



spring 1999

volume 2, no. 1

## Lockheed Martin welcomes ME interns

This past summer three of our women students, Cindy Christiansen, Ali D'Ambrosia, and Kerrie Thompson, were selected to intern at Lockheed Martin in Denver where they were immersed in real world production and test engineering. The Lockheed Martin personnel got the threesome going and working just as hard as every other engineer soon after their arrival.

Not only were they able to do the same things as the engineers with whom they were working, but they wrote plans that the mechanics actually used. In fact, Ali commented that the engineers seemed amazed at the capabilities of their young interns.



Cindy Christiansen, Ali D'Ambrosia, Kerrie Thompson (front row, second, third, fourth from right). Lockheed currently employs approximately 75 ME graduates.

Although working at the same place, the women did not have the same assignments. Cindy worked on production-planning for the Atlas III. Her job was to go through the testing process of the RD-180 engines to see if all of the steps were actually needed. Her goal was to ensure safety, but meanwhile lower the production time and costs. Kerrie and Ali worked together on a project. While Cindy was trying to improve the testing process, Ali and Kerrie were doing the actual testing. When the rockets were produced, they were asked to find the reason and location of leaks. They then formulated plans to reduce the amount of leaks.

Each of the women were impacted in different ways by their experience even though their encounter was essentially the same. Cindy felt that her knowledge of aerospace engineering was greatly enhanced by her work at Lockheed. The employees broke down everything for her, thus making it easier to learn. And learn she did. Even reading a blueprint became simple.

This was particularly a dream come true for Ali. She came to Colorado State for ME because of its proximity to Lockheed. Her intention had always been to go into Aerospace Engineering and she felt it was "amazing" being with the rockets. Her excitement level elevated when she worked with circuitry and discovered that

through her education, she actually understood it!

Kerrie felt right in her element. Working with the test engineers, she dealt with two things she loves: hardware and people. Collaborating with a team of people on a project seems to be her niche. Kerrie gained her team experience working on the ME Senior Design Course – The Walking Machine.

*"Students get a chance to learn what being an engineer is like and our company benefits not only from their enthusiasm and eagerness to gain new experiences and knowledge, but also from the new tools and ideas they had acquired through their classes and activities at CSU which they used to produce viable technical output."*

Joe Marcus,  
Vice President,  
Lockheed Martin,  
Colorado State University,  
ME, 1961

## Bently Nevada makes a gift

*"We made this gift to the Mechanical Engineering Department at Colorado State University in recognition of the quality of their engineering program and their commitment to hands-on educational experiences for undergraduate students."*

– Donald E. Bently  
Chairman of the Board and CEO  
Bently Nevada Corporation

In the Fall of 1998, Bently Nevada, a corporation known for making top-of-the-line rotating machinery monitoring equipment, provided a gift worth \$100,000 to the Mechanical Engineering Department for use in our Advanced Dynamics Laboratory. This laboratory is an integral part of the



Bryan Willson, Don Bently, Agnes Muszynska, Research Manager

course known to many as ME 324, Dynamics of Machinery. This course and its accompanying laboratory are taught by Dr. Bryan Willson. Bently Nevada provided a gift of four of their Rotor Dynamics Demonstration Systems, "Rotor Kits," which they use for research and training and sell as a

(continued on page 2)

They all agreed that this was a very worthwhile adventure. In fact, this past summer helped Cindy decide to attend graduate school; Ali would like to go back to Lockheed next summer; and Kerrie knows now that she needs to work in this people-type of setting. Internships are supposed to be educational, fun, and interesting. From what it sounds like, this one far surpassed the criteria and expectations of its interns. ■

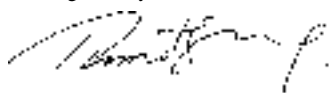
# From the department head

Let me begin by extending a heartfelt thanks to Dr. Fred Smith, for working so diligently to produce this newsletter which has enabled us to reach you this way. The inaugural issue, which was published in the spring of last year, has generated much response from our alumni and friends. We have received many compliments regarding the quality of the newsletter and encouragement to sustain continued publication. I was particularly gratified to hear from many of our alumni with whom we had not been in contact for a long time. You can find news about some of them in the "Class Notes" column. If you are an alum, please fill out the "Send us your Class Notes" form or drop us a note. We would like to know how you are doing and help you keep in touch with the Colorado State mechanical engineering family.

To update you about the Engineering Building renovation, the first phase of the construction is finally complete. Since October of last year, the department has been relocated into the renovated A-wing of the Engineering Building. For the first time in a long while, the entire ME faculty, the teaching assistants, and some of the research assistants are situated in the same general area. We even have office space for student societies such as Pi Tau Sigma and the student chapter of the American Society of Mechanical Engineers. The environment is much more conducive to faculty and student interaction than what we had before. We are in the midst of getting our undergraduate teaching laboratories fully func-

tional again. Major donations such as the equipment from Bently Nevada (see related article) for the Advanced Dynamics Laboratory are enabling us to transform our laboratories to state-of-the-art facilities. Further, Dr. Patrick Fitzhorn has been instrumental in securing a \$2.52 million-grant from Hewlett-Packard to help equip the College of Engineering with cutting-edge electronic communication and computing capability (see related article). In a matter of months, when the entire building renovation is complete, the learning environment will be unsurpassed. I invite you to visit us and share the excitement. I would be most pleased to give you a personal tour of our new facility.

In addition, I extend a gracious invitation to you to attend our 1999 Homecoming in October. We will have special recognition of all our graduates from 1974 and before on October 1. Please join us. For more information or if you have any comments or questions, please feel free to call me at (970) 491-6559 or contact me through e-mail at tong@ engr.colostate.edu. I hope you enjoy reading this issue of our newsletter. I look forward to hearing from you.



Timothy W. Tong



## Bently Nevada gift (continued from page 1)

research / training tool.

These kits include a shaft with reconfigurable rotors and bearings which can simulate the dynamic behavior found in rotating equipment such as steam and gas turbines, centrifugal pumps and compressors, and electrical generators. The kits can simulate machine malfunctions like imbalance, misalignment, fluid and gas instabilities, rub mechanisms, and cracked shafts. The kits provide the opportunity for the students to observe rotating systems with multiple "critical" speeds. These critical speeds can cause dangerous resonant vibrations that can seriously damage machines. The rotor kits can also be used in effective research for things like perturbation and control bearing testing. Perturbation testing is used to determine rotor dynamic parameters like spring stiffness, rotor inertial mass, and damping. These parameters can then be used to calibrate computerized rotor models. Control bearings replace magnetic bearings which have proven unsuccessful in most all applications. The rotor kits can be outfitted with control bearings where the student can produce a system that controls the rotor vibration and position, using hydrodynamic and hydrostatic forces within the bearing clearance. The rotor kits provide an excellent hands-on learning environment.

Bently Nevada builds machine monitoring systems which measure the vibrations of rotating machines and then process this information with "intelligent" software to detect potential problems.

The Rotor Kits we received include all of the sensors, signal processing equipment and software necessary to perform sophisticated experiments. This will provide an excellent opportunity to provide our students with hands-on experience in this important area of Mechanical Engineering. The equipment will be used initially in ME 324, but will also be available for use in more advanced courses and research.

Bently Nevada is a global company with over \$170 Million per year in sales. Their mission is to "Help You to Protect and Manage All of Your Machinery". The founder and CEO of the company is Mr. Don Bently. In addition to his corporate duties, Mr. Bently is an accomplished and recognized researcher in the area of rotordynamics. Last summer Bryan and Don Wright, one of his graduate students, attended a short course at Bently Nevada headquarters in Minden, Nevada in order to strengthen their knowledge of rotordynamics. Mr. Bently personally taught part of the course and he and Bryan became acquainted. Mr. Bently's interest in engineering education and the teaching of rotordynamics led to his decision to make this donation to CSU. Other Bently employees instrumental in this gift were regional representative Charlie Bouley and Service/Training manager Rett Jesse.

We are very pleased to have received this gift from Bently Nevada and are excited about the opportunities the equipment will provide for our next generation of ME students.

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## Send us your Class Notes

The ME department wants you to stay in touch and will publish your notes in a timely manner.

Name \_\_\_\_\_ Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Home Phone \_\_\_\_\_  
Year of Graduation \_\_\_\_\_ Degree \_\_\_\_\_  
Employer \_\_\_\_\_ E-mail address \_\_\_\_\_  
Information \_\_\_\_\_

(attach another page, if needed)

Send news about yourself to:

Fred W. Smith, P.E., Mechanical Engineering, Colorado State University, Fort Collins, CO 80523-1374. E-mail: fred@engr.colostate.edu

## News from student organizations

As in past years, the student organizations of the ME Department are busy. The American Society of Mechanical Engineers (ASME) student section operates in cooperation with American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) and Society of Automotive Engineers (SAE) at the present time. ASME holds meetings each week during the semester alternating between officer meetings and meetings for the members at which industry presenters talk about the realities of Mechanical Engineering practice and job opportunities. The officers of ASHRAE and SAE operate collaboratively with the ASME officers on a regular basis. ASME hosted the Regional Student conference in Fort Collins last spring and this year they will participate in the conference which will be hosted by Arizona State University in Tempe, Arizona.

ASME, in collaboration with the Society of Women Engineers (SWE), prepared a proposal for the ASME Diversity Action Grant program and were awarded a grant



ASME Officers, 1998-99, left to right: Mike Holland, David Burns, Jason Stulp, Chad Lewis, Jeff Rau, Kimi Ceridon (chair), Jen Erickson, Kelly Shafer, Derek Weishaar, Cindy Christiansen, Dave Fitzgerald.

last month. The funds they received will be used to enhance the SWE sponsored Sled Design and Race project which is intended to increase the interest of elementary school girls in studying math, science, and engineering.

Pi Tau Sigma is the National Mechanical Engineering Honor Society. They held their initiation ceremonies during the fall semester adding 12 new members to the group. In addition, they are engaged in working with the ME De-

partment on procurement of books and learning resources for the Department's James Morrison Memorial Library.

Planning for the Order of the Engineer Ceremony is under way once again. After a hiatus of several years, the Ring Ceremony of the Order of the Engineers will be once again conducted just before graduation time in the spring of 1999. The student leadership of ASME and other student organizations has played a significant role in this outcome. ■

## Mike Thomsic – a career of service

Among the many cards, letters, and contacts we received in response to the first issue of the *Mechanical Engineer*, we heard from Mike Thomsic, a baccalaureate graduate of the ME Department in 1934. He is a delightful man with strong ties to Colorado State University, having completed a second baccalaureate degree in 1936 in Forest and Range Management. He and his late wife, Elizabeth had four children, a daughter and three sons, all of whom are CSU graduates as well. Mike began his professional career with some surveying work at Yellowstone National Park where he served as Chief of Party for a survey crew that conducted a vegetation survey in the park.

Shortly after completing his second degree, Mike began a long career with the U.S. Forest Service and later the Soil Conservation Service from which he retired in 1967 after ten years of service in Fort Collins. During the years of World War II he was involved in a

project to grow Guayule plants to produce raw rubber for the war effort. His work in the USFS and SCS dealt with water development, soil conservation, tree plantings, range reseeding, and many other areas dealing with soil and water conservation.

After his retirement in 1967, he began activities in international development work which he undertook through Colorado State with participation in a project in Nigeria based upon his many years of experience in soil conservation. That project was short-lived because of governmental instability in the country at the time and thus in 1968 Mike became involved in yet another international venture. He spent the next five years working in India on a USAID sponsored project that dealt with a one million acre irrigation project where again his expertise in soil conservation was brought to bear. After that project concluded, Mike was still not done and he later under-

took a two year project activity in Java where he served as a Watershed Management Engineer on a watershed project in excess of 800,000 acres.

Twice recognized by the CSU Alumni Association on the Golden Anniversaries of his two graduations, Mike lives now in Scottsbluff, Nebraska, and as a result of our newsletter made a special effort to contact the Department. Last fall I had the opportunity to speak with him by phone a couple of times and our Department Head, Tim Tong, had the opportunity to meet with him during the CSU homecoming festivities. Mike brought along a number of items to commemorate his career and he and Tim had a great meeting.

It was great to hear from Mike about his life and career of service to people all around the world and we hope he will stay in touch. ■

– F. W. Smith, P.E.

### Congrats to stellar students

Congratulations to our students who made a 4.0 GPA for Fall semester 1998!! Keep up the hard work!

David Bullen  
Melissa Davis  
Benjamin Fernandez  
Douglas Hopper  
Dana Hutchinson  
Douglas Jackson  
Eric Michael Johnson  
Dustin Laufer  
Amy Lyons  
James Masters  
Alison Kara Smith  
Eamon Sullivan  
Kerrie Thompson  
Chandler Vaughn  
Michael Weinheimer

# Finding the key to inexpensive solar cells

Solar Energy research has long played a significant role in our ME Department primarily in the areas of building energy systems in connection with the Solar Energy Applications Laboratory. Photovoltaics, direct energy conversion from solar radiation to electricity, has always been a part of the potential for application of solar energy, but the cost of solar cells is a major impediment to the development and use of photovoltaic energy conversion. However, several years ago, Dr. W. S. Sampath of the ME Faculty, began developing an exciting new concept for manufacturing solar cells which has the potential to drastically reducing their cost.

Would you believe a “High Throughput” process that can accept a moving flow of substrate material that passes from room air into a vacuum chamber for deposition of thin layers of solar cell material and then passes back to room air for packaging all on a continuous basis? Sounds difficult or impossible perhaps? Well, not so. Dr. Sampath, or Sampath as we all know him, with the help of his students and research associates have figured out how to do exactly that. They have recently demonstrated this technology by making cadmium telluride solar cells. Although these cells cannot boast the highest efficiencies, they are inexpensive to produce using this new manufacturing process.



*Kurt Barth, research associate, shows CH2M Hill V.P. Dan Arvizu how the apparatus works.*

The “High Throughput” manufacturing method was developed at the Engineering Research Center here by Sampath, and two Research Associates, Kurt Barth, and Robert Enzenroth. The heart of this innovation is indeed the proprietary air-to-vacuum-to-air (AVA). The system relies on tight tolerances and differential pumping in order to operate correctly.

While some vacuum chambers have to be shut down for up to several hours to pump the system, the AVA process provides continuous processing with no down-time for pumping.

Thus, the AVA results in added value through the percentage of useful operating time. The AVA will be productive 95 percent of the time compared to 17 percent for traditional batch operated vacuum processing systems. The AVA process also promises lower maintenance costs because of 1) a lower component count and 2) the process does not need to take place in an expensive clean room as is the case for other solar cell manufacturing processes.

Sampath has been with the ME Department for about 14 years now. He has developed a reputation as an extremely practical and enthusiastic researcher which in turn spills over into his classroom lectures.

His current research is supported by the National Science Foundations, the U.S. Department of Energy, the U.S. Environmental Protection Agency, and others.

– F.W. Smith, P.E.

The College of Engineering was awarded a Hewlett-Packard Recipient Enhanced Grant (REG) of \$2.52 million. **Dr. Patrick Fitzhorn** was the CSU REG Coordinator for the grant, which is for a state-of-the-art network for the College of Engineering with a gigabit per second backbone. The network consists of several HP servers containing over three and a half terabytes (one terabyte = 1,000 billion bytes), around 100 times the capacity we have currently. Also included in the grant are 50 Unix and NT Windows workstations, \$200,000 in instrumentation, and \$60,000 in peripherals. We should start receiving equipment next month! Thank you, Dr. Fitzhorn, et al. ■



*Human Powered Vehicle (HPV) Team, spring 1998*

# Announcements

**Dr. Pat Burns**, Professor of Mechanical Engineering, has taken the position as head of Academic and Computing Network Services. Congratulations!

**Drs. David Alciatore** and **Mike Histan** have released the *Introduction to Mechatronics and Systems*, published by McGraw Hill.

After two and a half years in the Department, **Peggy Brechtel** has retired. Prior to working in the ME Department, Peggy was in CE for six years. The College of Engineering bids her a fond farewell.

**Kai Lee Awaya** joined the ME staff.

A pat on the back goes to **Jack Zentner**, BSME '99. He received one of four Industrial Assessment Center's Undergraduate Student of the Year Awards from the Department of Energy. He was flown to Washington, D.C., in February where he was presented with the award.

The Engineering Education Board of the Society of Automotive Engineers has selected **Dr. Bryan Willson** to receive an SAE Faculty Advisor Award. Congratulations, Dr. Willson!

**Dr. Harry Edwards** has worked long and hard to bring pol-

lution prevention to Colorado. During National Pollution Prevention Week, September 21-27, 1998, Dr. Edwards was recognized for his achievement with an award and plaque from the Colorado Pollution Prevention Advisory Board, The Pollution Prevention Partnership, and Colorado Pollution Prevention Forum. Good work, Dr. Edwards! ■

*U.S. Department of Energy Assistant Secretary Dan W. Reicher (right) presents Industrial Assessment Center Student of the Year Award to Jack M. Zentner (left).*



## Class Notes

In our last issue, we asked that you contact us and let us know what you are doing and where you are. We were very pleased to receive a significant number of responses and in the following we have summarized some of them. There were too many responses to include them all. Maybe this will help you keep up with some of your classmates.

**John J. Dolan**, BSME '51, retired from the Colorado Dept. of Highways in 1993 and retired from the National Park Service in 1993. He is living in Denver.

**James T. Hinricks**, BSME '51, lives in Louisville, Colorado, retired in 1994 from Ball Aerospace.

**William M. Richner**, BSME '51, is living in Isle, Minnesota. He retired after 31 years with Unisys Corp.

**Joe Marcus**, BSME '61, was recently promoted to Vice President of Production Operations for Lockheed Martin.



**Gus Plumb**, BSME '67, MSME '72, is a professor of Mechanical Engineering at Washington State University, Pullman, Washington.

**Ron Beethe**, BSME '69, MSME '71, is working in Albuquerque in the health physics and safety engineering area.

**Scott Boyd**, BSME '76, is living in Twin Lakes, Colorado. He worked for 17 years in helical and worm gear design, now owner of Mount Elbert Lodge.

**Chiharu Masaki**, MSME '76, is in Tokyo, Japan working as a director in a consulting service.

**Elliott Hough**, BSME '80 is in Norway working as a reservoir engineer for Phillips Petroleum.

**Debbie Ryon**, BSME '80, is living in Onancock, Virginia.

**Jean-Yves Gounaz**, MSME '81, is in Switzerland with Swiss Control as a project manager.

**Patricia Rhodes**, BSME '82, is at the Boeing Company serving as a program manager there. Thanks go to Patricia for her helpful comments concerning our Senior Design course.

She suggested that we broaden the participation in the course to include Business students, human resource people, and basic science students in order to prepare our students for managing people, money, schedules, products, suppliers, safety and technical design.

Congratulations to **Victor Walker**, BSME '83, who recently became Vice President of the Storage Server Business Unit at Groupe Bull, Paris, France. Groupe Bull has operations in France and Phoenix, Arizona, and engages in sales worldwide.



**Anthony C. Franzel**, BSME '85, is in Glendale, Arizona, with the U.S. Air Force as a Major, engaged in F-16 instruction.

**Alicia Bordon**, MSME '86, is in Paraguay working with the Peace Corps on programming and training.

**David Breitstein**, BSME '86, is living in Berthoud and is self-employed. He started his business in 1995.

**John D. Williams**, BSME '86, Ph.D. '91 and **Desiree D. (Kirchoff) Williams**, BSME '87, are living in Colorado Springs.

**Keith Williams**, BSME '86, works at VACCO Industries in South El Monte, California, as a Data Administrator.

Kudos to **Brett Anderson**, BSME '87, who received the Personal Service Award, presented by the College of Engineering Dean's Council Board of Directors to a non-employee of Colorado State University who has actively supported the College's program for at least five years. Brett is a member of the ME Advisory Panel (MEAP) and an associate partner of Andersen Consulting, where he is a recognized expert in the field of telecommunications.



**Samir Abdel-Rahman**, MSME '91, is still working in the Mechanical and Electrical Research Institute, Cairo, Egypt. He is also

presently working on a Ph.D. at Minoufia University near there.

**Mark L. Bibeault**, MSME '91, is working at Boeing in structures design engineering. In November 1997, a patent was issued to him entitled "self actuating mechanical joints" for space hardware applications. Congratulations, Mark!

**Constantinos Caroutas**, Ph.D. '92, is in Cyprus working with the Electricity Authority of Cyprus.

Now in Taiwan, **Dr. Ching-Yu Yang**, Ph.D. '92, is a Full Professor at the National Kaohsiung Institute of Technology in the Department of Mold and Die Engineering. It seems that he is making quite a name for himself as he was listed in the 1999 edition of *Who's Who in the World*.

**S. Jeanne McCreery**, BSME '92, is in Fort Collins, working at HP conducting R&D for integrated circuit processes.

**Steve Donnigan**, BSME '93, was working for Hewlett-Packard and has recently enrolled in the master's program at CSU.

**Nitish Behansan Joy**, BSME '95, is in Aurora, Colorado working with Gordon, Guneson and Associates Inc.

**Bih-Yaw Shin**, MSME '95, Ph.D. '97, is now Head of the Department of Management Information Systems at Yung-Ta College of Technology and Commerce in Pingtung, Taiwan.

**Tom Lambert**, MSME '97, is in Calgary, Alberta, Canada, self-employed as T. W. Lambert Consulting, Inc. ■

# Scholarship recipients

The following students have received scholarships for the 1998-99 school year. Congratulations on your exceptional achievements!

<b>Student</b>	<b>Scholarship</b>	<b>Student</b>	<b>Scholarship</b>
Scott R. Adams	Claude W. Wood	Douglas W. Jackson	Claude W. Wood
David A. Bullen	Engr. College Scholarships	Eric M. Johnson	Walter Scott Jr.
Troy A. Byerly	Colorado Scholars	Eric J. Lancaster	Ludlow
Christine L. Carroll	Claude W. Wood	Timothy R. McMahan	House
Kimi M. Ceridon	Boeing, Teledyne Water Pik	Matthew J. McQuarrie	MicroMotion
Jennifer R. Chambers	Colorado Scholars	Aaron G. Pankonin	Claude W. Wood
Melissa A. Davis	Dreher	Joshua N. Prater	Ival Goslin
Reid M. DeManche	Claude W. Wood	Jeffery J. Rau	Mock
Christopher A. Dragon	Walter Scott Jr.	Sean E. Sarmast	Ludlow
Casey C. Farnell	CO Contractors Assn.	Trevor J. Smith	Burns & McDonnell
Nicholas R. Fernandez	R. & B. Walker	Britney L. Sorenson	Claude W. Wood
Nathan M. Fox	Claude W. Wood	Michael W. Stewart	Claude W. Wood
Scott W. Gallagher	Walker Public Service	Ryan J. Stewart	Delano Scott
Andrew M. Harvey	Walter Scott Jr.	Kerrie A. Thompson	Claude W. Wood
Casey J. Hodges	Claude W. Wood	Naomi A. Tinker	Engr. College Scholarships
Dana M. Hutchinson	Claude W. Wood	Anthony R. Welter	Delano Scott

## Calendar of events

Engineering Careers Day	February 13, 1999
E-Days	April 23-24
SAE Walking Machine Competition - Montreal, Canada	April 29 - May 1
HPV Competition - Berkeley, CA	April 30 - May 2
ASME Roast and Toast	May 7
Graduate School Commencement - 3 p.m. Moby Gym	May 14
Commencement - 1 p.m. Equine Center	May 15
Formula SAE Race Car Competition Pontiac, MI	May 19-23
<b>Fall 1999</b>	
Dean's Council Board of Director's Meeting	October 1
Special Recognition Alumni Event for 1974 and earlier graduates	October 1
Homecoming Game vs. North Michigan State University Hughes Stadium	October 2
Engineering Exploration Day (tentative)	October 23



*Congratulations 1998-99 Scholarship Recipients!*

Visit the ME department at <http://www.engr.colostate.edu/depts/me>



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