Department of Mechanical Engineering-

NET PORTE UNIVERSITY

Fall 1999 Vol. 10, No. 1

Nurturing talent

ngineering is all about finding new approaches, yet one major resource remains largely unrecognized: Women engineers are still an uncommon sight.

Thanks to the Program for Women in Science and Engineering (PWSE) and enthusiastic instructors, such as ME Associate Professor Srinivas Garimella, young women are discovering the potential they have to become professional engineers.

Garimella was one of 11 Iowa State engineering professors who participated in PWSE's summer internship program, which includes high school and undergraduate women from around the country interested in engineering and science. His attitude may have inspired at least one more woman to enter the engineering field.

"I think there's nothing women lack in being able to do engineering," Garimella said. "It's just an artificial barrier. There's a lot to be gained by not excluding half of the world's population from engineering."

One member of that oft-neglected half was Liv Walter, a high school junior from California. She arrived for the six-week paid internship at Iowa State with only a vague idea about improving the environment. She left with a lot more than that, according to a letter her father sent to Garimella.

"Liv entered the program with a budding interest in engineering as a vocation," her father wrote. "Her summer experiences at ISU have reinforced that interest and given

continued on page 3

ME Associate Professor Srinivas Garimella, shown in his lab with an ISU student, spent part of the summer working with young women interested in engineering.

from the Chair

n the last issue of *MEUpdate*, I ended my column with the words "quality and change." Both remain constants. One of the major changes affecting the department is the completion of Howe Hall, west and a bit north of Black Engineering. Several ME faculty, staff, and graduate students associated with the Virtual Reality Applications Center (formerly the Iowa Center for Emerging Manufacturing Technology) have moved to Howe Hall – you'll read more about that later. Our co-tenants in Black Engineering for many years, Aerospace Engineering and Engineering Mechanics, have also moved to Howe Hall. The Department of Industrial and Manufacturing Systems Engineering will be our new neighbors in Black by the end of 1999. In this process, our two departments will try a noble experiment – sharing our manufacturing instructional labs.

Another change you will learn more about is in curriculum: the pilot offering of ME 270-Introduction to Mechanical Engineering Design. In our new curriculum this course and ME 231, the first thermodynamics course, are in the sophomore year. This is the first time in 20 years that a core course with an ME name has been in the sophomore year – a common trend in many great ME programs around the country. Faculty are working on labs that are an integrated part of fluids and heat transfer lectures, instead of the comprehensive ME 460 systems lab that many of you remember. Curriculum change draws on our resources, both time and finances, but it is important for delivering a quality program. And it helps us prepare for our ABET visit next fall. From the number of students selecting ISU-ME, an increase of 5% over last year to nearly 850, these changes and the job market make us the largest program in the College of Engineering. Graduate student enrollment is up a bit, thanks to the Distance MSME Program, where these students, principally from John Deere, make up about 10% of the graduate enrollment.

On the front page you read about Dr. Garimella's work with the Women in Science and Engineering's (WiSE) summer internship program. WSE made the inaugural award of the Laurel Ann Crowe Memorial Scholarship to sophomore ME student Elizabeth Schmerr – kudos to Elizabeth! But the ME connection continues. I had a chance to meet Mr. and Mrs. Crowe who established this award in memory of their daughter. While the reason for this memorial scholarship is sad, it really has a wonderful impact. I was very pleased to learn than Mr. Crowe is an ISU BSME'58. Another alumnus whom I meet quite often is Don Zweip, Emeritus Professor at Worchester Polytechnic. Many of you know Don as the past-president of the American Society of Mechanical Engineering. Another alumnus of distinction and an ASME Fellow is Dr. William Ward Copenhaver (PhD'88) of Propulsion Directorate at Wright-Patterson Air Force Base.

Before signing off, a couple items I wanted to let you know about: I'm pleased to report that Dr. Abhijit Chandra will be joining lowa State University as the first Engel Professor of Mechanical Systems just before the end of 1999. In our next issue, you will learn more about Dr. Chandra and his role in leading the department and serving as a mentor for students and young faculty alike. Another exciting piece of news is a gift from Bill (BSME'49) and Virginia Binger to establish the Binger Professorship for Tenure Track Faculty in Mechanical Engineering. This will give a young faculty member developing his or her career some extra resources to do all the things faculty at one of the largest ME programs in the country and a Research I University need to do. You'll get a chance to learn about the first Binger Professor soon, too.

Change is a given. I really hope you get a chance to come to Black to see it for yourself.

Warren R. De Unin

Talent.....continued from page 1

her a taste of college life that should be very valuable as she begins her college search this fall.

"I should add, by the way, that mechanical engineering is now near the top of her list in terms of specific career interests."

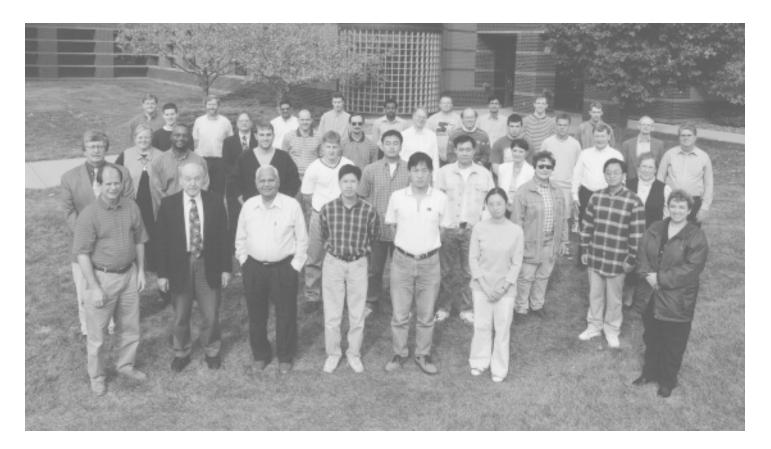
According to Garimella, recognizing future engineers is just a matter of paying attention.

"I don't think it's very difficult to see that potential," he said. "She was hard-working. The main thing that impressed me about her was that she was asking the right questions. The amount she was able to pick up in six weeks was quite impressive." Garimella advised Walter and an Iowa State chemical engineering undergraduate, Nicole Braden, as they delved into his research about efficient and environmentally safe air conditioning. They produced written reports and designed posters based on their work.

"I viewed it not as them solving my research problems but as me exposing them to engineering," Garimella said. "One of the reasons this was a positive experience for the students was because I could relate my work to everyday life. I'm working to improve air conditioning in cars, and when they see something common like that being helped by engineering, they get excited." The summer internship is just one of several programs offered by PWSE and Garimella believes it will help bring more women into the field.

"I think students will encourage other students," he said. "Liv came here without knowing much about ME and now she's very interested."

Liv concurred. Contacted by e-mail after she returned home to northern California, she had many positive things to say about engineering and the summer internship program. "Most of all, I learned that this (mechanical engineering) is something that I can do, something that I will find enjoyable."



Here we are! Several members of the mechanical engineering faculty and staff were on hand for this photo. Many of these faces will be familiar to you; there are some newcomers, however. For a complete listing of who's who, look for this photo and a detailed caption on our website. The address is: www.eng.iastate.edu/me. You'll also find other interesting information about our program, curriculum, and research on the web.

Graduates Honored

vonne Lund, MSME'87, PhDME'95, has received a prestigious 3M Technical Circle of Excellence Award. The award recognized her "determined and decisive leadership in the use of computer modeling and predictive engineering science to substantially accelerate the development and commercialization of a new family of bristle brush and radial bristle disc products."



Yvonne Lund

Lund was one of 20 employees honored; 270 were nominated. The award is one of the highest awards that a 3M technical employee can receive.

Lund began her career with 3M in St. Paul, Minnesota, in 1995 as a senior product development engineer. She is currently with 3M's electronic and mechanical systems laboratory. She also serves on the ME Industrial Advisory Council.

A recent mechanical engineering graduate was one of three recipients of a new leadership award.

John "Mark" Meacham, BSME'99, Columbus, Nebraska, received the Dean's Leadership Award, a new honor that recognizes outstanding leadership in major college-wide, university, community, or professional organizations.

John served on the Student Advisory Board, University Drive Association Senate, ISU Honors Mentor Program, and the American Cancer Society's 8-Hour Relay for Life. He was also a Solar Car team member, participated in Habitat for Humanity, and coordinated, organized, and directed an Eagle Service Project for the Boy Scouts of America. He was a member of numerous honor societies, including Tau Beta Pi.

Meacham received a plaque and a \$2,000 honorarium. 🚾

SWE receives five national awards



The Iowa State University Society of Women Engineers (SWE) walked away with five national awards at the recent 1999 National Convention and Student Conference in Phoenix, Arizona. The team won first place in the Boeing Team Tech Competition for a design project with Pella Windows in Pella, lowa, and also received first-place honors in the Student Corning Incentive Grant, which is awarded to the school with the number-one student outreach program in the nation.

The team received the Exxon Education Foundation Student Audio/Visual Award for its PowerPoint® presentation geared toward pre-college students that explains several engineering disciplines using the processes involved in making

Mechanical engineering student and SWE president Kim Tholen accepts an award from Engineering Dean James Melsa.

Your support makes a difference

Generous gifts from ISU ME alums, industry, and others enable our department to continue our tradition of academic excellence. Our ongoing success is linked closely to your contributions, which are used for the following:

- Scholarships and fellowships
- Start-up funds to attract top-notch new faculty
- Seed money for development of new projects
- Laboratory equipment

The Black-Hilstrom Mechanical Engineering Development Fund grew out of a fund started more than 30 years ago by Hollis "Pete" Hilstrom, ME'34. In 1980, Henry Black, department head from 1946 to 1972, joined with Hilstrom to invite other alumni to contribute to the fund. Since then, the endowment has grown to more than \$2 million with gifts from more than 475 alumni.

You can participate in the Black-Hilstrom Fund using the form included here. Or call us at (515) 294-1423 to learn about other ways you can support ISU ME.

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a can of soda pop. It received the Membership Program Award for its efforts in recruiting and retaining members and the Outstanding Outreach Program Certificate of Achievement for outstanding leadership in outreach efforts.

"The Iowa State University name definitely received a lot of attention that night," said Tricia Walker, a senior in engineering science who also serves as SWE's membership chair. "Coming away with five out of six national awards was a great honor. After such a successful conference, we are geared for another productive year." Cheryl Moller-Wong, an adjunct assistant professor of industrial and manufacturing systems engineering who serves as SWE's faculty advisor, said, "I'm very proud of the national recognition the Iowa State SWE section received. It's well deserved as the SWE students work very hard throughout the year to provide excellent programs and activities for its members, and the community as well."

Kim Tholen, a senior in mechanical engineering who serves as SWE president, said, "I feel that all of our SWE cabinet members helped to make this year such a success. We planned and created many programs that we thought would benefit our members, and it's nice to be recognized on the national level for all the hard work we did this past year."

Judy Vance, associate professor of mechanical engineering, serves on the national nominating committee for the group.

ME Department Dynamics

Francine Battaglia joins ME faculty

The newest member of the mechanical engineering faculty is Francine Battaglia, who came to Iowa State from the National Institute of Standards and Technology (NIST), Gaithersburg, M.D. At NIST, Battaglia worked in the Building and Fire Research Laboratory, applying her area of expertise in computational fluid dynamics (CFD) to study fire whirls, an example of a rare but catastrophic swirling fire that can arise during forest fires.

Battaglia earned her undergraduate degree at the State University of New York-Buffalo, where she



also received a master's degree in aerospace engineering. She has a Ph.D. in mechanical engineering from Pennsylvania State University.

A strong advocate of the experimental aspects of research, Battaglia hopes to use her background in CFD to develop links with industry and other

disciplines. For example, as a visiting scholar in the ME department at the University of Adelaide, Australia, Battaglia collaborated in an experimental/ computational study of a precessing jet burner used in large industrial kilns.

Battaglia was drawn to Iowa State by the balance in teaching and research that the ME department offers. A recipient of a GAANN (Research) Fellowship and numerous teaching appointments at Penn State, Battaglia looks forward to combining research with classroom instruction.

DeVries elected

Warren R. DeVries, professor and chair of mechanical engineering, has been elected to the American Society of Mechanical Engineer's Board of Governors.

The society serves the professional, technical, and educational interests of 125,000 professional and student members around the world. During his threeyear appointment, DeVries will work closely with the president, past-president, president-elect, and eight other at-large members of the board to provide strategic direction for all aspects of the society and establish management, financial, and legal policies necessary to govern ASME.

DeVries, an ASME Fellow, just completed a three-year term as senior vice president and chair of the society's Council on Engineering.

DeVries has chaired the ME department since 1996. Prior to that, he spent two years as a program director in the National Science Foundation's Division of Design, Manufacture, and Industrial Innovation. He was on the mechanical engineering faculty



at Rensselaer Polytechnic Institute from 1982 to 1996, and the University of Michigan from 1977 to 1982. He has co-authored numerous papers and two textbooks.

DeVries has taught graduate and undergraduate courses on manufacturing processes and systems, control and system identification, microcomputers, and mechatronics. He is a fellow and past president of the North American Manufacturing Research Institute of the Society of Manufacturing Engineers, a corresponding member of the International Institution for Production Engineering Research, and a member of the American Society for Engineering Education.

Oliver receives outstanding achievement award



James H. Oliver, associate professor of mechanical engineering, was recently selected as the 1999 Gustus L. Larson Memorial Award recipient. The award, given jointly by the American Society of Mechanical Engineers and the honorary society Pi Tau Sigma, honors engineering

graduates who have demonstrated outstanding achievements in mechanical engineering within 10 to 20 years following graduation.

Oliver, who joined the Iowa State faculty in 1991, received his B.S. (1979) from Union College in Schenectady, New York, and his M.S. (1981) and Ph.D. (1986) degrees from Michigan State University, all in mechanical engineering.

Since graduation, he has worked at Mechanical Technology Inc., Fluor Corp., and International TechneGroup Inc. Oliver taught as an assistant professor at State University of New York at Buffalo and has served as associate director of the Iowa State Virtual Reality Applications Center, formerly known as the Iowa Center for Emerging Manufacturing Technology. He specializes in the areas of geometric modeling, computer graphics, and synthetic environments and their applications to challenges in engineering design and manufacturing automation. He took part in Boeing's A.D. Welliver Faculty Summer Fellowship program in Seattle, Washington, and received the prestigious National Science Foundation's Young Investigator Award.

"The Gustus L. Larson award recognizes (Oliver) as a national leader, the best in the mechanical engineering profession," said Warren DeVries, professor and chair of lowa State's mechanical engineering department. "It's

"(Oliver) joins a distinguished list of past recipients. We are fortunate to have him as a faculty member." – ME Chair Warren DeVries

because of his excellent technical and educational contributions since receiving his bachelor's degree and that he has excelled at working with and in industry to develop imaginative solutions to important problems.

"(Oliver) joins a distinguished list of past recipients who have become vice presidents of major companies and deans and presidents at outstanding universities," he said. "We are fortunate to have him as a faculty member and leader in lowa State's Department of Mechanical Engineering."

Oliver is on temporary leave from the university to work at Engineering Animation Inc. in Ames.

Joensen retires

Alfred Joensen was witness to a myriad of changes during his 40-plus years at Iowa State. Some of the highlights from his lengthy career include the establishment of the Iowa State Center, the change from the quarter to semester system, the move to Black Engineering, and more profoundly the advent of the computer age.

According to Joensen, computers played a significant role in changing the ME curriculum to the current four-year system. A self-proclaimed "hardware systems person," Joensen reflects that computer technology significantly changed the lab facilities, making machine design easier and faster.



Joensen, who joined the faculty in 1958, will spend his retirement doing volunteer work at his church. A lifelong educator, he intends to focus on personal education during his golden years. In fact, he plans to "finally get a computer and learn how to operate it!"

CONGRATULATIONS to the class of 1999!



Members of the class of 1999 were honored at a pre-commencement reception held May 7th at Scheman, Iowa State Center. Many of the graduates and several of their family members and friends attended. The event was also attended by ME faculty and staff. The ceremony included a presentation by ME chair Warren DeVries. Graduates received a commemorative publication with a complete list of their classmates. The ME department hosts two commencement receptions annually. The event is always a highlight for students and their families. Here are the most recent members of the class of '99:

D. Allen

Ee-Wen Ang Christopher M. Avgenackis J. Travis Backlund Sameer G. Balagamwala Aaron L. Barfels* Joel D. Bartlett Keith A. Beckman* Scott C. Bents Thomas P. Brockhouse Paul J. Brocklehurst* Christopher T. Brovold Jeffrey J. Buchheit Yoong-Guan Chen John M. Chesterman David E. Chmura Ricky A. Chura Travis J. Crowell Patrick J. Cunningham* Sheryl L. Daake

Thomas Darwis Robert C. Davis Mark T. Delay Martin L. Denny Charles L. Depenning Matthew L. Dinslage Kevin M. Dixon Paul W. Duncan-Whiteman Michael P. Eldred Eric J. Ellison Jason D. Fife Benjamin J. Fister Daniel J. Galles Gary H. Gift* Joshua D. Graeve* Dennis M. Greene* Barry S. Grover Mark J. Hartman Christopher L. Hein Steve D. Helbing Phillip J. Irwin Gregory P. Kakert

Robert N. Kibbe Nathan M. Kinkaid* Nathan D. Kloock Tamara A. Kuiken Kean-Seng Lee Patrick E. Leer Peter G. Loutzenhiser **Eng-Han Low** Adam M. Marxen Matthew A. Mauritzson Mark D. McClellan Kirk S. Menges Tony R. Metzger* Brad A. Meyer Timothy J. Mull Brian J. Murphy Peter R. Nedved Avery R. Nelson Mike J. Ogbourne* Megan C. O'Leary Bradley D. Padget

Jeffrey J. Patry* Scott R. Petersen Todd A. Reinders Paul W. Rieck Darin M. Rosenboom* Michael J. Sall Christopher G. Seberg Trenity S. Simpson* Scott J. Spick Jonathan D. Spooner Scott A. Sporrer Brian L. Swanson Kok-Khai Tan* Swe-Kuang Tan Jason J. Tebbe Christopher M. Thompson Matthew J. Wells Jason L. Werning Tanya L. Wright* Haniel Yuwono

*with distinction

An early taste of ME

raditionally, the path of an ME major winds through two years of general engineering coursework. Then the fun begins.

In Mark Bryden's ME 270 class, the fun begins for sophomores, who encounter everything from gummy candies to camp stoves during their introduction to mechanical engineering.



ME students David Cook and Holly Elbert get an introduction to the physics of camp stoves in a new ME course for sophomores.

The experimental course, which will be expanded to four sections in the spring, is intended to give students a taste of ME a year earlier than usual. Bryden, an assistant professor with strong industrial experience and a quick sense of humor, serves up material meant to challenge and instruct budding engineers.

"This class teaches them what ME is about, so when they get to their other classes they have a basis on which to start," Bryden said. "Engineering education is changing a lot. It had gotten away from practical skills and now is getting back to them."

On a typical Wednesday, the students gather in a classroom at 8 a.m. so that

Bryden can take roll and set the agenda for the next two hours. He will meet with teams of students for 30 minutes at a time while the others work in the machine shop, conduct research in the biomass lab, or study in the classroom.

"We have one lecture and three labs per week," Bryden said. "That gives students an opportunity to manage their time."

As expected, time-management issues are a popular topic in the team meetings. The students have been assigned to investigate the engineering of gummy candies and the physics of camp stoves, and they must also manufacture tools in the machine shop. During the meeting, teams present written updates to Bryden.

"I try to keep enough assignments in front of them to keep them from wasting time," he said. "If they start to fall behind or drift in late to class, I tell them that when they are professionals they'll need to show up to work on time."

Bryden takes advantage of the meetings to stress practical issues while teaching engineering fundamentals. When a student says he is already "strapped for time," Bryden offers a week's grace period for the gummy project, but points out that "what you don't do now you've got to do later."

Other students are concerned about generating calculations for the camp stove assignment. Bryden tells them to focus on fundamental concepts, using anecdotes from his days as a manager at Westinghouse to give his stories industrial relevance.

"This is different than the recipe you were given in high school," he explains to them. "There you were given equations to solve. Here you can't solve the equations until you know what's going on." He tells them to think about combustion, vaporization, and heat and mass transfer. The calculations will come later. "Ask lots of questions and investigate," he advises. "Avoid jumping on the first solution that comes to you."

Students appreciate the opportunity for hands-on work.

"It's a great time and so far it's been a lot of fun," said Elizabeth Schmerr. "In my other classes we talk and see examples, but here professor Bryden says, 'Hey, go do it yourself.' "

That's just the attitude ME 270 aims for as it develops successful students and lays the groundwork for successful careers.

Recent gifts help fund C6

he college has recently received two industrial gifts totaling \$600,000 for the construction of C6, Iowa State's next generation of virtual reality technology.

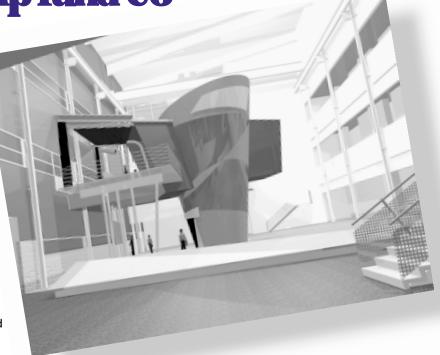
The John Deere Foundation recently contributed \$500,000, and the Procter & Gamble Company gave a second gift of \$100,000. These gifts follow a grant from the National Science Foundation for \$545,000.

The C6 is a room that will be designed to enable interactions between engineers and computer simulations. Users will be completely surrounded with three-dimensional audio and real-time images on all four walls, the ceiling, and the floor. It will be located in the center of a four-story open atrium in Howe Hall.

Judy Vance, associate professor of mechanical engineering, has worked on several research projects for Procter & Gamble using C2. She said, "When my P&G sponsors learned about C6, they wanted to help out. They see virtual reality as being a very integral part of the company's future."

Procter & Gamble Technology Leader Joseph Kitching said, "This technology has provided us with new insights into the results from our computeraided engineering analyses. The C6 will be a premier facility in the country and we look forward to continued visualization efforts and the possibilities that arise from being totally surrounded by stereo images of our data sets in the C6."

"At VRAC, it's very important to conduct research that's applicable to industry. These gifts are good indications that we're headed in the right direction. It shows that two industrial leaders support our efforts, and hopefully others in industry will as well," said



Jim Bernard, mechanical engineering professor and director of the Virtual Realty Applications Center (VRAC), formerly the Iowa Center for Emerging Manufacturing Technology (ICEMT).

He said, "We are grateful for the support shown by these gifts and look forward to a continuing relationship with these companies as we use VR technology to meet the challenges of the future."

VRAC researchers create synthetic environments where other engineers and scientists use virtual reality techniques to improve the design and manufacture of products ranging from pharmaceuticals to tractors. One of VRAC's many research projects is led by Vance, who is developing techniques that use virtual reality to visualize fluid dynamic results and perform virtual design evaluations on digital product models.

Nearly \$1 million has been donated to the C6 project. The project is scheduled for completion in 2000. When finished, it will be the only facility of its kind in the world.

ME prepares for ABET review

To create excellence, the Department of Mechanical Engineering focuses on goals and objectives. To maintain excellence, however, the department periodically undergoes an intensive, voluntary review process called ABET or an evaluation through the Accreditation Board for Engineering and Technology.

Established in 1932, ABET accredits about 2,300 engineering, engineering technology, and engineering-related educational programs at more than 500 colleges and universities in the U.S. This nationwide, non-governmental peer review process, which also ensures educational quality, determines if graduates are adequately prepared to enter the profession. By the same token, many state registration and certification boards regard ABET-accredited programs as a strong basis for screening applicants into professional practice.

What does ABET approval mean for the ME department? According to Don Flugrad, associate professor of mechanical engineering and associate chair of ME's ABET effort, "We would not be taken seriously as a quality ME program without accreditation."

Flugrad added that over the past two to three years, the ME department has been actively engaged in revising its curriculum, establishing objectives, and setting up assessment methods to address a major shift in ABET accreditation philosophy to an outcomes approach: what students learn versus what is taught.

The department will submit a self-study document or internal evaluation of students, curriculum, faculty, administration, facilities, and institutional support to ABET by July 1, 2000. Evaluators will visit campus next October.

From the ME photo archives: Taken in 1916, this photo shows an engine on a test dynamometer. Train engines and the technology to test them have certainly progressed in 60 years! ABET evaluators include representatives from the American Society of Mechanical Engineers (AMSE) and members from academe, government, and industry. During the on-campus visit, they will assess the self-study document; review course material, student projects, and sample assignments; and interview students, faculty, and administrators to ensure criteria are met. A final report identifying strengths and weaknesses along with recommendations for improvement will be sent to the department. Programs either receive accreditation or are denied, but they are not ranked. The ME department has been accredited for many years and although continued accreditation is never taken for granted, Flugrad is confident that ABET will be sufficiently impressed with Iowa State's ME program to give its stamp of approval.





In this issue:

- 1 Nurturing talent
- 2 Notes from the Chair
- **4** SWE receives 5 national awards
- **6** Department Dynamics
- 8 The class of 1999
- **9** An early taste of ME
- Recent gifts help fund C6
- **11** ME prepares for ABET review

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Eide honored for outstanding contributions to education

he American Society for Engineering Education's board of directors recently selected Iowa State's Mechanical Engineering Professor Arvid Eide as a Fellow of the society.

Ernest T. Smerdon, ASEE president, said the society was honoring Eide for his outstanding contributions. "This grade of membership is awarded to individuals with extraordinary qualifications and experience in engineering education who have made particularly important contributions to the field," he said.

Eide, who started with Iowa State as an instructor in 1964, worked all the way up the academic ladder serving as the college's Associate Dean for Instruction and Student Affairs. He currently teaches mechanical engineering and his educational research interests include using computer and communication technology as a way to enhance engineering education and developing better methods of providing quality engineering education for the distance learner.

Eide, who received bachelor's and master's degrees in mechanical engineering and a doctoral degree in higher education and engineering, all from Iowa State, served in many capacities with the ASEE. He was on the board of directors for three years, a zone chair, and chair for various other programs for nearly 10 years. Eide also received several other honors from the society, including the prestigious Centennial Medallion.



"This grade of membership is awarded to individuals with extraordinary qualifications and experience in engineering education who have made particularly important contributions to the field."

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