First Phase of Lab Renovation Complete

New students didn’t blink twice when they entered the newly renovated computer science lab – it is the top notch facility they expected when they enrolled in Cal Poly’s Computer Science Department. But returning students were surprised at the transformation since they left last June. With thousands of man-hours, Phase I of the computer science lab renovation was completed in time for fall classes.

The long-anticipated project began shortly after Commencement in June. Lab staff worked around the clock to keep one step ahead of the demolition crew. Six classrooms and labs in the south wing of the Pilling Computer Science Building were pressed into service for equipment and furniture storage. The entire second

Continued, page 2
floor of the north wing of the Pilling Building was gutted to the exterior walls. Room 232 downstairs was given the same treatment. Construction crews spent the summer replacing the heating and air conditioning system for the whole wing, and rebuilding interior walls upstairs to create more practical lab sizes. Networks were completely rewired and rerouted. Other new touches include carpeting, recessed lighting, larger screens and whiteboards, and computer projection systems.

Gone are the echoing, high ceilings and remnants of the old concrete locker pads upstairs. Students now enter a patterned tile hallway, with casual seating and improved lighting. Three classroom labs occupy one side of the hallway. Upper division and graduate students anticipate the opening soon of projects and graduate labs on the other side.

Downstairs, Room 232 is being transformed into a showcase with reconfigurable tables and chairs, and a folding wall that divides the room into two separate labs or meeting rooms. A fundraising campaign will address the needs to complete the renovation of the remainder of the first floor, including the machine room, storage and workshop areas, staff offices, and remaining open lab space.

Lab staff and student assistants worked hard to reinstall the furniture, computers and networks in time for fall classes. With a few minor delays — such as the controller for the new heating and air conditioning systems! — they pulled it off and faculty and students enjoyed a relatively seamless transition into a vastly improved educational and computing environment.

Special appreciation is due Paul Bonderson (BS EL/EE 1975), who provided major funding for the project, and Gary Bloom (BS CSC 1982), who helped fund the architectural design stage. A formal opening and dedication is planned later in the academic year.
What would you do with bandwidth 2,000 times faster than the average industry T1 connection?

It didn’t take Cal Poly Computer Science faculty long to come up with ideas to use it to improve educational quality and enable effective collaboration.

Cal Poly is one of 207 Internet2 universities working in partnership with industry and government to develop and deploy advanced network applications and technologies. As an Internet2 member, Cal Poly users can access other networks and servers at 655 megabits (MB) per second, much faster than the commercial Internet.

Faculty members Diana Franklin, Michael Haungs, Franz Kurfess and Hugh Smith have embraced the opportunity to look at a class of applications that wouldn’t be possible over the current Internet.

An example of capitalizing on Internet2’s high bandwidth is Haungs’ work with orthophotography. Orthophotos are aerial images, taken from either an airplane or satellite, transformed to account for camera location, orientation and ground elevation to produce a uniform scale image. They are commonly used for GIS data such as highways, elevation maps and soil samples.

Haungs is working with Cal Poly College of Agriculture faculty, as well as faculty from Oklahoma State University, to study optimal methods to serve a very large orthoephoto dataset over Internet2. The dataset, generously made available for this proof-of-concept by AirphotoUSA, is 22 terabytes of high quality black-and-white seamless aerial imagery of the United States, at 1-meter resolution. The data is normally packaged on multiple hard drives and delivered to customers. Haungs and two graduate students are involved in testing, performance measurements (bandwidth, memory and I/O constraints) and server architecture design. By supplying the data over Internet2, they can eliminate the need for multiple instances of large datasets throughout universities, minimize administration costs, and make the data available for innovative lab use for

Kurfess, one of the Cal Poly Internet2 “champions,” supervised the creation of a documentary on Internet2 use at Cal Poly. The documentary aims to inspire and motivate Cal Poly professors and students to pursue projects involving Internet 2 and to invite students and professors from outside Cal Poly to collaborate with Cal Poly on Internet2-related projects. Students Aaron Peckham

Continued page 11
Excellence in Undergraduate Education
A Message from Department Chair, Tim Kearns

The Computer Science Department has been extremely fortunate having another successful year despite many challenges. Highlights have been our first graduate in the new software engineering program, the completion of the first phase of our lab remodeling effort, and the renewal of our accreditation. All these reflect the commitment of our students, alumni, faculty, and industry to support the department, making its programs some of the best in the country.

An ongoing challenge has been attracting excellent new faculty and staff. The past year has seen the retirement of Professor Jim Beug, Professor Lois Brady, Professor Erika Rogers, and our lab manager, Don Erickson. They have all contributed greatly to the success of the many students whose lives they have touched. I am especially appreciative of the many contributions Jim Beug made to the department during his tenure as chair.

In addition, the department faces challenges brought on by the continued rapid change in our industry. Computer scientists and software engineers must now develop distributed systems that must be highly reliable and secure. Our curriculum must progress to meet these challenges, while still emphasizing the foundation concepts and skills of our discipline.

Because the state no longer provides sufficient funding to support our programs, Cal Poly is putting more emphasis on outside support. This means placing a greater emphasis on funding faculty professional development and laboratories from outside sources, including alumni, industry, and government grants.

Our goal for the upcoming years will be to continue the tradition of excellence in education that results in successful students and alumni. We hope to raise additional funds to complete the lab renovation and to develop a program to enable faculty to bring industry experience and learning more quickly into the curriculum. Through the generosity of Gary Bloom, a fund has been established that will enable faculty to develop closer ties with industry and bring in more projects that provide students with learning opportunities in the context of current industry problems.

To meet this challenge we will need your help. In the coming months you will hear more about some specific needs for the department and how you can help us address them. The Computer Science Department has a tradition of excellence in undergraduate education that enables our students and alumni to be top contributors. We have been able to be innovators and leaders by focusing on our strengths while recognizing changes in the industry. Fostered by help from our alumni and industry, we have been leaders in establishing labs with most of our courses, developing industry project-based software engineering courses, and creating a new software engineering degree. We will be asking for your support to continue this tradition.
### Honor Roll of Donors

Your Contributions Make a Significant Difference to Us!

We thank the following contributors to the Computer Science Department. One hundred percent of this money goes to the department and is used to benefit both students and faculty professional development, which indirectly benefits the students.

Every effort has been made to ensure the accuracy of this listing of contributions made from July 2003 through June 2004. Regrettably, mistakes do sometimes occur. If you find an error, please do not hesitate to contact the Computer Science Department, 805.756.2824.

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New Faculty Bring Energy, Talent to CSC Department

Michael Haungs
Assistant Professor, Ph.D. UC Davis
Operating Systems, Networking, Distributed Systems, Computer Architecture

Michael Haungs came to Cal Poly because he wanted to concentrate on teaching. As an active researcher, he also saw that Cal Poly’s “learn by doing” approach and strong industry ties encourage both faculty and students to work on and explore current technologies.

Haungs taught undergraduate and graduate operating systems courses his first year at Cal Poly. He finds the small class size at Cal Poly, and the genuine interest students have in learning, combine to create an environment where faculty and students work together to advance the next generation of computer scientists.

Enjoying his second year, Haungs is very excited about the research he and his graduate students are doing. They are currently studying the issues of serving a massive dataset over Internet2 for interactive educational use. (See the article on Internet2 collaboration on page 3.)

Another group of graduate students is working with Haungs on enhancing the Linux scheduler and QoS capabilities, ad hoc network routing, enhanced network programming primitives, Internet2-based web services and the next generation HTTP.

John Seng
Assistant Professor, Ph.D. UC San Diego
Computer Engineering, Computer Architecture, Low Power Design

Cal Poly’s strong engineering education was a good match for John Seng, who wanted to teach at a university with a focus on undergraduate teaching and with a bright student population. He has especially enjoyed working with students during computer architecture labs and on senior projects.

Seng’s research areas are computer architecture and wireless sensor networks. He finds both areas very exciting, with lots of possibilities of discovery and innovation. Processor design and embedded computing are further areas of interest in which he looks forward to doing research with Cal Poly students.

A Southern California native, Seng is enjoying living in San Luis Obispo!

Zoë Wood
Assistant Professor, Ph.D. California Institute of Technology
Computer Graphics, Computational Topology, Scientific Visualization

As a native Santa Barbaran, Zoë Wood had always heard about Cal Poly and respected its role in education in California. She has found Cal Poly to be as advertised: a teaching school that focuses on students and provides them with positive “learn by doing” experiences.

Wood is impressed with the caliber of students in her classes, finding them to be bright, engaged, and willing to work hard to complete very difficult and interesting projects.

During her first year, Wood taught the introduction to computer graphics course and Real-Time 3D Computer Graphics Software. She was awarded one of two outstanding professor awards at the Computer Science annual awards banquet.

Wood’s research focus is computer graphics. She is specifically interested in methods to acquire 3D models and geometric modeling algorithms — in other words, what can and should be done with 3D models to make them useful for general computation. She is also very interested in advances in graphics processors, real-time applications, games, and medical data visualization and applications.
Familiar Faces Bid Farewell

Jim Beug (Cal Poly 1973-2004)
Beug was appointed Professor Emeritus last January, after more than 30 years at Cal Poly, including seven years as chair of the Computer Science Department. He arrived in the era of punch cards, pushed immediately to get Unix available on the university PDP-11 graphics system, taught the first introduction to computer science course in Pascal, the first C programming course, and the first software engineering course in the department. More recently, he taught computer architecture, programming language design and implementation, operating systems, and anything else new of interest. During his term as chair of the department, the language in the introduction to computer science course changed from Ada to C++ and then to Java, the Industrial Advisory Council was re-established, major strides were made in corporate and individual donations to the department and the student programming team placed sixth in the world. These days, Beug iterates between the Cal Poly library, Paris, and Bainbridge Island, Washington, with dreams of still going around the world one day. In between trips, he will return to programming, and to teaching part-time in the Faculty Early Retirement Program.

Lois Brady (Cal Poly 1988-2004)
Brady was appointed Professor Emeritus in July. Brady is known for her contributions to the algorithms courses and her interest in formal correctness verification and performance analysis of algorithms. Her recent applied research includes cryptography, linear programming, neural networks and genetic algorithms. She has shown tireless dedication to curriculum issues in the department and served on a universitywide committee that contributes to equal opportunities and women’s issues. Brady’s retirement plans include continuing her work with computer science graduate students as well as international travel.

Don Erickson (Cal Poly 1987-2004)
Erickson came as a graduate student (MS CSC 1987) and later became an Operating Systems Analyst and the manager of the Computer Systems Labs (CSL). For many years, recently as a volunteer, he taught the Computer System Administration course. When Erickson arrived, the CSL consisted of a Pyramid, a few workstations and dumb terminals, and two labs of Tandem 286-class PCs. Networking was a mess of slow serial lines. Under his leadership, the CSL now consists of 11 labs with more than 200 machines, supported by a machine room with 17 Unix servers and 12 Windows servers. Networks running at gigabit speeds connect everything. Erickson plans to use retirement to finally take the chance to travel, and may teach a few courses in computer science.

Erika Rogers (Cal Poly 1998-2004)
While at Cal Poly, Professor Rogers pioneered the Human-Computer Interaction (HCI) course series, and was an early contributor to the Artificial Intelligence courses. Her research included interactive intelligent assistance agents, usability evaluation and human-robot interaction. She also served as Director of the University Honors Program. Retirement plans include returning to visual cognition research, travel and writing.
Alumni Updates

We want to hear from you and find out what you are doing. Keep in touch with your fellow alumni by sending us your news for the Alumni Updates section in the next newsletter. Please include your name, degree and graduation year, and any news you want to share. Just send an email to estier@calpoly.edu.

Nona Etheredge (MS CSC 1995) was named outstanding undergraduate advisor for the College of Sciences at University of Louisiana at Lafayette, where she is also an instructor in the Computer Science Department.

Rick Gilligan (BS CSC 1980) is a senior software specialist for Computer and Software Enterprises, Inc., and is living in Morro Bay.

Brad Dasko (MS CSC 1988) has gone to work for Raytheon.

Nate Lawson (BS CSC 1999) works at Cryptography Research in San Francisco and recently gave a presentation on common security pitfalls at the Pentagon USITA security forum. In his spare time, he has been developing ACPI and SCSI drivers for Free BSD.

Stephanie Ludi (BS CSC 1994, MS CSC 1996) earned her Ph.D. in Computer Science in the spring of 2003 and is an Assistant Professor in the Software Engineering Department at the Rochester Institute of Technology.

Daniel Scallon (BS CSC 1986) earned an MA in Geography from San Francisco State University in 1994 and is currently an instructor in geography and GIS in the Natural Resources Department at Shasta College. His current interest is participatory mapping and application of GIS/GPS in Malaysian Borneo. He resides in Redding, California, with his wife, Kim, and children, Sonja and Sam.

Holmgren Wins CSC History Contest

David Holmgren (BS CSC 1975) won the contest in our last issue to name the individuals and date of the historical Computer Science Department photo. He came closest to the facts. Pictured from left to right were Neil Webre, Dan Stubbs, Charlie Welty and John Hsu. The photo was taken September 22, 1972, at the Computer Science and Statistics Fall Picnic at Cuesta Park. David named the individuals, and guessed April 1971 as the date.

David received a signed copy of Elmo Keller's History of the Computer Science Department, and a certificate for $25 in Cal Poly merchandise from El Corral Bookstore. David is currently a senior financial analyst for Ivory Consulting Corporation in Walnut Creek, California.

@csc.calpoly.edu is published by the Computer Science Department, California Polytechnic State University, San Luis Obispo, CA 93407. Inquiries, suggestions and comments are welcome.

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INTERNET 2, cont.

and Jordan Small were the investigators on the project. Kurfess also taught an advanced topics course in which he and his students explored such Internet2 advanced applications as videoconferencing, video streaming, tele-collaboration, and tele-immersion. Several Internet2 staff members, including Douglas Van Houweling, Internet2 President and CEO, made presentations to the class via videoconferencing.

Smith, another campus Internet2 champion, has built a relationship with Ixia, a network performance testing company, which has made long-term loans and gifts of very high-end network test equipment for research, class assignments and senior projects. Smith’s project focuses on computer network performance testing, Internet2 end-to-end performance testing and latency and throughput on campus.

Franklin is using Internet2 to enhance the collaborative efforts of Cal Poly and UC Davis through the use of enhanced videoconferencing capabilities. She is able to interact in multi-campus group meetings on a project to design embedded microprocessors that approach the efficiency of special-purpose circuits used for signal processing. She purchased and tested videoconferencing equipment in the quest for an ideal remote collaboration environment.

All the Internet2 experimenters are hopeful their work will open collaborative opportunities for Cal Poly, which is geographically remote from academic and industry centers of research. Students will be able to work on multidisciplinary projects with other campuses and industry. Faculty can collaborate more easily with colleagues across the nation, and will have faster access to large datasets, such as those used for astronomy, biology, and GIS.

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