Innovative Engineering Research Leads to Seven IEEE Fellows

The Jacobs School of Engineering has developed extraordinary programs in telecommunications, microelectronics, networking and software engineering — disciplines that are key to today's technology industries. The collective strength of these programs was evidenced recently when seven faculty members from the School were elected Fellows of the Institute of Electrical and Electronics Engineering (IEEE) for the class of 2000. This was by far the largest number of faculty receiving this prestigious honor from any university in the world.

Electrical and Computer Engineering (ECE) Professors Peter Asbeck, Larry Larson, Bhaskar Rao, and Kenneth Zeger; and Computer Science and Engineering (CSE) Professors Walter Burkhard, Larry Carter, and Chung-Kuan Cheng have been named IEEE Fellows. Only 248 IEEE members from corporations, universities and government laboratories across the globe were honored this year.

Broadband Wireless Meets the Internet

Asbeck, Larson, Rao, and Zeger are all members of the School’s Center for Wireless Communications (CWC). The CWC was established in 1995 as a cross-disciplinary program of pre-competitive research and education supported by industry funding and participation. The Center’s 13 industrial participants represent some of the biggest names in wireless communications today.

The CWC has a variety of research programs unified by the vision of broadband wireless access to the Internet. According to a recent article by Professor Anthony Acampora, founding director of the CWC, in the October 1999 edition of IEEE Personal Communications, wireless access to the Internet will accommodate society’s growing demand to become mobile. At the same time, it will solve some of the current limitations preventing Internet users from reaping the full benefits of multimedia access. While Digital Subscriber Lines and cable services are beginning to provide relatively high bandwidth access to the Internet, only 40-60 percent of American homes are candidates for these services. And the situation is worse in underdeveloped countries. In contrast, broadband wireless Internet access using terrestrial and satellite channels is much less restrictive and can provide remote, cost-effective access to users throughout the world. Wireless devices need not be limited to telephones and PCs, but also might include sensors and personal appliances, video-on-demand programming, multi-location videoconferencing, and electronic books that can go anywhere.

The CWC, with 14 faculty members, has arguably the best communications minds in the world. A significant portion of the work of the CWC is supported by industry funding and participation. The Center’s 13 industrial participants represent some of the biggest names in wireless communications today.

To learn more about the CWC or to see a list of current members, visit the Center’s website at http://cwc.ece.ucsd.edu.

See IEEE Fellows page 6
**Deans’ Column**

**Student Enrollment Reaches All-Time High**

AS WE ENTER THE NEW MILLENNIUM, California’s economy is riding high, thanks in large part to successes in the high technology area. Nearly every industry sector has a demand for highly trained engineers, so young people are increasingly choosing to pursue engineering careers.

This fall, the Jacobs School enrolled more students than ever before, continuing a steady growth in our student body. We’d like to share with you some significant highlights about our students and our education programs.

**Graduate Students and Education**

Fall enrollment in our doctorate and masters degree programs increased by 14 percent over last year. With 697 students, engineering now represents 30 percent of UC San Diego’s graduate student body.

We had more than 3,000 applicants, which is a testament to the outstanding international reputation the Jacobs School now enjoys. Because interest was so high, we raised the bar in terms of selectivity, and we were able to admit only 20 percent of the applicants. Our students represent the most promising engineers in the nation. The average quantitative GRE score for our entering students is 755, which places our graduate student body among the top 10 at research universities across the country.

Interest was intense and enrollment grew in all engineering majors, with the largest number of students enrolled in our Electrical and Computer Engineering (ECE) Department. ECE accepted this fall into the innovative biotechnology degree program.

In parallel with our emphasis on academic quality, the School has embarked on a major effort to increase opportunities for students to enhance their professional skills. We currently sponsor 16 student organizations, encourage summer internships, and organize student outreach to K-8 classrooms. Last year, nearly 90 engineering students traveled weekly to local schools, and more than 1,000 K-8 students have benefited from this program since its inception four years ago.

We are also working hard to identify and eliminate sources of fruitless student anxiety. For example, this year we expanded the Engineering Student Services (ESS) program to give students a place to go for referrals to appropriate campus and school resources. To ensure students could easily find a place to go for help, we relocated the ESS office to a highly visible “storefront” location on the first floor of Engineering Building I.

The Jacobs School is attracting more men and women than ever before, and our diverse student body represents the best of the best. Our challenge and mission remains to provide our students with both engineering fundamentals and with the skills they will need to become leaders in the ever-changing global economy.

**Undergraduate Students and Education**

As planned, our undergraduate enrollment grew by 5 percent. With 3,136 students, UC San Diego now has more engineering undergraduates enrolled than any other campus in the UC system. Nearly one-third of our undergraduate students are pursuing majors in the Computer Science and Engineering Department.

We continue to work diligently at modernizing the undergraduate curricula. An important development this year was the formation of two new departments—Mechanical and Aerospace Engineering (MAE), and Structural Engineering. Historically, these programs were part of the AMES department which no longer exists. As a result, Structural Engineering introduced an enhanced curriculum with freshman engineering and more design courses throughout the four years. Within MAE, chemical engineering was elevated to program status. MAE and Structural Engineering now jointly offer the aerospace engineering degree. In the Department of Bioengineering, the first students were accepted this fall into the innovative biotechnology degree program.

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**By Association**
Enrique Luco and Anthony Sebold
What is the Department of Mechanical and Aerospace Engineering? It is a large interdisciplinary engineering department covering mechanical engineering, aerospace engineering, materials engineering, as well as chemical engineering. Research activities are centered around four major areas: (1) applied mechanics, solid mechanics and materials science; (2) dynamic systems and control; (3) combustion, fluid mechanics, geophysical physical and environmental flows; and (4) plasma physics.

Of the four major research categories mentioned, which is the department’s highest priority in terms of development? Applied mechanics, solid mechanics, and materials science, all of which are integrated into a multidisciplinary research and education program. Historically, MAE has had very strong activity in the general area of mechanics of materials. Our Center for Excellence in Advanced Materials (CEAM) has been and is one of the best in the country. During my tenure as Chair of MAE, I intend to further strengthen the “mechanics of materials” research area and make the materials engineering program one of the true centerpieces of the campus-wide material sciences activity.

The Dynamic Systems and Control Program has become a key strength of the department. How would you describe this program? Basically, it integrates system design, modeling, and control disciplines to obtain improved performance of the dynamic response of an engineering system using feedback control. My goal is to create a synergy between this program, the mechanics of materials, and fluid mechanics programs to foster initiatives such as the development of MEMS and smart materials, and tackle basic engineering milestones such as the “control of combustion instabilities” and the “transition from laminar to turbulence flows”.

What is the focus in the area of combustion, fluid mechanics, geophysical and environmental flows? Research in this critical area encompasses a broad spectrum of problems in aerodynamics, geophysical flows, turbulence, reacting flows, biological flows, multi-phase and particulate flow hydrodynamics. My goal is to expand the involvement in geophysical and environmental flows research, increasing the activity already initiated after the hiring of three new faculty members, by creating stronger ties with the geophysical fluid mechanics group and the Center for Coastal Studies at Scripps Institution of Oceanography.

Finally, what are your goals for the MAE department with regards to its educational commitments? To complete the restructuring of the undergraduate and graduate teaching programs in MAE, to not only address the new ABET 2000 accreditation requirements, but more importantly, to streamline the curricula to better address the changing professional needs of our graduates, and to better serve the industrial and technological development in the San Diego area.

Penner Lecture Series
The Mechanical and Aerospace Engineering Department has established the S.S. Penner Distinguished Lecture series in the Aerospace and Mechanical Engineering Sciences to honor Professor S.S. Penner, Founding Chair of Aerospace and Mechanical Engineering Sciences (AMES).

William Nix, Lee Otterson Professor of Materials Science and Engineering at Stanford University, will give the spring lecture April 7 at 4 p.m. in the UC San Diego Faculty Club. Nix’s research interests include mechanical properties of interconnect thin films and modeling the processes that lead to failure in these structures. Contact Norma Showalter at (858) 534-0113.

Research Review 2000
February 25

- Technical Break-Out Sessions
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Register on the web at
www.soe.ucsd.edu/events/

Portions of Research Review 2000 will be webcast as part of the UCTVonline project. Visit http://uctvonline.org

FOR MORE INFORMATION CONTACT:
Kelly Briggs (858) 534-2329
According to the U.S. Department of Transportation, urban traffic congestion costs the nation and its motorists over $100 billion per year in lost productivity, wasted fuel and pollution as stress, anxiety and inefficiency plague the veins connecting our cities and communities. Costs are highest in California where the California Department of Transportation (Caltrans) reports that freeway congestion costs the City of Los Angeles alone over $10 billion annually. And the number of freeway drivers will undoubtedly increase as the population continues to escalate. UC San Diego has received a research award of approximately $3 million from Caltrans and the State of California through the Digital Media Innovation (DiMi) matching grant program to help resolve this dilemma.

Headed by Mohan Trivedi, professor of electrical and computer engineering, the project will strive to create a powerful and integrated traffic-incident detection, monitoring and recovery system to reduce congestion. “It will make travel safer, smoother, and more economical, and will reduce wasted fuel and pollution,” says Trivedi, who foresees it beginning to take effect in the next two to three years.

The goal of this program is to detect and clean up traffic incidents more quickly. Utilizing clusters of video and acoustical sensors, mobile robotic agents and interactive multimedia workstations connected via high bandwidth communication links, traffic will be continually monitored and alterations automatically detected. Both omnidirectional and rectilinear video sensors will be used to provide customized, synthetic, real-time imagery to remote viewers in multiple locations. While an omnidirectional camera produces a 360-degree perspective of lower resolution, a rectilinear one offers zoom capabilities and greater detail from a single vantage point. The project will merge video and audio input from all sensory devices in order to construct a three-dimensional environment into which one can travel and maneuver according to his/her specific needs (e.g., a doctor may focus on an injured driver, while a police officer may be interested in the overall accident scene).

Accurately assessing the situation beforehand, Trivedi emphasizes means “only the essential personnel will be deployed on-site, reducing delays, costs and additional traffic congestion.” Information gathered may also be used for law-enforcement surveillance such as tracking a vehicle involved in a “hit and run.” Data will be stored for future analysis and decision-making.

Some of the challenges foreseen by Trivedi and his team include developing an architecture that works effectively in multiple environments and geographical settings and efficiently sharing public communication channels to utilize as little bandwidth as possible.

The first prototypes are likely to appear on the UC San Diego campus and in Santa Barbara where the Caltrans Testbed Center for Interoperability is located. Trivedi is collaborating with the Caltrans center and with the UC Santa Barbara Center for Research in Arts and Technology (CREATE). CREATE is headed by Dr. JoAnn Kuchera-Morin and is developing the simulation and graphical interfaces incorporating relevant geographical data and maps.

### UC Means Business

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Contact: Shari LaPerle
micro@ucop.edu
(510) 987-9488
www.ucop.edu/research/micro/welcome.html

**DiMI**
Digital Media Research
99/00 Funds: $2M
Contact:
Dr. JoAnn Kuchera-Morin
dimi@dimi.ucsb.edu
(805) 893-8798
www.dimi.ucsb.edu/

**BioSTAR**
Biotechnology Research
99/00 Funds: $5M
Contact: Jane Lee
janeke@uclink4.berkeley.edu
(510) 643-2584
www-biotech.berkeley.edu/New_Biotech_Site/biostar/BioSTAR_Home.htm

**LSI**
Information Sciences for the Life Sciences Research
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mmcg@ucsd.edu
(510) 643-3229
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**UC-SMART**
Semiconductor Manufacturing Research
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Contact: Julie Stein or Carolyn Capps
uc_smart@uclink4.berkeley.edu
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### Industry University Cooperative Research Program

This grant program leverages California’s R&D resources to accelerate early stage research in technologies key to the state’s economy. Corporate funds are matched with state funds to support investigator-initiated research projects. E-mail uc_ind@uclink4.berkeley.edu or visit http://uc-industry.berkeley.edu/
Coming to Your Computer Soon: Multithreading

IF YOU HAVEN'T HEARD of it before, you will soon. Multithreading is a new kind of processing that could more than double the speed of computers. Compaq has already announced plans to introduce multithreaded processors in future PCs. IBM has added a multithreaded processor in its business computers; and in December, IBM announced the Blue Gene project, a research effort to construct the world’s fastest parallel computer using the multithreading concept. Other major manufacturers are following suit.

“It is inevitable that many future computer architectures will have some form of a multithreaded processor,” states Larry Carter, Chair of the Department of Computer Science and Engineering (CSE).

Multithreading is the computer equivalent of walking and chewing gum at the same time. Today’s single-thread computers are very fast, but each processor executes instructions from only one program, or thread, at a time. Multithreaded computers will be able to process instructions from many programs, like e-mail and Word, simultaneously. (Today, although it appears that a computer is executing two programs at once, it is actually quickly switching back and forth between programs). A multithreaded computer might also divide one program into many parts, and execute all the parts at the same time.

Computer scientists at UC San Diego are on the leading edge of this new technology. Professor Dean Tullsen, considered a pioneer in multithreading, produced much of the research behind Compaq’s upcoming processor, which will feature Tullsen’s simultaneous multithreading design.

UC San Diego has also acquired the world’s first commercially produced multithreaded computer built by the Tera Computer Company of Seattle. Professor Carter is working with the San Diego Supercomputer Center to evaluate this revolutionary machine. The Tera MTA has eight processors (soon to be expanded to 16) and each processor can simultaneously execute instructions from 128 separate program locations. This, coupled with its large (eight gigabyte) shared memory, enables it to perform some difficult computations faster than any other computer. See www.sdsc.edu/mta_eval/darpa/.

If all goes as planned, IBM’s Blue Gene will have more than one million processors, each capable of one billion operations per second (one gigaflop) and the machine will be capable of more than one quadrillion operations per second (one petaflop). This level of performance would make Blue Gene about 2 million times more powerful than today’s top desktop PCs. IBM estimates it will take about five years to build the supercomputer.

While companies work to bring multithreaded computers to market, Tullsen, Carter and other CSE researchers are working to define the next generation of multithreaded architectures and are perfecting the software that will be needed to realize the full potential of multithreading.

“A multithreaded processor helps only when there are multiple programs running or when a single program is broken up into individual threads,” said Tullsen. “We are now exploring architectures which can get all the benefits of multithreading even when the software is not multithreaded.” See www-cse.ucsd.edu/users/tullsen/.

World’s 10th Largest Supercomputer Arrives in San Diego

Composed of 1,152 processors capable of one trillion calculations per second, the world’s 10th largest supercomputer arrived at the San Diego Supercomputer Center (SDSC) on November 27.

The IBM SP, the largest computer available to the U.S. academic community, will help researchers tackle demanding, deep computing problems such as determining chemical reaction rates, designing new materials, modeling climate and predicting storms, and understanding the origins of the universe.

“The computing capability of the IBM SP will open up new avenues for scientific discovery,” said Sid Karin, director of SDSC. “With this system, not only will researchers be able to enlarge today’s simulations, but they can also go back to the drawing board to devise computations not yet considered.”

Visit: www.sdsc.edu/Live/teraflops.html

Input/Output Performance with a Supercluster of PC Disks

In a demonstration that could change the way researchers exchange information, Andrew Chien (CSE) used a network server built out of a supercluster of standard PCs to deliver data at a rate of 439 megabytes-per-second. Server performance was enhanced by a collection of 16 IDE disk controllers developed by 3ware.

Today’s big science projects like the Human Genome Project involve huge data sets of a terabyte or more. Researchers who want to share data have found it nearly impossible to store and transfer that much information. Multi-terabyte data storage archives are typically extremely expensive, and sustain much lower transfer rates.

“This demonstration network server uses the types of computers found in most research laboratories linked together with some inexpensive software components,” said Chien. “The system is dramatically cheaper and faster than anything available today. It may be especially important as the next generation Internet enables more broadband communications.”

Visit: www-csas.ucsd.edu/
Bhatia Receives Packard Fellowship for Tissue Engineering Research

MORE THAN 30,000 Americans die from liver failure each year, yet there is no treatment other than organ transplants. It is a situation that Bioengineering Professor Sangeeta Bhatia has set out to change.

Bhatia is among 24 of the nation’s most promising young university researchers awarded the 1999 Fellowship for Science and Engineering from the David and Lucile Packard Foundation. Bhatia will receive $625,000 over five years for her research on liver tissue engineering.

Biotechnology companies are developing treatment alternatives such as external devices with live hepatocytes (liver cells) that function like a dialysis machine, and engineered liver cell transplants. However, these treatments are currently limited because once hepatocytes are isolated from the natural environment, they quickly lose their ability to perform their jobs of metabolizing food and protecting the body from toxic substances.

Bhatia believes the key to creating successful bioartificial devices or engineered tissue is understanding how hepatocytes interact with supporting cells and the surrounding environment. She specializes in using microfabrication tools to gain new information that cannot be gleaned by conventional means.

For example, Bhatia has patented a technique, called micropatterning, that allows her to assemble different liver cells on glass chips in much the same way electrical engineers assemble integrated circuits on silicon chips. She recently used this technique to prove that hepatocyte function improves when these cells are located beside fibroblasts, which form the membrane around the liver.

Bhatia plans to use the Packard Fellowship to develop additional tools. She is working with ECE Professor Sadik Esener on a new way to assemble and disassemble different types of cells in an array. The technology involves attracting negatively charged cells with positively charged electrodes. This novel yet simple technique could see applications in drug discovery and electronic circuit assembly. To move from two-dimensional to three-dimensional studies of structure and function, Bhatia and collaborator Chemistry Professor Michael Sailor grow liver cells in silicon pores, work that could pave the way for engineering an artificial liver.

Bhatia is also working on understanding of cirrhosis (scarring of the liver tissue that leads to liver disease), techniques to quickly diagnose variations of hepatitis with ECE Professor Shaya Fainman and novel ways to apply emerging technologies to improve both medical research and electronics manufacturing. For more information on her research, visit www-bioeng.ucsd.edu/research_groups/mtel/index.html.

the world focused on the ambitious vision of universal broadband wireless Internet access. Supporting this vision, Asbeck’s research involves high-frequency microelectronic devices and circuits, while Larson’s research focuses on microwave and RF devices and circuits. Zeger works on various areas in information theory, including source and channel coding, with applications to image and speech compression. Rao’s area of expertise is digital signal processing with applications to communications, speech coding and recognition.

Networking and Software Engineering

Relatively few computer science departments are part of engineering schools at universities across the country. And still fewer can boast strong faculty interest in both computer science (software) and computer engineering (systems and hardware). So it is no wonder that the Jacobs School has three computer science faculty elected fellows of IEEE, the professional society for electrical engineers.

It is this cross-disciplinary approach that allows the CSE Department at the Jacobs School to delve into research that is particularly relevant to the information technology industries. The primary focus of the department are high-performance computing, dependable computing, networking, information technology and software engineering. These can more or less be combined under the overarching theme of Internet computing.

The work of the new IEEE Fellows in CSE supports these research directions. Carter received his IEEE citation for co-inventing Universal Hashing, which has become the basis for provably secure authentication systems, a type of cryptography that is relevant to the Internet because it provides secure communication with authenticated recipients (a feature which is critical in the absence of “face-to-face” interaction). Carter currently focuses on high-performance scientific computing and is chair of the department.

Burkhard was elected for his work in the theory and practice of data organization algorithms for database and digital storage system design. He heads the Gemini Storage Systems Laboratory at UC San Diego, which conducts experimental and theoretical studies of data layout organizations and algorithms that provide suitable run-time performance and reliability. Burkhard is currently working on disk array storage systems.

Cheng’s research interests lie in the following areas of VLSI computer-aided design: partitioning, placement and floorplanning; routing and interconnect organization; and switching network design as applied to rapid-prototype systems using FPGAs. The partitioning methods help in deciding what components to put where in VLSI systems.

In addition to these IEEE Fellows, CSE’s Professor Fran Berman was recently named a Fellow of the Association for Computing Machinery for her work in the investigation of adaptive and dynamic techniques for achieving application performance on distributed resources.

Faculty Honors

Fran Berman (CSE) has been named a Fellow of the Association for Computing Machinery.

Robert Bitmead (MAE) was recently elected to the Australian Academy of Technological Sciences and Engineering for his “enduring, high-impact national and international contribution to design methodology and industrial applications in process control systems and signal processing.”

Shu Chien (Bioengineering) will serve on the National Institutes of Health Center for Scientific Review Advisory Committee for a term of 1999 to 2003.

Xanthippe Markenscoff (MAE) was awarded the Gold Medal for Science and Technology by the Technical University of Crete.

Shankar Subramaniam (Bioengineering) was elected a Fellow of the American Institute for Medical and Biological Engineering (AIMBE).

Frank Talke (MAE) received the Max Planck Research Award for International Cooperation for his outstanding research achievements. The award was presented by the Max Planck Society and the Alexander von Humboldt Foundation.

Sidney Karin (CSE and SDSC) was awarded the distinction of Fellow by the American Association for the Advancement of Science. Karin was cited for leadership in integrating computational and computer science research and for establishing infrastructure to support and enhance that research.
Student-Run Job Fair to Kick Off National Engineers Week

DECaF (the Disciplines of Engineering Career Fair) will take place at the UCSD Price Center on Tuesday, February 22. The event, organized by engineering students, is a great way to reach talented and motivated UC San Diego students for various employment opportunities. Participating companies will receive a book of undergraduate and graduate student resumes, an invaluable tool to access the best and brightest engineering minds. Companies that would like to participate may register until February 15 on a first-come first-served basis. A $350 fee registers two company representatives. Additional representatives may be registered for $50 per person. All proceeds benefit engineering student professional organizations at the Jacobs School.

DECaF Works!
Pantea Vahidi, a CSE senior graduating in June 2000, gave her resume to several companies at last year’s DECaF, including the Continuous Computing Corporation for whom she received an internship. The company is an original equipment manufacturer (OEM) of high-availability network and application-ready computer systems for datacom and telecom equipment manufacturers. Its engineers have core competencies in manufacturing, networks, high-availability computers, and hardware and software development.

“The representative really liked my experience and background and scheduled me for an interview right on the spot,” says Vahidi, who began working for Continuous Computing full-time during the summer and switched to part-time when school resumed in fall. She primarily writes test scripts which are programs that test hardware.

As is evident by Vahidi’s experience, DECaF really works! In fact, she is the chair of this year’s event.

If you would like more information on DECaF e-mail Pantea Vahidi at pvahidi@ucsd.edu or Jason Ellis at jnelis@hotmail.com, (858) 673-1901.

DECaF kicks off National Engineers Week at UC San Diego, sponsored on campus by the Triton Engineering Student Council. For more information on this student-run organization, visit their website at www-acs.ucsd.edu/~esc/

National Engineers Week at UCSD

Feb. 22 - DECaF
Feb. 23-24 - Free BBQ, 16 professional student organizations display projects, K-12 outreach project.
Feb. 25 - UCSD Graduate Program’s Preview Day. Grads discuss research projects with undergraduates.

Holiday Cheer

The Jacobs School’s student chapter of the American Institute of Aeronautics and Astronautics took time out during finals week last December to visit hospitalized children at the UCSD Medical Center. The engineering students and advisor John Kosmatka helped nearly a dozen children build model airplanes while they talked about their Christmas lists and their favorite airplanes—the stealth fighter and space shuttle were the biggest hits. The students also went around and visited with children who were too sick to leave their beds. The San Diego Aerospace Museum provided financial assistance and free museum passes for both the children and the volunteers.

“This was a great experience for the engineering students and a wonderful way to lift the spirits of those brave children,” said Kosmatka, who organized the event. “We’d like to make this a regular outreach project.”

Many of the students were so inspired by the holiday outreach project that they decided to volunteer at the hospital on a regular basis.
RESEARCH REVIEW 2000 is on February 25. This CAP-sponsored event includes keynote presentations by Brian Kenner (Chief Technology Officer and Co-Founder of INTERVU, Inc.) and Lawrence B. Prior III (President and CEO of High Technology Systems, Inc.), technical break-out sessions led by the faculty, 140+ graduate posters, industry technical exhibits, laboratory tours, and a reception at which best poster awards will be presented. This event is $25 per person (no charge for Jacobs School students, alumni, and faculty), and offers a chance for industry and university engineers to come together to exchange knowledge and ideas. Visit www.soe.ucsd.edu/events/ or call Kelly Briggs (858) 534-2329 to register.

Welcome to the following companies who joined CAP in the last four months: BAE Systems, Encad, Ericsson, Rincon Research Corporation, INTERVU Inc. and Packet Video.

SAIC was recently honored by INROADS, a national internship program, as ‘New Company of the Year.’ According to an article in the November/December 1999 issue of The Pulse, ‘SAIC was recognized by INROADS in large part due to the working relationship of supervisor Krista Page and intern Teresa Elizade.’ Page used quantitative and qualitative criteria to evaluate Elizade’s performance, fostered open communication, and provided an environment for continued professional growth.” Elizade is a computer science major at the Jacobs School.

The newly created SAIC Lecture Series is designed to encourage intellectual exchange between researchers at SAIC and Jacobs School faculty. Each quarter the site for the lecture will rotate between SAIC and UCSD, and one organization will host a speaker from the other institution. Lectures are open to CAP member companies and UCSD faculty, staff, and students.

The next lecture will be presented by SAIC’s H. Swarger on “Underground Nuclear Test Detection for 3-D Verification” February 1 at EBU II, Room 584 from 3:30-5 p.m. For more information contact Lindy Nagata at (858) 822-2457.

CAP Means Direct AccessTo Students

Corporate Information Sessions
As a CAP member, you can host a Corporate Information Session on the UC San Diego campus to introduce the student population to your company, your products, and your employees in an informal, intimate setting. A Corporate Information Session is a great opportunity to invite the students of your choice to spend several hours with your representative, focusing solely on your corporate needs and objectives. Our capable staff is ready to assist your HR representatives in finding the right venue for your Corporate Information Session and will oversee all audiovisual, catering and room arrangements.

Looking for an effective way to connect with high-calibre students? CAP offers three valuable tools

Resume Service
You can also utilize our Resume Service, which provides access to our extensive resume database in order to select the students of your choice for internships, part-time or full-time employment. Resume searches can be broad or specific depending on your needs. For example, a company can search for recruits by year, GPA, courses completed, or any combination. The goal is to tailor each search to the company’s requirements. CAP members also receive a copy of the resumes bound in an easy-to-use book.

MAE 156 students develop a working prototype over a 15-week period. Companies should contact Nathan Delson at (858) 534-6555 by mid-October for call-out projects and by early December for winter-spring projects.

Design Courses
Our Senior Design Projects (MAE 156 and ECE 191), available to mechanical and aeronautical, and electrical and computer engineering students, put you in touch with a highly creative and motivated engineering team who, under faculty guidance, deliver a completed product to your organization. Perhaps you have projects that have not been completed due to a lack of resources. This facet of CAP membership can solve such a problem, benefiting the students by giving them valuable experience, and benefiting you by helping complete necessary projects. It is a win-win situation that can even lead to internships and permanent employment opportunities, and provide valuable mentoring to students.

School Bids Fond Farewell to CONNECT Director Otterson

WILLIAM W. OTTERSON, a friend and advisor to the Jacobs School, died on November 24 after a courageous battle with cancer.

Otterson was a successful entrepreneur who used his business experience to benefit hundreds of start-up companies and to tackle important public policy issues. He directed CONNECT, a program founded to enhance regional economic development by accelerating the growth of high technology enterprises in San Diego. As director, Otterson built CONNECT into an internationally renowned program.

Today, CONNECT has more than 600 members and sponsors with a budget of $1.7 million (visit www.connect.org/). CONNECT’s flagship programs, the Financial Forum and the Corporate Partnership Forum were developed and refined by Otterson’s ideas and drive. Both programs connect entrepreneurs with sources of funding, through venture capital or corporate partnering. More than $4 billion has been raised by companies through the programs, and 80 percent of participants are still in business or were successfully acquired.

Otterson served UC San Diego and the San Diego community in countless ways. He was a member of the Jacobs School’s Council of Advisors to the Dean, and was always quick to offer a word of advice or encouragement.

University of California President Richard Atkinson said "Bill Otterson leaves an enduring legacy of accomplishment not only to UCSD and San Diego but to California and the world."
IN AN EFFORT to sharpen its competitive edge in attracting the best graduate students, UC San Diego has launched a special initiative to raise private support for graduate fellowships. From now through June 30, 2000, the university will match each dollar contributed to an academic division for graduate fellowships. The goal is to raise $1 million. Combined with the matching program, $2 million will be made available to students.

The first gift in the program was provided by Walter Zable, CEO of Cubic Corporation. Joe Bear, executive director of external relations for the Jacobs School, says the initiative is particularly time-critical for the Jacobs School. The School has grown from a graduate enrollment of 500 in 1995 to 697 today, and graduate enrollment will increase to 1,000 over the next five years.

“Fellowships are an excellent tool for recruiting the best minds to the School. As we continue to increase enrollment, fellowships will be essential to maintaining and enhancing the quality of the students selecting the Jacobs School,” said Bear.

The School plans to use the graduate fellowship initiative to support students in their first year of study. After the first year, students receive support through research contracts. It costs approximately $25,000 to attract and support a student in the first year.

To be eligible for the matching program, the minimum contribution is $3,000 per year for three years ($9,000 total). A minimum donation of $75,000 over three years entitles contributors to name the fellowship. Students will benefit from the program as early as fall quarter 2001.

Please call Joe Bear at (858) 534-7609 if you have questions or would like to provide your support.

Endowed Chair Honors Beloved Scientist and Teacher

The family of the late Professor Eric Reissner has established the Eric and Johanna Reissner Endowed Chair of Applied Mechanics and Structural Engineering to honor Dr. Reissner and his wife. The chair will help recruit and retain outstanding faculty in the Department of Structural Engineering.

Professor Reissner was an international figure in applied mathematics and structural mechanics. A pioneer in theories of elasticity, much of Reissner’s work concentrated on analysis of vibration, stress, deformation and stability of beam, plate and shell structures. His research had profound impact in civil engineering and the design of aerospace structures. Reissner’s variational theories have been applied in solid mechanics, structural mechanics, materials science, biomechanics and biology.

Structural Engineering Chair Frieder Seible says the Chair is a fitting tribute to his friend and colleague. “Eric Reissner’s work was fundamental and can be applied across many disciplines and types of structures,” said Seible. “This is the same way we define and practice structural engineering in our new department, namely cross-disciplinary covering civil, aerospace, mechanical, offshore and marine structures. We are deeply honored to receive this Chair and will strive to do Professor Reissner’s name proud.”

Eric Reissner had a reputation for mathematical perfection and was elected to the prestigious American Academy of Arts and Sciences in 1950 at the young age of 37. He published nearly 300 journal articles and received numerous honors, including election to the National Academy of Engineering in 1976. After a 30-year career at MIT, Reissner joined the AMES department at UC San Diego in 1970, where he continued his research until the time of his death.
In the fast-paced world of Internet companies, Kenner says INTERVU took a seemingly long time to come of age in defining its product thrust. “We had a great solution looking for a problem, which is a common mistake for start-ups. Potential clients just didn’t have the infrastructure to produce the content needed for streaming video.”

It was President Clinton’s 1998 Lewinsky debacle that was the real turning point for the company. “CNN wanted to offer Clinton’s Grand Jury testimony online and they outsourced the entire project to INTERVU. Everyone in the company went all out to do the job right,” said Kenner. “It was the single greatest challenge we ever faced. We successfully handled a huge audience of viewers, and the event generated a great deal of publicity for INTERVU, which allowed us to go out and get several new contracts. It also galvanized us toward the path we wanted to take.”

INTERVU is now focused on managing and distributing audio and video on the Internet. The company’s secret to success has been to make the technology disappear for the customer, going as far as providing camera and light set-ups to record content. Clients now use the streaming media service to show the latest news story, distribute pay-per-view events, enhance teleconferences, or offer product education.

“It’s been a great adventure. In the beginning, a lot of people tried to talk me out of taking the risk because of all of the problems we would run into,” says Kenner. “But I knew we had a great idea. We just kept running at it, and when we got knocked down we picked ourselves up and learned from our mistakes. It’s extremely satisfying to see our idea become a reality.”

INTERVU is also entering the education market, and together with Intel, is working with UCTVonline to offer faculty and visiting scholar seminars as video on demand. Portions of the Jacobs School’s Research Review 2000, scheduled for February 25, will be available through UCTV in March.

Looking to the future, Kenner says streaming media will transform the way companies reach their audiences.

“Television started with three networks. Today, there are more than 20,000 cable stations. Tomorrow, there is the potential for hundreds of thousands of broadcasters via the Internet. I think we will see even more niche marketing and companies becoming very savvy about how to sell their products by being entertaining.”

**Driver, Risk-Taker and Explorer**

For Brian Kenner, co-founder and chief technology officer of INTERVU, his love of riding bikes off-road says something about his unique perspective on life.

**Brian Kenner**

Brian Kenner will be a keynote presenter at the Jacobs School’s Annual Research Review on February 25.
Alumnus Named Among Top Innovators

Paul Bender (Ph.D., Electrical and Computer Engineering, 1992), vice president of technology for QUALCOMM, was recently named one of the top 100 innovators with the potential to make significant technological contributions in the next century” by Technology Review, the world’s oldest technology magazine.

While at UC San Diego, Bender conducted research in signal processing for digital recording at the university’s Center for Magnetic Recording Research and worked with students to design and debug basic analog circuits for the Electrical and Computer Engineering Department.

Since completing his work at UC San Diego, Bender has contributed his expertise to the development of innovative CDMA digital communications at QUALCOMM. His responsibilities have included formulating the system test team and leading the system engineering team that developed commercial CDMA (IS-95) cellular and PCS infrastructure. Currently, as vice president of technology, he leads a team responsible for developing QUALCOMM’s High Data Rate (HDR) technology for wireless Internet access in portable, mobile, and fixed applications using a flexible IP-based architecture.

All 100 innovators were recognized at a symposium on November 4, 1999 at MIT, hosted by PBS broadcaster, Bill Moyers, and CBS broadcaster, Lesley Stahl. Members came from dynamic technological areas including biotechnology, information technology, chemistry, and materials science.

Bender leads QUALCOMM’s development team for High Data Rate (HDR), a technology that provides wireless Internet access from a variety of mobile devices.

Alumni Updates

1976 Michael Zya, AMES, Bioengineering. Zya, professor of computer science at the Naval Postgraduate School, recently co-authored an ACM Press, SIGGRAPH series text titled “Networked Virtual Environments: Design and Implementation.” The text has received great reviews, with its first printing selling out in 90 days. Professor Zya additionally participated in the drafting of an NRC report entitled “Advanced Engineering Environments,” a look at how NASA should design space systems of the future. E-mail: zyda@acm.org or visit: www.npsnet.org/~zyda

1991 Antonio K. Liu, B.A., ECE - communication science. Liu earned an M.D. from University of Southern California and completed his residency in Neurology at UCLA. He now serves on the medical staff of White Memorial Medical Center in Los Angeles. E-mail: aliumd@yahoo.com

1992 Madeleine Forsyth, B.S. Applied Mechanics. Forsyth (who as a UCSD student detested statistics) is employed as a quality engineer with Gambro Renal Care Products in Lakeview, CO. She provides statistical analysis and guidance for engineering and clinical groups as well as leadership for product and process improvements. Gambro Renal Care Products is a wholly owned subsidiary of Gambro AB, a global medical technology and healthcare company. E-mail: mady@cob.com

1993 Adam L. Muzikant, B.S., Bioengineering. Muzikant is working as a scientist at Physome Sciences in Princeton, NJ, developing biological computer models/software to improve drug discovery and development. He received his Ph.D. in Biomedical Engineering from Duke University in July 1998. E-mail: alm@physome.com

1994 Andrew Reynolds, B.S., Computer Science. Reynolds recently moved back to San Diego from Melbourne, FL, to join Minerva Associates, a new company in Del Mar. E-mail: ajrey@datacity.com

1998 Marna Kagele, B.S., Mechanical Engineering. Kagele works at Boeing in Los Angeles as a design engineer on the space shuttle main engines. She has always wanted to be involved with the space program and NASA. She will be starting an MBA program in the Spring. E-mail: Marna.M.Kagele@Boeing.com

1999 Daren Deffenbaugh, M.S., Bioengineering. Deffenbaugh recently accepted a position as a clinical applications engineer for the southwestern region with BrainLAB, Inc., a neurosurgery equipment manufacturer. E-mail: daren-llorraine@worldnet.att.net

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