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## Motorsports Engineering Is Up and Running

Motorsports engineering is an emerging field in the United States due to the tremendous interest in automotive racing over the past 10 years. Due to the efforts of the current faculty, Don Radford, Patrick Fitzhorn, and Rudy Stanglmaier, the Colorado State University ME program is among only a few university programs in North America to serve the expanding demand for engineers to serve on automotive race teams. Currently, a typical auto race team will have two to five degreed engineers working on the team, and some teams have up to 25 engineers.

In October 2002, the program laboratories were moved from the on-campus Engineering Building to the Motorsport Engineering Research Center (MERC) located at the west end of Vine Drive. Under remodel now, the research and teaching facilities include two principal buildings, a 14,000-ft<sup>2</sup> research building and a 5000-ft<sup>2</sup> education and conference center. The Educational and Conference Center houses the main entry and reception area for the Motorsport Program; a classroom for up to 40 students; faculty and graduate student offices; conference room; and high-performance computing areas, all equipped with 1 Gbs Internet connections and wireless computer access throughout. A Formula 1-quality damper (shock absorber) dynamometer, one of only four in North America, is installed and operating in the research building.

The facility also contains a brake dynamometer for friction materials testing and a 175 HP Eddy Current engine dynamometer with cooling tower, computer control system, and emissions bench, which are all connected to the Internet. On the educational forefront, a new graduate vehicle dynamics course has been initiated and is being taught to nearly 50 undergraduate students who are doing their ME Senior Design Practicum work at the complex.

The program recently received an S-22 professional race car with an electronic data acquisition system that is capable of sensing wheel speed; multiaxial accelerations in roll, pitch, and yaw; and damper and steering rack position. Rudy Stanglmaier and his graduate students are setting up a Dynamic Flow Bench to measure and analyze flow through cylinder head valves while the valves are in motion; flow is detected by PIV (Particle Image Velocimetry) equipment.

Other facilities at the MERC include a fully operational foundry for casting brass, bronze, and aluminum; an Electron Discharge Machining (EDM) capability; a plastic thermo former; and a 30-ton injection-molding machine. Renovation of the building to set up a design studio is currently under way as well. In addition, the Composite Materials, Manufacturing, and Structures Laboratory that was formerly at the Engineering Research Center has been moved



Student working on new Motorsport Engineering racecar, the Clarival S22 (donated by Larry Vollum and updated with MOTEC data acquisition system from Dave and Ellen Ferguson).

in its entirety to the MERC.

The Motorsport Engineering program, a burgeoning effort, has been built by hardworking faculty and students but could not be possible without the donors who have provided the funds and equipment approaching a value of \$1 million. If you have a chance, please stop

by to visit the MERC. Among the things you will see are all of the student-designed and student-built FSAE race cars from the past several years including the hottest new thing for this year – a race car, the shell of which is made fully from aerospace-grade carbon fiber composite material.

## Alumni Spotlight: Mr. Robert Anderson

Mr. Robert Anderson (B.S.M.E. 1943) has achieved noteworthy career successes and significantly impacted the educational experiences of past, current, and future CSU engineering students.

Mr. Anderson credited Dr. J.T. Strate, former head of the Department of Mechanical Engineering, for positively influencing his educa-



tion. "Dr. Strate was an excellent professor," he shares, "and I owe an awful lot to him for what he taught me. Fluid Dynamics was an outstanding course, and he was an outstanding professor."

*(continued on page 2)*

# Dr. Sandy Thayer Passes Away



Dr. Sanford Thayer

The Department of Mechanical Engineering is saddened to announce that Dr. Sanford (Sandy) Thayer passed away on January 5, 2005, after a year-long struggle with cancer. He was a professor emeritus in our department, and he served our students with excellence from January 1966 until his retirement in 2001.

Sandy graduated from Stanford University with a B.S. in industrial engineering in 1955, an M.S. degree in 1957, and his Ph.D. in 1965. Before joining the ME department, Sandy worked with the Stanford Research Institute on international programs and on research for the U.S. military. At Colorado State, he taught classes and performed research in a wide variety of industrial engineering areas, including engineering economy, reliability, and quality control.

He was hired at Colorado State to start the industrial engineering component of our ME program. He was among the first of the College of Engineering faculty to teach on the Colorado SURGE program (Colorado State University Resources in Graduate Education, now called CSUN). The College of Engineering and the Division of Instructional Services at CSU instituted this program in 1967. He expended a major part of his efforts promoting and executing the Industrial Engineering program and later the Engineering Management program, not only for on-campus students, but for large numbers of off-campus, distance education students as well. During his tenure at the University, he served as the major professor for more than 100

M.S. and Ph.D. students, an outstanding accomplishment. Sandy was an excellent teacher known for holding high standards for his students.

He was respected for his sharp intellect, wit, and incisive insight in a wide variety of fields. He served on public boards dealing with engineering issues including the tramway board that oversees the safety of ski lifts in Colorado. One could always count on Sandy for a humorous story concerning an issue of the day. Even in the last weeks of his illness, he attended the traditional ME department holiday party, and his wit was in evidence. His students and his colleagues will miss him.

It was important to Sandy that more research on lymphoma cancer treatment be funded. Memorial contributions may be made to the University of Colorado Foundation at 225 East 16<sup>th</sup> Ave., Suite 690, Denver, CO, 80203. Please indicate on your check that the gift is in memory of Sanford Thayer for lymphoma research.

Class Notes will be featured in the next issue of *The Mechanical Engineer*.

## Alumni Spotlight (continued from page 1)

Mr. Anderson began working with Chrysler Corporation in 1946 as a graduate student in the Chrysler Institute of Engineering; he earned a master's degree in automotive engineering two years later. He held several engineering positions with Chrysler before joining Rockwell International Corporation in 1968 as a corporate vice president and president of the company's Commercial Products Group. He was named a corporate executive vice president in 1969 and elected president and chief operating officer in 1970. He served as Rockwell's chairman and chief executive officer before retiring in 1988. He is currently chairman emeritus.

## From the Department Head



Dr. Allan T. Kirkpatrick

Welcome to the Spring 2005 edition of the ME newsletter. The Senior Practicum students have finished their oral presentations and are getting ready for their Engineering Days public presentations on Friday, April 15. There are 20 student design groups that are wrapping up their senior projects. We have a wide variety of projects – not only airplane, human-powered vehicle, and formula car competitions, but also new projects with corporate support. Of note is a diesel emission project supported by the John Deere Corporation. I hope that many of our alumni remember their E-Days presentations. My first Engineering Days at Colorado State was in 1981, when we had our freshmen design teams build two-person vehicles that had to go as far as they could on ¼ cup of gasoline. One team figured out how to optimize operation on the engine power curve and were able to operate for an hour!

In this issue of the newsletter there is an article about our new motorsports laboratory. This laboratory supports not only the SAE Formula Car competition in the Senior Practicum but also a new graduate program in motorsports engineering. There is cutting-edge work going on in innovative suspension design, composites, and data acquisition at this laboratory.

Finally, I would like to inform you that two long-time ME professors, Fred Smith and Mike Histan, will be retiring this year. Their retirement receptions are noted in the calendar on page 4. Professor Fred Smith has been with the department for 40 years, since 1965, and was department head from 1973 to 1983. He has provided invaluable service to the department and has received many awards for his contributions to the engineering profession. Professor Michael Histan has been with the department 36 years, since 1969, was director of the University Honors program for a 10-year period, and has received many teaching awards during his career at the University. Both professors will be missed, and we wish them well.

Mr. Anderson also has served in leadership positions for numerous national and international organizations. In 1983, President Ronald Reagan named Mr. Anderson to the Presidential Commission on Industrial Competitiveness, a panel of 21 labor and academic leaders who were charged with improving the nation's ability to compete in the world marketplace. In 1966, Colorado State University conferred on Mr. Anderson an honorary Doctor of Law degree and named him the Honor Alumnus for the College of Engineering. In 1985, he received CSU's William E. Morgan Achievement Award.

As a financial supporter of

the Department of Mechanical Engineering and the College of Engineering, Mr. Anderson played an instrumental role in the establishment of the College of Engineering's Rockwell/Anderson Assistant Professorship and the Anderson Computer Lab. When asked to describe the motivation behind his generous contributions, Mr. Anderson stated, "It's really about a feeling that I owe something back to the institution that helped me get to where I am. It's very important that we give something back to the places from which we've taken something out, places that have meant so much to our lives."

Mr. Anderson currently resides in California.

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# Mechanical Engineering Professors Retire



Mike Histan, 2004

development for methods to relate hemodynamic changes with atherosclerosis and the invention of an esophageal probe for measuring cardiac output noninvasively. The ultrasound research was followed by biomechanical studies on bone healing with Erick Eggar of Colorado State's Veterinary Teaching Hospital using exteriorized skeletal fixation methods complemented by the development of courses in bioengineering, biomechanics, and bioinstrumentation. More recently, he developed a course in mechatronics in collaboration with Dave Alciatore that has culminated in the publication of a book, *Mechatronics and Measurement Systems*, now in its third edition. In the ME curriculum, he also developed Computer Methods for Mechanical Engineering and Advanced Mechanical Systems.

In 1976, he spent a year at Kyoto University working on a digital heart pump and giving lectures at Osaka Medical School. In 1985 and 1987, he established the flow cytometry laboratory at the University of Zurich Medical School and ETH with Rolf Zinkernagel, recipient of the 1997 Nobel Prize in Medicine. At that time, HIV was becoming prevalent and high-speed cell analysis was very important.

From 1990 until 1999, he was the director of the University Honors Program, a universitywide program offering honors classes and seminars to some of the best students at Colorado State. In addition, Mike has been the recipient of the Oliver P. Pennock Distinguished Service Award and has received numerous teaching awards in the College of Engineering.

Mike plans to continue revising *Mechatronics and Measurement Systems*, among time spent painting, maintaining his house on the Pacific Coast, and enjoying the company of his grown children, neighbors in California, playing golf, hybridizing iris, reading fiction, and walking Opus. One of Mike's greatest experiences has been the supportive, friendly, and nurturing environment of the Department of Mechanical Engineering at Colorado State University, particularly head professors Fred Smith and Byron Winn.

Please join us on April 29, 2005, at the Lory Student Center University Club, for Mike's retirement reception.

**Dr. Michael Histan** arrived at Colorado State University in fall 1969, accepting a joint appointment in mechanical engineering and physiology. He immediately went to work on a research program in bioengineering that culminated in an NSF grant for work on bloodflow in curved tubes. In association with C.W. Miller in physiology, he built a research program in hemodynamics at the Collaborative Health Research Lab over the next 15 years with the help of funding from NSF, HH, NASA, and the American Heart Association. This work led to the



Mike and daughter Kaia, 1971



Pondering new vistas post retirement



Fred Smith, 2004

vibrations, mechanics of materials, fracture mechanics, and continuum mechanics throughout that time. He served as head of the mechanical engineering department for 12 years, associate dean for research of the College of Engineering for 11 years, and interim dean of the college for two years. He has served as the major professor for 14 Ph.D. students and 36 master's students.

He has been involved as principal investigator or co-principal investigator on more than \$30 million in contracts and grants and has authored more than 100 research and other publications. From the mid-1980s through the mid-1990s, he cooperated with the Mechanical and Electrical Research Institute of the National Water Research Center, Government of Egypt, through the University's Egypt project. His recent contract and research activity has dealt with dynamic fracture simulation in complex nonlinear materials. He worked as a co-principle investigator on the NSF-sponsored Colorado Alliance for Minority Participation (COAMP) and recently has chaired the Women and Minorities in Engineering Advocacy Board.

He worked for the Boeing Company for six years in aerospace engineering and has undertaken numerous consultancies. He is a Life Fellow of the American Society of Mechanical Engineers (ASME), and a Centennial Medalist of both the ASME and the American Society for Engineering Education and has won numerous awards and recognitions for his research, teaching, and service.

Fred has been in transitional retirement for four years and says he has gotten used to not working full-time. In fact, he says, "I don't know how I had time to work before going into transitional retirement." He will continue to be active with his many personal interests that include skiing, playing jazz piano, flying radio-controlled model airplanes, fishing, and traveling with his wife, Shirley. They travel in their motor home and have taken a few group tours to places such as Peru and Africa, with the Indy 500 and the Sacramento Jazz Festival in between.



Fred playing jazz piano

After 39½ years as a faculty member of the Department of Mechanical Engineering, **Dr. Fred W. Smith, P.E.**, is retiring on May 20, 2005. The department is sponsoring a retirement reception for him that day from 3-5 p.m. at the Lory Student Center University Club, and you are invited to attend. Fred first came to Colorado State University on Christmas Eve 1965, after completing his Ph.D. at the University of Washington in Seattle.

At Colorado State, he has engaged in teaching and research in mechanical design, dynamics,



Fred Smith, 1969

As he approaches his retirement, Fred says, "I am very proud of the successes of the many students I have had the pleasure to work with over the years. My students are a reflection of my efforts through the years, and it is a great thing to look back upon as the work of my life. It is hard to think of a more rewarding way I could have spent my working career."

# Brothers Graduate in 1938, Return for Engineering Reunion

When Vance and Roy Vorhees attended the College of Engineering's 50+ Year Alumni Reunion in October 2004, it was the first time they had set foot on campus in many, many years. While numerous things in the area had changed during their absence, at least one thing remained the same: The College of Engineering at Colorado State University continues to hold a very special place in their hearts.

While students at Colorado State, Vance and Roy were both members of ASME, the Euclidian Club, Phi Kappa Phi, Kappa Kappa Psi, Sigma Tau, and Alpha Tau Omega. Roy was president of both ASME and the Euclidian Club and was selected as the Honor Engineer by the Colorado Engineering Council. Vance won the Rocky Mountain singles tennis championship as well as New Mexico's state tennis champion; he became Colorado's state collegiate tennis champion in 1938. At the same time, Roy was on the varsity basketball and tennis teams and won the tennis confer-

ence doubles championship.

The Vorhees brothers were also academic powerhouses in the College of Engineering: Roy was valedictorian of the 1938 graduating class, and Vance was named salutatorian of the same group. They both were named Pacemakers, the highest award available to graduating seniors. Roy shares, "Learning 'deep' subjects like calculus and thermodynamics while being exposed to lab subjects such as foundry and mechanical power were very rewarding to a 'green' student with little practical experience."

Both Vance and Roy had very successful careers. Vance held numerous leadership positions with Commonwealth Edison and Crane Packing and was the recipient of such honors as the National Award of the American Society of Lubrication Engineers. Roy began working for Chrysler Corporation in 1938, earning his M.S. in auto engineering from the Chrysler Institute of Engineering in 1940 and spending



Vance Vorhees, Allan Kirkpatrick, and Roy Vorhees

his entire career with this organization. He held positions ranging from chief liaison engineer to chief industrial engineer. He gained extensive management experience by running two manufacturing plants with a combined total of 6,000 employees. He also was responsible for planning and implementing the realignment, renovation, and expansion of Chrysler's Highland Park facilities to transform them into international headquarters.

For many years, the Vorhees brothers have impacted the educational experience of Colorado

State engineering students. Vance says, "After the death of my father, Roy W. Vorhees Sr., my mother wanted to set up a scholarship to aid engineering students." In 1988, the Vorhees Family Scholarship was established to fund students based on need and scholastic achievement. Roy notes, "I was very

fortunate to have such a variety of interesting, rewarding, and exciting jobs; fine friends; and a loving family who supported me all the way. Thank you, family and friends. Thank you, Chrysler. Thank you, Colorado State University."

Roy and his wife, the former Marjorie Fielder, were married in 1943. Roy resides in Grosse Pointe, Michigan.

Vance and his wife, Corinne, were married in 1939. Vance resides in Palatine, Illinois.

## ME Alumnus Strikes Balance with Law and Engineering



Lee Osman (B.S.M.E. '88) is an outstanding example of the many ways in which leadership and determination combined

with an engineering education from Colorado State University can open doors in unexpected places and lead to unparalleled professional successes.

Following graduation and two years of employment with Honeywell Inc. as a semiconductor process engineer, Mr. Osman realized that a law degree would allow him to build a career in Colorado while remaining involved in the field of technology.

In his current role as a patent attorney with Dorsey & Whitney, LLP, he relies on his mechanical engineering education every day. "I interpret technical drawings, back-check functionality, and analyze performance of new technologies. I am able to recognize when something does not make technical sense, and I help my clients improve their

designs based on my fundamental understanding of the technology with which they are working. I understand what my clients are doing, communicate with their technical people, and interpret the technology through the written word and spoken language to an often less-technical business person."

Mr. Osman witnesses innovation on a daily basis. He notes, "I have clients that continue to make significant technical improvements in areas as seemingly straight forward as cam-pulley arrangements, four-bar linkages, vehicle suspensions, shower heads, and luggage." He finds that such projects are even more rewarding because he regularly crosses paths with Colorado State engineering alumni. "Many of my clients who drive technical innovation along the Front Range are CSU graduates. I enjoy catching up on their lives, what professors we shared, our fond memories of CSU, and where they are headed in their careers."

He credits the mechanical engineering Senior Design Practi-

cum for playing an instrumental role in his education, stating, "My team experiences at CSU were critical in learning how to assign tasks to the right person on the team, how to follow a leader, how to be a leader, and how to motivate people to get results. I credit my career success in part to CSU's training, as well as to a wonderfully supportive firm culture, talented local and national firm colleagues, and my wife."

Mr. Osman feels strongly about contributing to the College. "CSU engineering alumni are collectively fortunate to have had the opportunity to graduate from this university, and specifically from the College of Engineering. For the benefit of our successors, we have an obligation to help this organization thrive, just as our predecessors did for us. I thoroughly enjoyed my experience at CSU and in the College of Engineering. I want to give back, and while contributions at all levels are effective, I foresee the level of my support growing. The ability to focus my support is what interested me to start supporting the college regularly."

### Student Competitions:

- 4/22-24 SAE Aero Design West Fort Worth, Texas
- 4/29-5/1 Human Powered Vehicle Fresno, California
- 5/7-10 U.S. Open RoboCup Rescue Robot League Atlanta, Georgia
- 5/18-22 Formula SAE Race Car Pontiac, Michigan
- 7/13-19 World Open RoboCup Rescue Robot League Osaka, Japan

### ME/COE Events:

- 4/15 E-Days and ME Senior Design Practicum Project Demos
- 4/15 MEAP Board Meeting LSC Virginia Dale Room
- 4/16 Alumni Awards Dinner & Dance, LSC Ballroom
- 4/28 Scholarship Recognition Luncheon, LSC West Ballroom
- 4/29 Michael B. Histan Retirement Reception, 3-5 p.m., LSC Univ. Club
- 5/14 Undergraduate Commencement LSC Ballroom
- 5/20 Fred W. Smith Retirement Reception, 3-5 p.m., LSC Univ. Club