August, Tong returned to campus and established a home for himself and his family.

"I'm very excited to be here," Tong says. "We have an outstanding faculty and many talented

people, who are recognized for their commitment to excellence in education. The challenge our department faces for the future is leveraging existing activity to create more opportunities for our students and faculty, and to better serve the Colorado community. The Engines Laboratory and the Industrial Assessment Center are good examples of how this is being done already.

Tong formerly headed up the energy systems research center at Arizona State University, where he worked for 11 years. Prior to that he taught at the University of Kentucky. He received his graduate degrees from UC-Berkeley.

Tong lives in Fort Collins with his wife, Esther, and their three children: Ernest, 18, Patricia, 15, and Jonathan, 10. ■

From the department head

Welcome to the first issue of *The Mechanical Engineer* – and thank you for welcoming me to your University. We are sending this newsletter to all our alumni and supporters, as well as our partners in industry, in hopes of encouraging a lively and relevant exchange of information and ideas. I welcome your input about the newsletter and how the department is doing in preparing students to become viable, marketable employees and citizens.

In the encounters I have had with our alumni, I have been moved by the degree of pride that our graduates have in this department and this University. Your accomplishments and the prominent roles you play within the industry are an inspiration to our current students, showing them that they, too, can be competitive in the marketplace upon graduation and that their Colorado State education is something they can be proud of.

Our biggest challenge over the next few years will be to lay the foundation that will support a 20-

“Upon their retirement, Byron and Donna Winn established an endowment to support faculty and student projects in mechanical engineering. On behalf of the department, I thank them for their generosity and dedication to Colorado State.”

percent growth in undergraduate ME students and a 33-percent growth in graduate students. The Engineering Building’s renovation and expansion is a necessary start, and I’m pleased to inform you that

construction is progressing on schedule. Our students will soon be learning in top-notch facilities in spaces that are designed to encourage teamwork and the testing and evaluating of ideas that groups of students and faculty will brainstorm. We will continue to improve our undergraduate curriculum as well.

One of our greatest strengths is our outstanding faculty; they do a superior job of producing graduates who are well educated and well trained. We must continue to capitalize on this strength and use it to our best advantage in the learning, research, and service opportunities we offer our students.

One thing I hope to accomplish in coming years is greater involvement with our alumni, and this newsletter is one way we can begin to connect. I want to establish a dialog with our graduates, because you, more than anyone, can tell us about the preparedness of our students for their careers. I’d like to extend an invitation to all our grads, and especially those who graduated prior to 1950, to attend the College’s Fall Commencement ceremonies.

Please enjoy this issue of *The Mechanical Engineer*, and use it as a way to stay in touch with us. I invite you to contact me directly; my e-mail address is tong@engr.colostate.edu



Timothy Tong



Former space engineer finds unique way to support students

Bob Walker, '56, has owned a space engineering firm, a horse track, and a recreational resort near Yellowstone. Yet, for all his success in many areas of the country, he has never forgotten the little town of Hugo, Colo., where he was raised. Nor has he forgotten the university where he earned his degree. Recently, Walker established an annual scholarship that will award \$20,000 to a deserving mechanical engineering student for his or her education at Colorado State.

Walker hopes the town of Hugo will supply Colorado State with some entering mechanical engineering freshmen

“The support for the student projects has been a tremendous morale booster for our students.”

to compete for the scholarship, but if not, ME students from other areas will be considered.

In addition to the scholarship, Walker also provided \$7,500 to match funds students raised for three student-team projects: the Walking Machine Decathlon, Formula SAE Vehicle, and Human-Powered Vehicle. “The support for the student projects has been a tremendous morale booster for our students,” says Department Head Tim Tong.

Walker says he values the education he received at Colorado State, and he believes the scholarship and student-project funds are good ways to invest in the mechanical engineering program and in future students.

“The Walker Scholarship is the first scholarship of this magnitude that has been made to mechanical engineering,” reports Tong. “We appreciate this kind of support and the statement it makes about our graduates and the value they feel they’ve received from their Colorado State education.” ■

Recent retirees

ME Professor C. Byron Winn retired last fall after 30 years of outstanding service to our department. From 1983-95, Byron served as department head.

He has been very active in solar energy and undertook numerous national and international leadership roles in this and other areas. He was among the first instructors to teach via Colorado State’s videotaped distance-learning program, SURGE. He also established the Energy Analysis and Diagnostic Center at CSU. The EADC became a unique and truly excellent program providing service to the manufacturing industry of Colorado, as well as providing an excellent learning experience for our students. The program still operates today as the Industrial Assessment Center.

Last spring, the College recognized Byron with the Abell Service Award. Other awards he has received include the Pennock Distinguished Service Award, J. E. Cermak Advising Award, Distinguished Alumnus Award from the University of Illinois, and the AIAA Technical Paper Award.

Even though he’s retired, Byron continues to contribute to departmental programs in many ways.

■ ■ ■

After 26 years of dedicated service to Colorado State, **Peggy Stumpf** has retired. Many alumni may remember Peggy from her years of work at the Engineering Research Center, agricultural engineering, the office of the associate dean for undergraduate studies, and the ME department.

Since 1986, Peggy served as student adviser, ensuring that students received accurate advice regarding their courses and requirements. Students often asked her for advice on other than curricular matters as well, such as seeking employment and preparing resumes. Once, a student even asked her advice on how to propose marriage.

We wish Peggy well in her retirement. Recently, she came back to visit during our interview of candidates for a new dean of the College. The candidate was one of Peggy’s students, and she came to greet him and wish him well. ■

New Engineering Building begins to take shape

Construction on the new Engineering Building began Nov. 17. Within the next two years, the 40-year-old building will undergo a renovation of 130,000 square feet of existing space and the addition of 44,000 square feet of new space. Featured in the \$17 million project are high-bay laboratories where students from civil, electrical, and mechanical engineering will be able to work and learn collaboratively. Those skills, along with the principles of basic engineering, are essential, according to employers of today’s graduates.

For in-depth, up-to-date news on the campaign, visit our campaign web site: <http://www.colostate.edu/Depts/AcadAffairs/EngBldg> ■



Adm. Richard Truly, director of the National Renewable Energy Laboratory, and his staff visit with Bryan Willson at the Engines Laboratory.



To date, more than 250 ME students have participated in engines research and student projects at the Engines Laboratory.

Engines Laboratory off to a great start By Fred W. Smith, P.E.

In early 1992, Bryan Willson and I were driving around Fort Collins looking for a place to set up a new laboratory Bryan had conceived: the CSU Engines and Energy Conversion Laboratory. According to Bryan's vision, this was to be a place for conducting research on large-bore, natural gas-powered, gas-compression engines. It was also to be a place where ME students could conduct car projects. The Methanol Car, Solar Car, Natural Gas Vehicle, Hybrid Electric Vehicle, and the SAE Formula Car projects were already under way and were popular with both students and sponsors. We looked at every building with a foundation that would support exceptionally large engines and that would have enough space for student projects as well. The old Fort Collins Power Plant became a serious possibility. The building's turbine-generator foundations appeared to be stable and strong enough to support the loads we had in mind. The City of Fort Collins negotiated a lease with CSU, and Bryan was in business. He already had sponsors who were excited about starting the research Bryan had proposed. By June 1992, a 35-ton, 300 HP, 300 RPM Cooper Bessemer four-cylinder, two-stroke compressor engine was being installed. A number of similar engines are used across the nation to compress natural gas as it is transported through pipelines.

Primary sponsors of the laboratory are the Natural Gas industry, including the Pipeline Research Committee Inc. and the Gas Research Institute. The National Science Foundation, Department of Energy, Tennessee Gas Pipeline Co., John Deere Corp, Woodward Governor Corp, and several others are among the list of partners involved in the laboratory programs.

Research has focused on improving efficiency and reducing exhaust pollutants of large engines. Roughly five percent of all natural gas consumed in the United States goes to operating large engines, so a lot can be saved by efficiency improvements. Willson and his students are conducting experiments on high-pressure fuel gas injection for these engines and are implementing this through on-line optimal control strategies. Using such strategies along with advanced diagnostic tools available in the laboratory, students and faculty have expanded the understanding of emission-formation mechanisms and engine performance.

Recently, three 1000 HP, 1000 RPM engines were installed to continue the research. Another exciting development is the NSF-sponsored Global Engine Project, which is aimed at developing an engine to be available via the Internet for conducting experiments. K-12 and college students anywhere in the world would be able to "dial up" this engine. They would start and operate it through controlled conditions and gather data on its operation. Allan Kirkpatrick and Willson are co-investigators on this project, which is expected to serve as a model to allow students greater access to expensive, specialized research laboratories around the world.

Since the Engines Lab opened, more than 250 students have interacted in research and design projects at the lab. The laboratory's programs have helped attract many undergraduate students to the ME department. Sometime when you're in Fort Collins, take a moment to stop by and see what's going on at the Engines Lab. It is located on the east side of North College Avenue, just north of the railroad tracks. We hope to see you there. ■

Congrats to stellar students

Congratulations to the following mechanical engineering undergraduates, who earned 4.0 GPAs during Fall Semester 1997:

- David Bullen
- Kimi Ceridon-Scott
- Melissa Davis
- Sherold Doerfler
- Cody Farnell
- Douglas Jackson
- Eric Johnson
- Timothy Langworthy
- Chad Lewis
- Matthew McQuarrie
- Alison Smith
- Joseph Sprowls
- Eamon Sullivan

SWE Sled Contest

In February, members of Colorado State's Society of Women Engineers joined forces with fourth, fifth, and sixth grade girls to test the students' engineering and design skills in the third annual snow sled contest. Organized by assistant ME professor Sue James, the contest enticed 30 Beattie Elementary School girls to design sleds using wood, plastic sheets, inflatable rafts, old skis, foam, and other materials. CSU engineering students helped the girls to build their sleds.

"The girls had a wonderful time designing and building their sleds," James reports. "They got an idea of what engineering is and how much fun it can be."

Prizes were awarded for design, speed, maneuverability, and safety. Sponsors included CSU's Society of Women Engineers, Dow Chemical, FiberLok, Hewlett-Packard, Kodak, Lockheed Martin, NSF, and Woodward Governor. ■

Tell us what you're up to

The ME department wants you to stay in touch. Use the form below to let us know what you're doing, where you're living, and so on.

Name _____ Address _____
 City _____ State _____ Zip _____ Home Phone _____
 Employer _____ E-mail address _____
 Information _____

(attach another page, if needed)

Return to: Fred W. Smith, P.E., Mechanical Engineering, Colorado State University, Fort Collins, CO 80523. E-mail: fred@engr.colostate.edu

ASME students host regional conference

On April 3 and 4, CSU's Student Section of ASME hosted the Region XII student conference in Fort Collins. More than 140 students and faculty advisers attended, representing colleges and universities from Colorado, Wyoming, Utah, New Mexico, Arizona, Texas, and Mexico.

Students competed in team and individual technical activities sponsored by ASME International. CSU had two entries in the Old Guard Oral Presentation. Fifth-place winner Kimi Ceredon spoke on biomechanics and ergonomics in the context of the mechanical design process, and Anthony Puckett spoke on HydrOX, the CSU Walking Machine.

The ASME International design competition encouraged teams to design and construct a machine that recognizes and sorts good widgets from bad widgets. Ninety-nine-cent Radio Shack electric motors, each having only one battery, powered the machines. Scoring was based on sorting accuracy and speed. The CSU ASME Student Section performed well overall, with "Rapid Fire" taking first place and "Slide Hook Design" taking third in the widget-sorting competition.

In the technical poster competition, Chris Whitman, current chair

of the CSU ASME Student Section, entered a poster on the CSU Human-Powered Vehicle that competed in the ASME HPV competition in early May. Kerrie Thompson's poster, featuring the current CSU Walking Machine, won second place.

The CSU ASME Student Section took first place in the Allied-Signal competition, in which judges evaluate the overall quality and quantity of student-section activity for the year. CSU has won this competition consistently for most of the past 30 years.

This year CSU added a new component to the Region XII student conferences: a career fair featuring four companies that support the ME department in many ways. Representatives from Andersen Consulting, Maxtor, Hewlett Packard, and Bentley Nevada made presentations and operated booths. This company involvement prompted interaction with students, including resume submissions that would allow students to be considered for internships or job opportunities.

The conference was entertaining, productive, and well synchronized, thanks to the organization and leadership of the ASME Student Section. ■



Tim Tong, far right, with student leaders during the joint Pi Tau Sigma Initiation and ASME Friday Afternoon Club celebration held in April.

Calendar of events

1998

SAE Walking Machine Decathlon, Dekalb, Ill.*	Apr. 30-May 2
Human Powered Vehicle Competition*	May 1-3
Commencement	May 15-16
Formula SAE Car Competition, Pontiac, Mich.*	May 27-31
Homecoming	Oct. 9-11
Engineering Careers Day	Oct. 17
ASME Roast and Toast	Dec. 11
Commencement: A special invitation is extended to our pre-1950 grads	Dec. 18-19

1999

Engineering Careers Day	Feb. 13
Regional Student Conference	Early April
Human Powered Vehicle	Early May

*Please note: The department is hosting receptions for our alumni and friends for student competitions taking place outside Fort Collins. If you're in areas where the competitions are held, please join us. For specific information about upcoming receptions, contact Bryan Willson (Formula SAE Car), Fred Smith (Human Powered Vehicle), and Mick Peterson (Walking Machine).

The Department of Mechanical Engineering would like to extend a warm welcome to Fort Collins' newest industry leaders:

- **Robert G. Hantman, Vice President of New Products and Engineering, Teledyne Water Pik**
- **Roger H. Maddocks, Site Manager and Vice President, Kodak**

Visit the ME department at the College of Engineering's web site: <http://www.engr.colostate.edu>



Department of Mechanical Engineering
Fort Collins, CO 80523-1374

NONPROFIT
ORGANIZATION
U.S. POSTAGE
PAID
Fort Collins, Colorado 80523
Permit Number 19

Address service requested

Colorado State University's Department of Mechanical Engineering publishes *The Mechanical Engineer*. Comments, questions, address changes, letters to the editor, and class notes information may be directed to: Fred W. Smith, P.E., Department of Mechanical Engineering, Colorado State University, Fort Collins, CO 80523-1374. E-mail: fred@engr.colostate.edu

For information about donations to the department, contact Jean Lamm, (970) 491-1312, or via e-mail: Jlamm@engr.colostate.edu