Dragons, airplanes, and other flying objects are part of the new Computer Animation course taught by computer science Professor Buzz King under the course call number, CSCI 4809/5809. For the past two years, King and his students have explored this popular technology in a high-tech classroom at ATLAS, the Alliance for Technology, Learning and Society. ATLAS is one of CU’s newest buildings and home of the interdisciplinary program of the same name directed by John Bennett, who is also a computer science faculty member. The course is available both on campus and remotely through the CAETE distance-learning program (caete.colorado.edu).

Some of the still images created by King’s recent students are shown above. The dragon was created by senior computer science student Erin Rowland. If you were to pull back from the close-up, you’d see the wings flapping. The airliner (no, that is not a photograph) modeled by geography Ph.D. student Jochen Wendel takes off and majestically banks, and then flies into the distance. In the farm scene, created by recent B.S. graduate Bardia Khalili, the animals and the farmer sway to the tune of “If you’re happy and you know it, clap your hands.”

The scenes were modeled and animated with a software program called Autodesk Maya. The dragon was rendered with mental ray; the other two with the Maya Software Renderer, the industry standard in 3D animation and the same software used by blockbuster animators Pixar and Dreamworks. The new animation course covers the basics of 3D modeling (with polygon, subdivision, and smooth curve modeling), keyframe and path animation, materials and textures, hard and soft body collisions, cloth, particle dynamics, lighting and shading, and rendering. Over the course of the semester, students build an animated short video, complete with a soundtrack.

Students in the class come from a variety of majors including computer science, various engineering majors, and film studies. King tells us that he grades not on artistic skill—only on effort. At the end of the semester, students in the class present their models and videos to each other.
Greetings to our CS alumni and friends,

Since we haven’t had a department newsletter for a few years, let me begin by giving you a brief introduction and summary of the Department of Computer Science at the University of Colorado at Boulder. The department started in 1969 as a graduate program and turned into a department in the College of Engineering and Applied Science in 1980. The first undergraduate class graduated in 1988. Currently, we have 31 tenure and tenure track faculty (1 distinguished professor, 14 full professors, 9 associate professors, and 7 assistant professors), four research faculty, one senior instructor, and seven administrative staff. As of Spring 2010, the department has 90 PhD students, 88 master’s students, and 253 undergraduate majors.

Since I became chair in Fall 2007, we have seen some changes in the makeup of our faculty. The department has hired five outstanding junior faculty members including Christine Lv (PhD ’06, Princeton), Bor-Yuh Evan Chang (PhD ’08, UC Berkeley), Nikolaus Correll (PhD ’07, EPFL, Switzerland), Sriram Sankaranarayanan (PhD ’05, Stanford), and Aaron Clauset (PhD ’06, U of New Mexico). We also said goodbye to retiring professors Hal Gabow and Bobby Schnabel, who went on to become dean of the School of Informatics at Indiana University Bloomington.

To help the department achieve its educational and research goals, in Spring 2009, we formed an advisory board of 15 prominent members from industry and academia. After several years of discussion and preparation, the department decided to seek accreditation from ABET, the same nationwide organization that accredits other programs in the college. In Spring 2009, the ABET team conducted a two and a half-day site visit which included interviews and meetings with our students, faculty, staff, dean, and provost. The report from the ABET team was very positive, and we believe the degree program will receive accreditation in Fall 2010.

The department has received a large number of research grants totaling $6.3 million in 2009. One of them is Henry Tufo’s NSF MRI grant, which will bring CU a teraflops supercomputer to support the university’s mission of high-performance computing in science and engineering. The principal investigator of the other large grant is Professor Leysia Palen, who leads a group of faculty and students in the study of crisis informatics, which uses the latest communication technologies in the understanding and management of information flows in man-made or natural crises, such as the recent earthquake in Haiti.

I am proud to mention a few prestigious awards our faculty received recently. Katie Siek and Sriram Sankaranarayanan received the National Science Foundation’s CAREER Award. Doug Sicker received the Provost’s Faculty Achievement Award. Mike Eisenberg received the Thomas Jefferson Faculty Award. Gerhard Fischer was named an ACM Fellow.

The department is 40 years old (same age as the Internet!), and we believe we are not over the hill yet. Computing technologies are fundamentally changing the world, the way we live our lives, and the way we do research and education. We will continue our mission to offer the best education to our students and to become a world leader in computing research.

We will keep you informed about the department, and hope you will stay in touch and let us know your story.

Xiao-Chuan Cai
In this Edition

News
Animation Arrives: New Course at CU Boulder  p. 1
CU Research Team Aids Haiti Response  p. 1
Message from the Chair  p. 2

Faculty and Research
Leysia Palen—Emergency Response in the Cyber Age  p. 4
New Faculty Nikolaus Correll—Robotics Renegade  p. 6
New Faces  p. 8
Newly Funded Research  p. 10
Honors and Awards  p. 12
Return EXIT_SUCCESS; (Retirements)  p. 23

Stay Connected
Then and Now: 5 Questions with CS Alumni  p. 14
PING! Alumni Updates  p. 15
Support our Department  p. 22

Computer Science Education
A Brief History of Senior Projects  p. 24
2009 Theses  p. 26
Engineering Design Expo  p. 27

Our Department
By the Numbers

36 faculty members
15 affiliated faculty
90 Ph.D. students
88 masters students
253 undergraduate students

New!
Undergraduate Curriculum Tracks

Undergraduate students majoring in computer science now have an opportunity to select a specific track in their studies from the areas of:

- general computing
- computational biology and health informatics
- computational science and engineering
- human-centered computing
- networked devices and systems
- software engineering
- systems

Computer Science Advisory Board:

Anshu Aggarwal (Zebek)
Steve Bjorg (MindTouch, Inc.)
Steven Bucuvalas (ioSemantics, LLC)
Lori Clarke (University of Massachusetts, Amherst)
David Cohen (TechStars)
Trent Hein (Applied Trust Engineering)
Scott Hudson (Carnegie Mellon University)
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Judith Olson (University of California, Irvine)
Howdy Pierce (Cardinal Peak, LLC)
Lucinda Sanders (National Center for Women & Information Technology)
Matthew Seidl (Google, Inc.)
Richard Walker (Lockheed Martin Corporation),
Daniel Weaver (Array BioPharma)
Tell us about your vision for this research. Where will the study of crisis informatics take us in five years?

Imagine a future where there are more opportunities for gathering and making sense of information from multiple sources during a disaster event. Picture this: It’s Fall 2014 in Southern California. Temperatures are high and small fires have ignited in dry areas. With Santa Ana winds picking up speed and dried vegetation at its densest in years, emergency officials are worried the fires will expand and affect communities that have encroached further and further into the “wildland-urban interface (WUI).” Residents have been notified of the fires through weather and environmental alerts direct to their smart phones. Some evacuations have begun, while residents in other more distant areas remain on alert and begin making preparations.

Upon receiving the evacuation and alert notifications, people start taking action. Most residents under evacuation prepare to leave quickly, and use smart phone applications to get information about evacuation routes and traffic conditions. But also, they post updates about their plans to leave; where they plan to go; as well as requests for help that they might need once they evacuate, including places to stay, medical assistance for preexisting health concerns, and help with children and pets. Via social media, text message, and the Internet, this information propagates to friends, family and neighbors, as well as officials who can then make better plans about who might still need evacuation assistance. Neighbors, all concerned about their communities, make plans to stay in close digital contact to pool information they are able to gather about what is happening in their area.

Others in more distant areas are also engaged in this intensified information search in case they need to evacuate quickly. They go online to get specific information about the fires from a wide range of peer sources that are knowledgeable about the particular areas under threat. After all, some areas are still rural, and require local knowledge to convey precise information about what is happening and to see what neighbors down the road are doing. Rather than attempt to assemble this online information by hand and check it against heavily taxed official websites with possibly outdated information as was done in the past, they now have access to a suite of synthesized, easy-to-use web applications tailored to crisis situations that integrate up-to-the minute information from multiple sources. No longer must they worry about not knowing what new technology is available and missing critical information that resides in those new forums. Instead, they can readily find the most relevant online destinations and information streams with supplemental meta-information about how trustworthy, timely, and relevant the information is to their particular circumstances.

One figure from your paper shows your conceptualization of how the public will
interact with the crisis response team. Tell us about the new kinds of information flow that will happen.

One piece we've already shown in the Southern California scenario: More and more of the public's information comes directly from other citizens through the information interface (arrow D in Figure 1). The new issue depicted by arrow C deals with the matter of where this new information is received in the organization of emergency response: Are these data that result from communications something that the “public information” function attends to, or does the “intelligence” arm of command field them? This question speaks to the new tensions that are arising in the institution of emergency management—tensions that create a need to reconsider how information is shared and received. This argument of “changing information pathways” is one we have made and presented to practitioner audiences. This issue is actively being reviewed by government agencies in the United States and groups, including the U.S. Federal Emergency Management Agency, where the new presidential appointee, Craig Fugate, is calling for increased support of such change.

In the diagram, both of the new arrows are coming from a source that might appear unreliable. How do you deal with that?

The first thing to know is that during the immediate periods of emergency activity, information sources are trying to be reliable, especially from within the affected area. The bigger problem is that information becomes unreliable over time because it is no longer current. There remains the problem of the “bad actor”—someone who might deliberately insert bad information from a distance, which bigger digital audiences might attract. The information we use ostensibly relies upon many users distributed within what are known as the “impact” and immediately surrounding “filter” zones communicating with mobile wireless Internet-enabled devices.

One type of activity to detect is false information coming from a location distant from the crisis. It’s possible to verify the physical location of each contributing user using information observed by the wireless infrastructure. In several kinds of crisis situations, we can use this technique to verify location of the information source.

Please describe some examples from the present day.

Two of our Ph.D. students, Sophia Liu and Sarah Vieweg went to Virginia Tech in the aftermath of the tragic shootings that took place on April 16, 2007. In two separate attacks, approximately two hours apart, the perpetrator killed 32 people and wounded many others before committing suicide. The experience was difficult, and this initial data collection combined with ongoing data collection of online activity by those who remained at home in the lab was informative and groundbreaking for establishing some of the empirical basis for “crisis informatics” research, where a combination of social and technical approaches are required to understand new phenomena. For instance, within 90 minutes of the shootings, before the extent of the crime was known, an I’m OK at VT group on Facebook had emerged, and was one of the earliest uses of Facebook in emergency response activity.

The ramp up to today’s social media use in emergencies has been steep. Other researchers, including information scientist Christine
Nikolaus and Olga Correll’s two children, Arthur and Tatiana, are growing up multilingual in Boulder. There’s German and English for starters, but around the Correll house, they may very well find themselves conversant with robots as well. That’s because their father’s work in multirobot systems has the potential to follow him home.

Nikolaus Correll joined the CS faculty at CU-Boulder two years after completing his 2007 Ph.D. dissertation on swarms of miniature robots at the École Polytechnique Fédérale Lausanne in Switzerland. Prior to coming to CU, Correll was a postdoctoral researcher at MIT’s Computer Science and Artificial Intelligence Lab. His work on the collective behavior of robots began as a master’s student at Eidgenössische Technische Hochschule Zürich and Cal Tech, and before that, he studied Electrical Engineering as an undergraduate in Germany and Sweden.

During his first semester in Boulder, Correll drew students into his research projects and began interdisciplinary collaborations with engineering faculty from the departments of chemical and biological, electrical and mechanical engineering. To understand their work on Amorphous Computational Material (ACM), they ask you to “imagine a material that is made from a large number of soft individual units that each sense, compute, actuate, and communicate with one other. Such a material could be sensitive to chemical or biological compounds, pressure, noise, light, or orientation, and interact with the world by shape deformation or emission of electromagnetic waves.”

Correll and his colleagues envision using ACM to build artificial arms and hands that can sense and grasp much as a human does, both for robotic applications and prosthetics. Robots manufactured entirely from ACM could be as flexible and compressible as a rabbit squeezing between two fence posts. The changes in shape and the mobility of such devices will be controlled in a distributed fashion, drawing on Correll’s expertise in multirobot systems.

We talked with Correll firsthand about his passion for robotics and his current research and teaching endeavors:
Tell us a little bit about your work in multi-robot systems.

As we use more and more robotic systems in our daily life, such as vacuum cleaners and toys, and emerging “butler” robots, I believe these systems’ “intelligence” can be drastically improved by having robots working together and sharing information with other intelligent objects in the environment. More recently, I am intrigued by taking lessons that I learned from working with swarms of robots (like swarms of bees or ants) to create intelligent materials that consist of thousands of elements that can sense, actuate, compute, and communicate with each other. The intuition here is that this is essentially what seems to happen in living organisms whose complexity results from such cells interacting with each other. I will also continue to leverage the mobility and sensing abilities of animals to increase the performance of artificial systems. Examples of these systems are lawnmowers made from sheep that we can control using robots integrated in the herd, or predatory animals that track large distances in the forest to collect data from sensor networks monitoring animal activity and weather.

It sounds very futuristic, like something we would read by Isaac Asimov. Has the future arrived? Is there any particular fiction that has influenced you?

I can’t deny that I was thrilled by the robotic fantasies of the ’80s and ’90s—my youth—including Robocop, Terminator, Minority Report, and more recently The Matrix, Iron Man, and I, Robot. I never actually read SciFi books with robotic content. While these movies often go beyond what seems physically possible, I find the technical creativity that these writers exhibit and the ethical problems that they anticipate extremely stimulating.

Tell us about some specific multi-robot applications that you and your students are working on now — things that we might see in homes and business over the next five years.

Robots that guide customers in malls, perform delivery tasks in factories, or provide services in restaurants have been demonstrated; I think we will see more of this in the near future. We’re currently working on algorithms for robots that meet in tight environments such as a factory floor or a crowded mall. They need to plan optimal, collision-free paths in real time. The angle that we are interested in is to make optimal use of the available resources such as bandwidth and computational time, and to provide safe and sound solutions even if these resources are limited or failing. We are also working on algorithms and systems that allow us to distribute sensing, computation, and actuation into the environment. Why shouldn’t an espresso maker come with the code for a robot to use it? Once the machine is unboxed and turned on, your robot would know immediately what to do when you say, “Make me a coffee (please).” In order to get these algorithms out into the public, we are working with the Fraunhofer Institute for Production and Automation in Germany, which has a series of commercially available platforms.

What problems of scale do you anticipate when we go from a handful of robots to thousands, or from thousands to billions of tiny robots?

Scaling problems can be mitigated by using decentralized algorithms that rely solely on local communication and local information. While these algorithms are usually less optimal than centralized ones, scalability problems arise only when global information, i.e. a consensus among all swarm members, is required to solve a particular task.

What’s the smallest hardware platform that you’re working with, and what languages do you use to program it?

For our smart materials we are using Atmega 88s that have a footprint of 4×4 mm². They are programmed in C (in fact, the same GNU C-compiler that first-year students use here at CU). The overall robot—consisting of many such elements—is larger, however. The smallest robot I worked with is the Alice robot, which has a footprint less than 2×2×2 cm³.

Does the notion of emergent properties arise in your work? Or perhaps self-replication?

We see a lot of emergence, although more often due to bugs than by design. The problem with the term “emergent” is that it is much less exciting as soon as you know the mechanism behind a phenomenon. Also, self-replication is a tricky one. Is it sufficient that a robot can assemble a copy of itself or does (Cont’d on p. 8)
BOR-YUH EVAN CHANG joined the faculty in January 2009 after completing his PhD at the University of California, Berkeley. Evan’s research is primarily in the areas of programming languages and program analysis. He is interested in tools and techniques for building, understanding, and ensuring reliable computational systems. These interests include programming methodology, language design, and programmer productivity tools—that is, methods that will improve the way we program and the resulting software for the end-user. One of his current focuses is on using novel ways of interacting with the programmer to design more precise and practical program analyses. Before studying at Berkeley, Evan received his bachelor’s degree from Carnegie Mellon University. He is excited to have moved back to Colorado after these years of study. Though born in Taiwan, Evan spent his childhood in Fort Collins.

AARON CLAUSET received a BS in physics from Haverford College and a PhD in computer science from the University of New Mexico. He joins CU-Boulder this year from the Santa Fe Institute, where he is an Omidyar Fellow. Aaron’s research explores the physics of complex systems, focusing on methods for understanding the structure and function of networks, on the origins of morphological diversity in biology, and on patterns in terrorism and warfare. Outside of research, he enjoys traveling, the outdoors, and spending time with his wife, Lisa.

SRIRAM SANKARANARAYANAN joined the department in the fall of 2009. He obtained his MS and PhD in computer science from Stanford University in 2005. Subsequently, Sriram was a research scientist at NEC Labs in Princeton, NJ. Sriram’s research focuses on mathematical models and formal verification techniques for cyberphysical systems. His work combines a variety of ideas from automata, control theory and optimization. His hobbies include listening and performing Indian classical music. He also enjoys traveling and going on long hikes.

We also welcome NIKOLAUS CORRELL, who is featured on p. 6.
A doctoral student working with Leysia Palen’s research group, KATE STARBIRD came up with an idea for using Twitter to facilitate communications between citizens and emergency workers during a crisis. Starbird’s “Tweak the Tweet” concept won her second place at the “Random Hacks of Kindness” competition sponsored by Google, Microsoft, and Yahoo, and is being used to communicate crucial information during the relief effort for the earthquakes in Haiti.

Emergency Response in Cyber Age
(cont’d from p. 5)

Hagar, have examined how farmers used computational media to find information and support one another during the lengthy 2001 UK foot-and-mouth crisis. In the 2004 Indian Ocean tsunami, there were indications of significant socio-technical change in public participation behaviors such as mobile phones, personal blogging, and online photo repositories like Flickr. In the 2005 London terrorist attack, camera phone users on subway trains offered officials, the media, and the public firsthand assessments of the impact of the bombings. After the May 12, 2008 Sichuan earthquake in China, a popular internet forum became a location for integrating information with other people from multiple sources, organizing public action and expressing grief and anger (Qu et al., 2009). Work in the area of humanitarian crisis, specifically the Kenyan postelection violence in January 2008, was the basis for the creation of a “crowd sourcing” environment, Ushahidi, where people could warn of and report violence (Meier, 2009). Initial analyses on the use of that system show that citizen journalism had a greater geographical reach than traditional sources.

Last year, more examples emerged. During the floods of the Red River across the U.S. and Canadian border as well as simultaneously occurring Oklahoma grassfires, we did our own extensive research of Twitter records, examining the relationship between geographical location and the generation of new information. Analysis of the “neogeographers” who emerged during these and other events to create crisis map mash-ups reveals the relationship between design decisions and mash-up evolution (Liu & Palen, 2010).

In the area of public health, disease trajectories are being tracked and anticipated through Internet search. Multiple efforts, including Google Flutrends, track flu outbreaks by analyzing and geolocating relevant query terms (e.g., “aches”). The U.S. Geological Association uses citizen geo-reports to measure the intensity of earthquakes on “Did You Feel It” (earthquake.usgs.gov/eqcenter/dyfi/). They have also deployed software using common accelerometer-based laptops to detect earthquakes and are now mining Twitter for earthquake detection. This again suggests a future vision of computer-augmented users as participatory data collectors.

What are some of the specific questions that you’ll be analyzing as part of your NSF research?

In tackling such empirical goals for disaster research, we must understand features of activity at different scales of interaction. This includes (but is not limited to) analysis of:

1. Where and when online crisis-based information arises;
2. How people organize around online information exchange including the degrees and types of participation;
3. Who participates and why;
4. The presence or absence of self-policing for accuracy and credibility;
5. Timeliness of information;
6. The kind of information needs that arise for different kinds of large-scale emergency events, and who needs what kinds;
7. How people make judgments about the accuracy/validity of information from peers.

As we completed the newsletter, Professor Palen’s research group was immersed in the relief effort for the earthquakes in Haiti. One approach that the group brought to the relief efforts was “Tweak the Tweet,” an idea conceived by graduate student Katie Starbird and colleague Jeannie Stamberger. The system uses consistent keywords called hashtags that precede crucial information. The tags allow immediate identification and collation of information such as a poster’s location, the status of key facilities, the specific relief needs that have been requested, and the specific offers of aid that are being made. The system is now being used by Sahana, a free and open source disaster management system.

Additional information on Tweak the Tweet, including access to the research group’s data, is available at epic.cs.colorado.edu/helping_haiti_tweak_the_twe.html. Information on the Sahana Foundation is on-line at www.sahana.LK.
**CS Faculty: Newly Funded Research**

KEN ANDERSON received a $25,000 grant from the National Renewable Energy Laboratory for his research in Experimental Data Management for the Process Development and Integration Laboratory. The grant is to fund the PhD work of Daniel Korytina who also works part-time at NREL. For his dissertation, they are designing and developing techniques to automatically generate provenance information about scientific workflows used at NREL.

XIAO-CHUAN CAI and co-PI RICHARD BYRD received a $752,000 DOE award to study *Scalable Optimization Algorithms for Systems Governed by Multi-Physics PDEs*. The project investigates parallel algorithms for numerical based control and stabilization of fluid instabilities. Cai is also the principle investigator on an NSF grant ($264,000): *Nonlinear Preconditioning Techniques for Coupled Multi-physics Problems on Massively Parallel Computers* and a co-principal investigator on another NSF grant ($580,000): *Multiscale Nonlinear Domain Decomposition Method for Modeling the Impact of Climate Change on Groundwater Resources*.

MIKE EISENBERG received an NSF grant ($397,000): *A Cultural Shift in Computer Science: Introducing Computation through E-Textile*. The project introduces a pathway that does not purport to change or even implicitly criticize the existing CS culture, but rather seeks to provide a very different culture through which new populations (and especially females) can become fascinated with computing.

DEBRA GOLDBERG and co-PIs DIRK GRUNWALD and CLAYTON LEWIS received a $2.9 million, five-year NSF GK-12 grant that integrates computer science into traditional studies in the K-12 classrooms. The goals of the project are to introduce middle and high-school students to computation and computer science by integrating computational thinking into existing curriculum. The grant supports 10 graduate fellows for up to two years each. Each fellow works with teachers in a local school to introduce computation in existing lesson plans. Examples include the use of computational bioinformatics in genetics or biology classes, the effect of computation on maps, privacy, and civil society in geography and social studies; and the addition of computational thinking to traditional STEM fields such as mathematics and physics. The fellows don’t focus on programming; rather, they emphasize general computational thinking skills, including the use of algorithms, analysis of data, and ways to automate certain decision or data analysis tasks.

DIRK GRUNWALD received funding for two new and two ongoing projects in 2009 as part of the GENI (Global Environments for Network Innovation) program at the NSF. Both projects involve next-generation wireless networks. In one three-year project, the University of Colorado will work with Rutgers University to deploy a next-generation “Programmable WiMAX” access network in Boulder for experiments in mobile computing. The other three-year project involves building a “Cognitive Radio” platform in conjunction with Rutgers University to experiment with dynamic spectrum access and selection across vast ranges of spectrum, such as the future Digital White Spaces. Dirk is also co-investigator on a DARPA award with JEREMY SIEK on a program that is helping design compilers for highly parallel computers.

LIZ JESSUP received an NSF grant of $250,000: *Taxonomy for the Automated Tuning of Matrix Algebra Software*. The project studies ways to ease the production of optimized matrix algebra software.

CLAYTON LEWIS received $85,000 to support the Fluid Project, an open, collaborative development project with the goal to improve the user experience of community source web applications (fluidproject.org).

QIN (CHRISTINE) LV received two new NSF grants as a co-PI. The first is a $1.55 million, four-year grant, *CommonSense -- A Distributed Mobile System for Socially Collaborative Environmental Monitoring*, which aims to develop new techniques for efficient and effective environmental sensing, management and analysis of environmental sensing data, as well as environmental and social study. The second is a $576,514 grant, *DataRods: Enabling Time-Series Analysis of Massive Multi-Modality Cryospheric Data*, which aims to develop efficient techniques for managing and analyzing large amounts of cryospheric time-series data.

MICHAEL MAIN received funding from the Engineering Excellence Fund for a pilot project on using tablet technology in the introductory computer science class and the discrete structures class. During lectures, the material is projected using a tablet PC. Students with tablets or laptops in the classroom can annotate the lectures and interact via real-time quizzes and other collaboration tools.

JANE MULLIGAN received two research awards totaling $96,000 from Flashback Technologies to support her research *A Non-Invasive Monitoring System of Combat Casualties for Early Detection of Hemorrhagic Shock and Early and Reliable Detection of Hypovolemia*. 
LEYSIA PALEN’s $2.8 million NSF grant in the area of crisis informatics is the subject of an article in this newsletter.

MARTHA PALMER and JIM MARTIN are principal investigators for a $2.8 million collaborative NSF grant, Richer Representations for Machine Translation, which is aimed at developing methods for automatically learning correspondences between Chinese and English at a semantic level, allowing machine translation to benefit from recent work in semantic (meaning) analysis of text. The collaborating institutions include the University of Rochester, Columbia University, the University of Southern California, and Brandeis University. The CU funding is $560,000 over four years.

ALEXANDER REPENNING is working on a $1.5 million NSF project, Strategies: Reforming IT Education through Game Design: Integrating Technology-Hub, Inner City, Rural and Remote Regions, with co-investigator David Webb. The goal of the project is to reinvent computer science in public schools by motivating and educating all students including women and underrepresented communities. The students learn about computer science through game design starting at middle school. The project investigates motivational and educational concerns in various contexts including inner city schools, remote rural areas, and Native American communities in South Dakota and Colorado. The project has identified a real need. It aimed to instruct 1200 students in 3 years but has reached already over 1300 students (52.5% girls) in the first semester.

SRIRAM SANKARANARAYANAN received an NSF CAREER Award of $460,000 for his proposal Automatic Analysis of Cyber-Physical Systems. This project will investigate verification techniques for analyzing large and complex cyber-physical systems. The project will develop rich modeling formalisms that are capable of capturing realistic system designs at the right levels of abstraction. These formalisms will form the basis for verification techniques that can be used to pinpoint functional defects in cyber-physical systems.

DOUG SICKER received an IBM faculty fellowship $10,000 to study network security. This is Doug’s third fellowship from IBM.

JEREMY SIEK, a joint member of the computer science faculty and electrical, computer, and energy engineering, received an NSF CAREER award for his project Bridging the Gap Between Prototyping and Production. The research aims to discover the scientific principles necessary for a single programming system to effectively support the incremental refinement of prototypes into production software, resolving classic conflicts between flexibility and safety, and between abstraction and performance.

KATIE SIEK received $610,000 NSF CAREER Award for her work on Health Bridge: Motivating Personal Health Record Adoption by Low-Income Communities. The research includes community building, curriculum design, and K-12 outreach activities. Katie and the Wellness Innovation and Interaction Lab will collaborate with the Health Bridge project to design Health Bridge. Research methodology and results will be integrated into her established health-related course and specialized undergraduate curriculum in health-related informatics.

TAMMY SUMNER and co-PI JIM MARTIN received a NSF grant of $392,000: Enabling Robust Learning with Conceptual Personalization Technologies. The goal of the project is to support robust learning with personalization strategies using natural language technologies.

HENRY TUFO has received a total of $1.65 million from two DOE grants: Petascale Atmospheric General Circulation Models for CCSM and Chicago: Toward a Non-Hydrostatic HOMME. He has also received an NSF award funded by the American Recovery and Reinvestment Act, entitled Stochastically Robust Resource Allocation for Computing.

Climbing With Chaos! This photo was taken during research performed at the Boulder Rock Club by Professor Elizabeth Bradley and PhD student Caleb Phillips. The work uses an aspect of chaos theory called strange attractors to generate variations in rock climbing routes, and, in final step, the variations are smoothed using machine-learning techniques.
Honors and Awards

Readers can find the latest news about department achievements at www.cs.colorado.edu/department/news

Faculty and Staff

Grants administrator EVAN CANTOR received the Employee Recognition Award for September.

GERHARD FISCHER was elected a Fellow of the Association for Computing Machinery for his contributions to human computer interaction and computer-mediated lifelong learning. He also received a fellowship from the Council on Research and Creative Work for the 2009-10 academic year, during which he was the keynote speaker at four international conferences including the Ninth IEEE International Conference on Advanced Learning Technologies in Latvia.

Dean’s Faculty Fellowships were awarded to DIRK GRUNWALD, BUZZ KING and HENRY TUFO.

RICK HAN and his graduate students won the computer science award in CU’s New Venture Challenge for their iPhone application, Hoozat, which allows users to view the Facebook profiles of people who are physically near to them. Han worked with his graduate students to develop and market the application.

ROB KNIGHT, a computer science affiliated faculty member from chemistry and biochemistry, is among 50 of the nation’s best early career science faculty who have received the prestigious Howard Hughes Medical Institute Early Career Scientist Award for 2009. He will receive a six-year appointment to the Institute, allowing him the freedom to explore the human microbiome without worrying about where to find the money to fund those experiments or whether the experimental design matches what was said in a grant application, essential in this fast-moving field.

CLAYTON LEWIS was elected a member of the Association for Computing Machinery’s CHI Academy, an honorary group of individuals who have made substantial contributions to the field of computer-human interaction. In September, Lewis also received the dean’s performance award for professional progress.

Faculty members JIM MARTIN and TAMMY SUMNER along with former students STEVEN BETHARD and PHILIPP WETZLER received the 2009 Vannevar Bush Best Paper Award at the 2009 ACM/IEEE-CS Joint Conference on Digital Libraries for their work on “Automatically Characterizing Resource Quality for Educational Digital Libraries.” Kirsten Butcher, of the University of Utah, was also a co-author.

SRIRAM SANKARANARAYANAN was the recipient of the ACM SIGSOFT Distinguished Paper Award presented at the 24th ACM/IEEE International Conference on Automated Software Engineering held in Auckland.

DOUG SICKER, along with colleagues Eric Frew (aerospace) and Robert McLeod (electrical), was selected to receive Faculty Achievement Awards from the provost. Sicker was selected as a senior advisor to the Federal Communications Commission (FCC) National Broadband Plan, where he is leading the task force on research and development recommendations. He also recently received an IBM Faculty Award.

RICHARD BYRD, ANDRZEJ EHRENFEUCHT, HAL GABOW and GRZEGORZ ROZENBERG have each been named at ISIHighlyCited.com as being among the top 250 preeminent individual researchers in each of 21 subject categories who have demonstrated great influence in their field as measured by citations to their work.

MIKE EISENBERG is a recipient of the 2010 Thomas Jefferson Award for his classes that inspire origami and other see-and-touch mathematics. Former chair Liz Bradley wrote of his work, “Mike is one of our best-loved teachers, even though he insists on deep thinking and hard work. His courses are, in my opinion, the most innovative in the department.”
Students

JUDE ALLRED received the college’s spring award for outstanding graduate for service.

JACOB BURTON, a joint major in computer science and international affairs, has earned the prestigious Boren Scholarship, offered by the Institute of International Education through their National Security Education Program. The highly competitive, national scholarship is awarded on the basis of merit and relevance of the student’s academic and professional pursuits to the international interests of the United States.

SCOTT BUSCH received the college’s Outstanding Graduate for Service award for fall 2009.

DAVID CHEESEMAN received the Chancellor’s Graduate Award for Excellence in STEM Education.

DANIEL COSTINETT won an award for his work at the spring Discovery Learning Center research symposium.

JULIA GOODRICH was awarded a prestigious Goldwater Scholarship. Her undergraduate thesis work is with Rob Knight in the analysis of DNA sequences.

MARYAM GOOYABADI was recently named a Global Social Innovation Fellow by the Orbis Institute for her project LeadAWay. The project creates a leadership and economic development model for the establishment of self-sustaining orphanages in communities around the world.

RYAN KENNEDY was named the department’s Outstanding Graduate for 2009. He also received the Astronaut Scholarship last year, and he is now in the graduate program at the University of Pennsylvania.

JONATHAN MAI and MICHAEL TON were recipients of the 2009 Domino Award, which is given annually to students for an outstanding essay honoring the impact that other computer scientists have made on modern society. Mai wrote on Bill Gates’ development of Altair Basic, and Ton’s essay highlighted the invention of the transistor. The award, sponsored by CU computer science alumnus Herb Morreale (BS ’91), includes a $500 prize.

DAMON MCCOY was named a 2009 Computing Innovation Fellow by the Computing Research Association. This award provides funding for postdoctoral work at the University of California-San Diego under the mentorship of Stefan Savage.

The 2009 winner of the Lloyd Fosdick award for outstanding group-based student project was SketchCraft: A Sketch-Based, Physics-Enabled Video Game. Project team members were undergraduate computer science majors EVAN MCQUINN, GEOFFREY MITCHELL, COLIN RIEGER, MAREK SOTOLA and JAN STRZEPEK.

KATE STARBIRD received an NSF fellowship. She also won second-place with her social media innovation Tweak the Tweet in a national technology competition, Random Hacks of Kindness. The idea focused on improving communication during disasters.

Alumni

JAMES BARTON (MS ’82) was honored by IEEE with the 2010 IEEE Masaru Ibuka Consumer Electronics Award. The award recognizes Barton for contributions to the development and commercialization of digital video recorders and was presented recently at the IEEE International Conference on Consumer Electronics in Las Vegas.
Twenty years ago, Professor **XIAODONG ZHANG** (PhD CompSci ’89) had just completed his PhD dissertation in Boulder. Today, he is the Robert M. Critchfield Professor in Engineering and chair of the Department of Computer Science and Engineering at Ohio State University.

He tells us that his career path from Boulder to Columbus, Ohio, has been both challenging and exciting. He spent his first eight years after graduation at the University of Texas in San Antonio where he became acting chair of the newly formed computer science program and led the effort to build a PhD program. From there, he moved to the College of William and Mary in Williamsburg, Virginia, and most recently, he served on the faculty at Ohio State University. Zhang also spent two years serving as a program director at the National Science Foundation in Washington, D.C. He was recently elected a Fellow of the Institute of Electrical and Electronics Engineers for contributions to computer memory systems.

At the other end of the time spectrum, **JUDE ALLRED** (BS CompSci ’09) completed his BS in computer science in Boulder just last year, receiving the college’s Outstanding Graduate for Service award. Allred got married last summer to Stirling Gibbs and with his new wife moved to Brooklyn where he has begun his career with the Manhattan office of Fog Creek Software.

Allred’s award from the college was well-deserved. He served both as an Engineering Fellow and a member of the Engineering Excellence Fund Committee. Within our own computer science department, Jude was chair of the student-run Computer Science Undergraduate Advising Committee (CSUAC), and as he prepared to graduate he was busy coordinating a job fair and other CSUAC activities. He generously gave his time to at least a dozen other activities such as the local Association for Computing Machinery chapter and serving on the external review of the Art and Art History Department. His volunteer work continues in Manhattan, where he is working in his free time on a free-technology-for-students-and-startups initiative at Fog Creek.

We posed a series of questions to our two graduates from then and now, and are happy to report to you with their answers.

**Please tell us about the focus of your computer science work.**

**Zhang:** A common thread of my research focuses on fast data accesses and resource sharing with cost- and energy-efficient management at different levels of the memory and storage hierarchies in distributed computers and Internet systems. I have led research projects for design and implementation of caches, memory, and storage systems. One work of ours, impacting both academic research and technology advancement, is the development of the LIRS algorithm. This algorithm fundamentally addresses the limits of the LRU replacement used in almost all memory-capable digital systems, from large computer systems and databases to small devices, such as cell phones. LIRS and its approximation methods have updated the memory management in major production systems, such as Linux, NetBSD, and MySQL. Several other algorithms and system designs of ours have been widely adopted in the memory controllers in commercial processors (e.g. AMD, Intel, NVIDIA, and Sun), and in the virtual memory management of Linux. In addition, our new research findings and solutions have been included in several computer architecture and system textbooks.

Being a professor, I have been fortunate to have a unique opportunity to mentor and
teach many talented students, and, conversely, to update my own knowledge by learning from them. I have supervised several dozens of graduate students, visiting scholars and post-doctoral researchers. It is worthy to mention that five of my PhD graduates have become faculty members at academic institutions in the U.S., four of whom have been tenured and promoted to associate professors. Three of them received NSF CAREER awards, and one received a Department of Defense Young Investigator award. My third generation PhD graduates have been out for a few years.

Allred: I work at Fog Creek Software, which is Joel Spolsky’s company, and I’m a FogBugz developer. Because our company is fairly small, we’re all more or less engaged with all of the products and initiatives of Fog Creek. Aside from general engagement, I’m part of a small team of software developers (and one project manager) actively working on FogBugz, which is an issue tracker and project management suite. We’re all responsible for the performance, maintenance, and advancement of FogBugz, and as such we all have many, many duties that might arise. Naturally, some of us will spend more time in some areas than in others, so we specialize in that way. I’m the most knowledgeable about our full-text search architecture and algorithms, as well as database performance optimization, but we’re all expected to be capable of doing whatever needs to be done. At the moment, I’m working on a small plug-in to provide customizable landing pages for FogBugz sites, handling support cases, trying to figure out why Microsoft’s ActiveRecord interface is 10 times slower than sending SQL directly to our database, writing a functional spec for Fog Creek’s Student and Startup initiative, and teaching our Wasabi compiler how to properly type check and link with inline C# code.

**Professor Zhang, what are the biggest changes that you’ve seen in the field of computing over the twenty years since you’ve completed your PhD?**

Zhang: The first biggest change I have seen is that “computing” has become a basic and necessary utility everywhere in the human society, almost equivalent to the value of water and electricity. It is low-cost (or free in many ways), pervasive, and well-connected by Internet and wireless networks.

The second biggest change I have seen is that we have entered a data explosion era. The concept of “computing” has shifted from CPU-intensive to data-intensive operations. Today, most enterprises, online stores, Web service providers, and various scientific application practitioners must quickly process an increasingly huge amount of data, which are the sources of revenue and critical knowledge base of the human society.

Third, parallelism and concurrency have become the basic programming and execution model everywhere in computer systems. I did my PhD thesis in parallel computing 20 years ago when parallelism was considered a new technology. Now instruction-level parallelism and multithreads are required on chips, such as in multi-core processors and in SSD flash memory; memory-level-parallelism creates concurrent accesses to DRAMs, MapReduce-like models enable massively parallel data processing in large scale distributed systems; and a RAID-like structure has been a standard storage configuration for concurrent I/Os.

Finally, the rapid economic globalization means “the world is flat.” For example, we buy daily goods manufactured in China at major shopping centers all over the world; we drive Toyotas made in Japan and BMWs made in Germany, and we watch the Samsung LED TVs made in Korea. However, the whole world continues to depend on the core computing technology of both hardware and software made in the United States. The strong and dominant American leadership in computing has not changed.

**Jude, what are the workdays like in 2010 for a new graduate?**

Allred: My days are pretty varied. The only things that don’t vary, really, are that I work eight-hour days, and lunch is at noon. I have my own office, an Aeron chair, and a very large whiteboard. Here’s a short list of common activities:

1. Fixing a bug or performance issue: Sometimes this involves working with a customer directly. We’re lucky in that most of our customers are software developers, so they’re generally pretty helpful in diagnosing problems.

2. Implementing new functionality: I always have some sort of project that I’m working on. If it’s a large project I might be put into ‘protected’ mode, which means that the other developers will take care of any tech support issues that might otherwise come my way. Creating new functionality entails implementing code in a branch repository (we use Mercurial), getting code reviews as I progress, providing a custom build to our QA team for bug and usability testing, and then once everything looks good, merging the branch back into the main repository.

3. Writing or giving feedback on a functional specification: All new features with a significant visible-to-the-user component start out as functional specs. It’s a lot faster to iterate on user interface and behavioral choices in text and with mockups than it is to do so with code.

4. Performing a code review: All of our code is peer-reviewed, and we perform the reviews in Kiln. This echoes the mentality of doing things right the first time so as to minimize the burden of maintaining the code later.

(Continued on p. 16)
5. Lunch. We eat lunch together every day. It’s rather like Thanksgiving, but daily and much more varied. This is a very significant part of my day, as it’s a chance for me to sit down and chat with anyone about anything. Since I’ve started here, I’ve had several corporate strategy-related ideas that I’ve been able to discuss with our CEO by virtue of sitting next to him at lunch. It’s really nice to feel like my thoughts are given serious consideration. I’ve also gotten pretty good at making lattes.

6. Talking to people: I usually have a queue of questions or things that I want to discuss with assorted people, so I’ll call them into my office whenever they walk past. Some things are more efficient to talk about than to convey via text, ergo we talk. I talk to our lead programmer at least a little bit every day, as he talks to everyone and can appraise me on any essential information.

When I’m not coding or talking to people about coding, I’m using FogBugz, since it handles all of our communication (both internally and with customers), specs, tasks, time estimates and tracking, code reviews, etc. I feel like about 90 percent of my day (excluding lunch) is productivity, and the rest is overhead dealing with how to best be productive.

What advice would you each give to an 18-year-old who is considering computer science as a career?

Zhang: First, the strong U.S. leadership in computing technology is also reflected by providing the best computer science education and research program in universities. Thus, choosing a computer science major in a U.S. university is a very wise decision with many advantages.

Second, computer science is not equivalent to programming at all (perhaps you saw that in Jude’s answer). In fact, basic programming classes are required to all majors now in U.S. universities, just like English and calculus classes. Programming provides us with a basic vehicle to communicate with the computers. The computer science study focuses on laying a foundation to gain both algorithm analysis ability and practical techniques of implementations for computer systems and applications. This is one of the most challenging and exciting topics in the field of science and engineering.

Third, the computer science field is still young, and there are a lot of challenges and space to grow. The field rewards highly innovative students who may not have transcripts of straight As. The world has been changed by several major computer companies that were started by undergraduate and graduate students, such as Microsoft, Sun Microsystems, Google, Yahoo, and many others.

Fourth, hard work is a basic requirement in our field. Computer science is a highly personal, merit-based field. A lot of effort is required to master the subject. In Malcolm Gladwell’s recent book Outliers, he gives a rule of 10,000 hours concentrating on a subject in any field in order to be an expert based on true stories of many world leaders, including Bill Gates of Microsoft, Bill Joy of Sun Microsystems, and Steve Jobs of Apple.

Finally, a unique feature of the computer science field is that it disseminates the knowledge/technologies and transfers them to society much faster than other fields do. Because it is a common practice in our field to make new ideas available to the public without a patent protection, to make high quality software as open source, and to communicate and exchange scholarships in highly competitive conferences, instead of journals.

Allred: Get your feet wet as soon as possible.

Computer science is special in that you can experiment and innovate at a rapid pace and with minimal tools. The applications of CS are very, very broad, so explore until you find something that’s fascinating to you. I still agree with most of the advice that I read during my freshmen year: www.joelonsoftware.com/articles/CollegeAdvice.html.

Right from the start, your CSCI 1300 and 2270 courses are rather the ultimate. In those courses I learned the fundamental tools that I’ve since been reapplying constantly. If you’re able to think at a low level, and able to decompose high-level workings into their low-level components, you can think at any level. It’s rare that I directly touch pointers nowadays, but I see them everywhere and manipulate them constantly. API programming influenced me a lot. It introduced me to C# and .NET, which then enabled me to make non-command-line-based programs. Breaking free of the command prompt was a pretty substantial thing for me, as it meant that I was suddenly able to produce meaningful software. Since that class, I’ve developed a host of pet projects and fun little apps that I use with some frequency.

Persist in your attempts to find an internship—I initially tried in 2007 and was rejected. I’m glad that I tried again a year later. My GPA and extracurricular activities got me past the resume screen, and my knowledge of data structures helped me ace three of the interviews, combinatorics the fourth, recursion and functional languages the fifth, bit wise operations and memory management the sixth, and a general knowledge and comfort with algorithm development and runtime analysis was useful in all of them.

Our thanks to Professor Zhang and Jude Allred for taking the time to talk with us and with future computer science students.
PING!  News from CS Alumni

The best part of putting together the newsletter was the delightful, large response I got in response to my request last December for updates from CS alumni. Many of your names brought forth good memories of faces and classes from the past 30 years. If I missed your e-mail or you missed my request (or I inadvertently slipped a mistake into your listing) please send something to me now! I apologize for the tiny font—but that’s what I get for insisting on all the news!

All my best,

Michael Main, Associate Professor ■ main@colorado.edu

‘70s

Dave Kasik (MS ‘72) is a senior technical fellow at Boeing where he’s having great fun doing visualization and interactive techniques worldwide. ■ John Penzie (MS ‘73) spent 30 years as a computer applications engineer at the Federal Highway Administration. He tells us that his MS in computer science combined with a BS in civil engineering provided many interesting, challenging, and rewarding career experiences. He was assigned a leadership role in civil engineering software development, evaluation, and procurement during 30 years with the Federal Highway Administration. He was also detailed to the World Bank occasionally to provide hardware and engineering software procurement assistance to foreign countries such as China, Thailand, Paraguay, and Saudi Arabia. He is now preparing for retirement from the business development team at Bentley Systems, Inc. ■ Dean Schulz (MA ’69, PhD ’76) is president of Conceptual Assets, Inc., which provides system and software development as well as consulting on intellectual property. He was recently awarded his 14th U.S. patent. His software work includes a 3D dynamic bicycle fitting system (retul.com), a 3D optical tracking system, and an object-oriented 3D geometry computation library. ■ Bruce Sanders (MS ’78)—We’re just checking to see whether you’re paying attention to these alumni notices, but, yes, our long-time senior projects instructor was a 1978 grad of the computer science program, and he is still guiding students in the year-long senior project course (see the article elsewhere in this newsletter).

‘80s

Becky (Jones) Postell (MS ’80) recently left her position at IBM in Lexington, KY. She’d like to return to Boulder soon. ■ After his degree at CU, Alaaouda Refoudi (MS ’80) completed a PhD in the area of natural language processing at the University of Sheffield. He is presently a professor in computer science at the University of Setif, Algeria, where he conducts research in natural language processing, ontologies, and web services. He is the father of two children, a girl (21) and a boy (18). ■ Tom Ertl (MS ’82) is a professor of computer science at the University of Stuttgart, Germany, where he recently hosted a visit from our very own Gerhard Fischer. ■ Rob Brazell (BS ’83, MS ’95) is chairman of the board of Return to Work, Inc. (return2work.org), an organization that is devoted to rapidly rehabilitating wounded warriors returning from Operation Iraqi Freedom and Operation Enduring Freedom in Afghanistan. The organization has recruited multiple companies to donate millions of dollars to help the veterans return to work and return to life. Rob is also president of B2C Inc. of North America. ■ Tyler Curtain (BS ’84) is associate professor of English and comparative literature at the University of North Carolina at Chapel Hill, and also adjunct faculty in the women’s studies department at Duke University. He says it all started with his courses at CU-Boulder and his interest in the philosophy of computation/philosophy of meaning. “I now teach courses in theories of language, and incorporate a good deal of some very basic and important lessons I learned from Andrej Ehrenfeucht’s courses on theories of computation and Alan Turing. He and Evi Nemeth have been two central folks to my intellectual career!” says Tyler. He lives with his husband, Jay D’Lugin, MD, in Chapel Hill and Atlanta. ■ Jeff Jennings (MS ’86) is a senior firmware engineer at STEC (stec-inc.com) in Boulder. For their mid-life crises, he and his wife Kim Kreutzer (26 years) both started playing ice hockey. They plan to fit in as much traveling as possible over the next few years, having their eyes on Ireland or maybe Japan this year. ■ Ronald Olshausen (MS ’87) went on to earn an MBA in finance from Indiana University and build a career in computational finance, a synthesis of computer science and structured finance. For the past decade he has run his own company, Olshausen Consulting LLC, with offices in New York, London, and Vancouver (Canada). They build massively parallel computational engines for investment banks for the valuation and risk analysis of structured credit products. The work occurs using massive, multi-terabyte data warehouses coupled with grid computing technology to model the predicted behavior of complex financial instruments—“absolutely fascinating stuff,” says Ronald. He says that he spends a ridiculous portion of his life in airports and hotels and back-and-forth between his Vancouver and New York City homes. For 16 years, he has been married to Linda Sah Olshausen, an architect by training from UC Berkeley. ■ Alley Al Hinai (BS ’88) is the IM&T Skillpool manager at Petroleum Development Oman in the coastal city of Mina Al Fahal. The IM&T department, where he is responsible for staff talent and capability development, has about 300 full-time employees and over 200 contractors. Prior to returning to Oman, he worked in Houston and the Netherlands. ■ Margaret Pinson (BS ’88, MS ’90) is a computer engineer with the National Telecommunications and Information Administration in Colorado. Though her research project has remained the same since graduation, the work has changed from programming (which she sometimes misses) to research and international standards. Her research is in objective and subjective measures of video quality with the most recent accomplishment being the launch of the Consumer Digital Video Library (cdvl.org). This website gives users access to high quality uncompressed video scenes that may be used freely for research and development. Her work sends her around the world to countries such as Japan, Switzerland, and Germany. ■ Athman Bougueddaya (PhD ’89) has been a faculty member at Queensland University of Technology in Brisbane, CU, Virginia Tech and Purdue. He is now a science leader in the area of service computing at the Australian Commonwealth Scientific and Research Organization in Canberra. He continues as an adjunct professor at the Australian National University, University of Queensland, and Macquarie University, and was recently elected as an IEEE Fellow. ■ Rolf Reitzig (BS ’89) completed an MBA at CU in 1994. He lives in...
Denver with his wife, Lea Ann, and nine-year-old son, Philip. He is president and principal consultant for Cognence, Inc. (cognence.com), a software engineering management consulting company that specializes in helping customers implement more effective processes and tools that ultimately improve software quality, productivity, and predictability. In his scarce spare time, he plays in a ska/reggae band called Judge Roughneck (judgeroughneck.com). The group has been together for 15 years, producing three CDs, and playing with the best reggae/ska artists in the world, including four times at the Reggae on the Rocks festival and various gigs around Colorado and beyond.

‘90s

■ Bassam Saliba (BS ’90) is chief executive officer of the software firm Eiquom, Inc. (equiom.com) in Bellevue, WA. ■ Bindu (Rufus) Wavell (BS ’90) is vice president of engineering at Zia Consulting in Boulder, where he has focused on document management consulting for many years. He is working on a dynamic textbook publishing system for McGraw-Hill Higher Education (create.mcgraw-hill.com/createonline/index.html) that allows instructors to combine source materials from thousands of textbooks and many tens of thousands of articles/cases/readings. ■ Herb Morreale (BS ’91) works on a variety of projects ranging from board positions (including the Computer Science Department’s advisory board) to social media consulting to non-profits. He started the Domino Award (blog.toplers.com/2009/05/05-domino-award-winners.html) designed to help undergraduate computer science minds figure out how to make a big impact in the world. (See the article elsewhere in the newsletter on this year’s winners). Herb lives in Louisville with his wife Terry (BS ’94) and two children. ■ Ying Xu (PhD ’91) is professor and director of the Institute of Bioinformatics at the University of Georgia where he holds the Regents Research Alliance Eminent Scholar Chair. He spends most of his research time on developing systems biology techniques (including computer algorithms) for early detection of cancer through blood and/or urine tests. One example of his work was the co-authored paper “Computational Prediction of Human Proteins That Can Be Secreted into the Bloodstream,” published in the journal Bioinformatics. ■ Dale Barnard (BS ’92) is sole proprietor of Box of Keys, LLC, in Austin. ■ Stefan Carmiën (BS ’92, MS ’02, PhD ’06) is a senior researcher in neuroengineering for the Fatonik- Technalia Foundation in San Sebastián, Spain. He lives in the Basque province of Gipuzkoa where he is known as ikertzaila nagusia, neuroingeniería. He works on cognitive orthotics for persons in early onset Alzheimer’s disease, with a goal of helping them live in their home as long as possible. ■ Tom Orban (BS ’92) works for Lockheed Martin in Colorado. ■ Jan Inge Bergslien (MS ’93) is a senior software architect for Microsoft. He is still an active cross-country skier, mountain biker, and runner. He lives with wife and three daughters in Norway where they enjoy skiing, mountain biking, running, and traveling. ■ Brian Ellis (BS ’93) is a software system architect for Nagrastar in Denver. ■ Alan Krantz (PhD ’93) works as a software engineer at Akamai in Boston, which he joined in 2000. His specific tasks and work ranges from design/architecture, customer integration, implementation, and system debugging. ■ Greg Hill (MS ’93) was most recently a research associate at Colorado State University, working on programmatic access to and analysis of weather station data records. Before that, he was a research assistant with the CU Museum working on a variety of applications including georeferencing natural history collection records and phyloge- netics. Now he is taking a year off to spend at home and with his partner, Deane, at Brown University in Providence. He plays the flute seriously and tuba for grins; he collect antiques, paints, and reads a lot. He is a volunteer natural- istic volunteer at the Boulder County Parks and Open Space program and has become a noodle aficionado (a new puppy, Zyllda, in addition to his beloved 11-year-old kelpie, Chip). ■ George Rabatin (BS ’93) is a systems manager at Amazon. com where he manages operations for the Internet Movie Database (imdb.com). ■ Chad Scates (BS ’93) is a partner in Cardinal Peek, a Lafayette engineering firm. ■ Gerry Stahl (PhD ’93) is a tenured associate professor at Drexel University in Philadelphia. He is the author of two recent books, Group Cognition (MIT Press, 2006) and Studying Virtual Math Teams (Springer, 2009). ■ Phil (PJ) Bostley (BS ’94) is a principal engineer/manager for Qualcomm Innovation Center, Inc. in Boulder. ■ Vajayanti (Rupa) Eichenberger (BS ’94) lives in the San Francisco Bay area, where over the past 10 years she has worked at both startups and large companies (currently a principal staff software engineer at Motorola). She owns her home in the foothills and is single. She runs a social and tech-centric group for women engineers in the South Bay (www.linkedin.com/reichenberger). ■ Chris Jansen (MS ’94) is a service-oriented architect at a new Boulder start-up, Troppus Software (trop- pussoftware.com), where the work is challenging but fun! ■ Marc Latour (BS) is a solutions architect at Orbitz.com in Chicago. ■ Matt Rice (BS ’94) lives in Kremmling, CO, and is the owner of Silicon Creek, LLC (siliconcreek.com). He tells us that he’s always looking for the next entrepreneur endeavor, and he’s active in politics that recognize the importance of freedom and liberty. ■ Carolyn Schauble (PhD ’94) spent many years on the faculty at Colorado State University. She now works there part-time, primarily teaching their online courses. ■ Sreerupa (Rupa) Das (PhD ’95) is a level 4 software engineer at Lockheed Martin in Oviedo, FL. She moved there last year after 13 years with AT&T/Lucent/Avaya in Colorado. During those 13 years, she was married and had two children. She tells us that getting uprooted from Colorado was not easy, especially as they arrived midst of Hurricane Fay. They were not drowned or washed away, and now their kids love it, though Rupa dearly misses the Rockies and the lovely mountain scenery on the west horizon. On the job front, she is doing research in machine learning, statistics, and prognostic health management (of machinery). Other accomplishments include several patents pending. ■ Jules Dibaise (PhD ’95) is director of digital media at standuptocancer.org in Venice, CA. She has a new baby, Isabella Margherita, born November 4. ■ Melodi (Mel) Mosley Gates (MS ’95) has been living a dual life as Qwest’s chief information security officer by day and law student by night. Last summer, after 21 years in a variety of IT-related positions, she took a sever- ance package and is now pursuing her law degree full-time. She will graduate from DU’s Sturm College of Law in December 2010, and she recently passed the patent bar exam. She hopes to combine her technology background with the law to help others address the increasing issues in data protection, privacy, and intellectual prop- erty protection. ■ Patrick Juola (PhD ’95) is an associate professor of computer science at Duquesne University in Pittsburgh. He is just fin- ishing his third book (Oxford Press) and complet- ing a major research project (jgtaap.com) into authorship attribution. ■ Jeff McWhirter (PhD ’95) is a level 4 software engineer at Unidata (part of UCAR) in Boulder where he enjoys the outdoors and is still having fun writing cool soft- ware. ■ Manuel Neyra (BS ’95) is a senior principal business development manager with Oracle in Colorado. He and his wife Patricia have two children, Diego (7) and Isabella (2), who are growing up fast! ■ After completing a degree at CU, Otto Press (MS ’95) completed a PhD on modeling properties for software intensive systems at École Polytechnique Fédérale de Lausanne. He is now senior vice president and head of medium volt-
age drives at the ABB Group in Switzerland. He says that his body gets older, but his brain won't accept it: broken ribs and torn Achilles tendon are the results. ■ WIll Thorburng (BS '95) is a sys-
tems administrator with Sun, loving life in Boulder, and awaiting Oracle's acquisition of Sun to complete. He says the cultures of the two companies seem to be similar. ■ Marc AndOns-
ersen (BS '96) completed his PhD in chemistry at UC Santa Cruz in 2001. He is presently an assistant professor at San Francisco State University where he is performing research that combines his computer science and chemistry training to address difficult problems in chemical informatics and drug discovery. ■ DaniEl CarRoll (MS '95) is happy in his long-time job as network administrator at Mesa State College in Grand Junction. ■ Stan James (BS '95) received his master's degree in Cognitive Science from the University of Osnabrück in 2005. He later founded Lijit Networks Inc. (lijit.com) and co-founded Wordnik (wordnik.com). He is now taking a year off to live in Berlin, explore the tech scene there, and work on a book. ■ Brian Zou (MS '97) is a senior software engineer for IBM in Round Rock, TX. ■ Greg AssELun (BS '98) is happily married with two children in Westminster where he works as a professional services technical manager for Sun. ■ George Fairbanks (BS '98) later completed his PhD at Carnegie Mellon working on software frameworks with advisors David Garlan and Bill Scherlis. Now, he has a consulting and training company, Rhino Research (rhinoresearch.com) that specializes in software architecture, and he is finishing up a book on the same topic. ■ Jeff Hightower (BS '98) went on to complete his MS and PhD in computer science at the University of Washington. He is now a senior scientist and engineering manager at Intel Labs in Washington State. ■ Theron LaBounty (BS '98) lives in Boulder and works as a software development engineer for Microsoft. ■ Michael RoHS (MS '98) is a senior research scientist for Deutsche Telekom Laboratories in Berlin, Germany. ■ Devyani Talukdar (MS '98) is enjoying family, friends, and travel as a software engineer for IBM in Boulder. ■ Aaron Hart (BS '99) loves working for ZOLL Medical, Inc. (7 years now) in its data management products division writing software for ambulance/EMS companies, specifically the field data collection application (www.zolldata.com/ web/tabletpcr.aspx). He still lives in the Boulder area, and likes it too much to move. His main adventures since graduating include traveling the world (13 countries now, including Bhutan, Nepal, Tibet, and Jamaica last year). He plays a lot of soccer and has broken the same leg twice. He got his private pilot's license a couple of years ago at the Rocky Mountain Metro Airport. ■ Artur Kraus (PhD '99) is a member of the technical staff at Google. ■ Patrick Link (BS '99) lives near Snoqualmie Pass in Washington state and is a senior software engineer and technical lead in the Content Management and Publishing Systems division of Disney Interactive Media Group in Seattle. Recent events in his life include home ownership, engagement, a cat, and possibly a 2010 Harley (not necessarily in that order of importance). ■ Ahmed BahazIQ (BS '99) is the data center general manager for the General Authority of Civil Aviation in the Kingdom of Saudi Arabia. ■ Scott Munger (BS '99) is COO of Highwinds in Phoenix. He and his wife, Diana, have a daughter Lilla (2) and a baby boy due early this year. And, he points out, that he has finally read Hitchhiker's Guide to the Galaxy once (41 more times to go).”
Advanced Aviation System Development near Washington, DC. She’s working on a master’s degree in aeronautical science and human factors. Her time is spent designing and conducting human-in-the-loop experiments, analyzing the results, and presenting the results to the FAA. The experiments explore concepts for the National Airspace System, mostly focusing on air traffic controllers. She has two cats and volunteers weekly at the humane society. She is also learning to play the piano and the harpsichord.

San Skulrattanakulchai (PhD ’02) is an associate professor at Gustavus Adolphus College in St. Peter, MN, where his research and teaching continues in the area of algorithms. Jonathan Stockho (BS ’02) is a software engineer (Level II) at Swissoft in Colorado. He and his wife, Marianne, had their first child, Anastasia Amara, in 2007, and their second child, Malachi Luthor, was born last year. Their third child is due this coming fall. He tells us, “Being a father is the most difficult and most rewarding career I could imagine. It makes software development look like a walk in the park!” Craig Swift (BS ’02) is a business analyst and software program manager at Sun. In the evenings, he’s working on an MBA at UC Denver. He is married and planning to start a family after graduation in May. Hexar (formerly Matthew) Anderson (BS ‘03) is a software development engineer for Microsoft in Redmond, WA. Jimmy Bollinger (BS ‘03) has been serving as a missionary with International Teams for the past few years, in the Amazon basin city of Trinidad, Bolivia. There, he worked at a Christian K-12 school for Bolivian nationals teaching computers to high school students and also working on several computer projects including a website for the project as well as a database to track attendance. Additionally, he helped co-lead the youth group in the church. Currently, he’s preparing for a move to a suburb of San Jose, Costa Rica, to work at the Latin America regional office of International Teams providing technical support of their network, helping other missionaries and staff to troubleshoot their computer problems as well as developing numerous websites for the various ministries. He also has a minor role engaging in Christian discipleship of college-aged youth.

Matt Friedman (BS ’03) is a senior product manager with National Instruments in Austin. He loves to travel, including a trip last year to Africa to climb Mt. Kilimanjaro. Edith (Hand) Shimagala (BS ’03) continued her studies at CU and completed the MS in electrical and computer engineering in 2007. She is now a systems engineer with United Launch Alliance where she works in the development and evolution team pursuing and implementing exciting new development programs (and, yes, she launches rockets!). She and her husband James recently moved into a new home near Golden. They have a five-year-old miniature Australian shepherd named Juno and are expecting their first child early this year. Ryan King (BS ’03) is a systems engineer at National Instruments in Austin. Together with his fiancée, Soo, he has been doing a lot of traveling. This year, he made it to Australia, Malaysia, Singapore, Colombia, and India. Viktor Przebinda (BS ’03) works in the San Francisco Bay Area on Google’s Websearch. He misses hiking the Boulder foothills, but picked up road biking to substitute. He says that during his years at CU he learned about the biodiesel-powered Buff bus and since then has always wanted his own vegetable oil-powered vehicle. Last year, he finally met his goal of vegetable oil-powered cars with two vehicles for his family (voyenthaler.przebinda.com). He’s also learned to fly—an enjoyable and practical way to travel on the weekends.

Alex Vogenthaler (BS ’03) lives in New York City where he is a product manager for Google. He has got into competitive cycling in the last year, which is pretty easy to do when living a few blocks from Central Park. B.J. Williams (BS ’03) is a senior software engineer for Raytheon in Centennial, CO. He moved to that position after working for a couple years in California for the video game industry (Activision and Electronic Arts) and Northrup Grumman. He and his wife have a three-year-old daughter and are awaiting their next little one this spring. Ross Zwisler (BS ’03) has been a software engineer at LSI Corporation (lsi.com) for six years. He currently works in the Advanced Development group, which does research into new technologies and helps to plan future products. He and his wife live in Lafayette, CO, with their two daughters.

Shinya Daigaku (BS ’04) returned to Japan after graduation and worked for Motorola as a software engineer for three years. He then moved to Adobe in Kanagawa as a computer scientist where he supports a mobile carrier to embed the Adobe flash player engine to handsets. In his free time, he’s really crazy about snowboarding and goes to a lot of different mountains in Japan—though he really misses the Colorado mountains! Scott Greenberg (BS ’04) completed his MD last year at CU and recently moved to New York City for his residency at Cornell University. He plans to pursue a career in cardiology.

Reese Lloyd (BS ’04) is a lab manager at IBM in Boulder. His work includes network architecture and management, process implementation, security (physical and virtual), compliance, and infrastructure (power, cooling, etc). His hobbies include cooking and baking, backpacking, photography, and cocktail making. Cody Munger (BS ’04) has been moving from job to job and from apartment to house to condo every six months (Boulder to Dillon to Carson City to Reno). He says he’s currently the Adobe Flex “Jedi Knight” (an advantage when you get to name your job position) at PowerDEX, Inc. Prior to that position, he worked at 3G Studios and released his first software title, Jillian Michaels’ Fitness Ultimatum 2009 for the Wii. He enjoys road trips, hiking, snowboarding, climbing, and national parks—and hopes to find himself back in Colorado, California, or Washington state soon. Jeff Poznanovic (BS ’04) is currently a master’s student with a focus on parallel computing at the University of Edinburgh. Last year he studied in Italy, and he previously worked at Cray, Inc. and the Los Alamos National Laboratory. When he and his wife aren’t busy with work/studies, they enjoy traveling. The last five years have included trips through South America, Southeast Asia, and Europe. They recently returned from a trip to southern Morocco. Blake Reid (BS ’04) is finishing his third year at the CU law school, where he serves as the editor-in-chief of the Journal on Telecommunications and High Technology Law and as a clinician in the Glushko-Samuelson Technology Law and Policy Clinic. In the clinic, he is winding up representation of a computer science professor in a matter before the U.S. Copyright Office involving the Digital Millennium Copyright Act. He received helpful support from some of our faculty members including John Black, Dirk Gruuwald, Doug Sicker, and his law professor Harry Surden. They hope to secure a three-year exemption from one of the anti-circumvention measures in the DMCA for computer security research, which may help cut off potential lawsuits against DRM researchers. After graduation, he’ll be a law clerk for Justice Nancy Rice on the Colorado Supreme Court.

Chris Schenk (BS ‘04) works as system administrator for the CS department at CU-Boulder. This spring, he’s also writing his MS thesis under advisor Doug Sicker.

After graduating, Isaac Squires (BS ‘04) worked for Sun, National Instruments, and National ICT of Australia. He then cofounded two companies, the latest of which is Warb Web (warweb.com and warbgames.com), a web design studio that he runs with his wife Carly and four employees.

Nels Anderson (BS ’05) is a gameplay program-
mer at Hothead Games in Vancouver, Canada, where he also earned his MS degree at the University of British Columbia. Last year, he was married to Tila Brown—"a Vancouver local and amazing woman," says Nels. ■ TROY KOELLING (BS '05) is a tech lead and level 2 software engineer at Apple in Cupertino, CA. He’s been at the firm for four years, has filed two patents, and is getting married this spring. ■ GAURAV KULKARNI (BS '05) is an IT architect performing end-to-end enterprise systems designs at IBM in Colorado. He has three patents pending for automated creation of virtual worlds based on existing physical environments. He and his wife of two years just bought their first home. ■ SARAH MACUMBER (BS '05) just moved to Seattle where she is an applications engineer for CD-Adapco (cd-adapco.com). ■ DAN MAYER (BS '05) is president and founder of Devver (devver.net), which is his second startup since graduation. Through the TechStars program in Boulder he raised startup funding from O’Reilly AlphaTech Ventures and is now working daily on the new product. ■ CHRISTY PREDANIA (BS '05) is a systems engineer for Northrop Grumman in Virginia. She is presently one of five engineers selected for the newest class of the Northrop Grumman’s Systems Engineering Associates program (SEA), a highly selective two-year long series of rotational assignments designed to facilitate the rapid maturation of engineers identified as high-potential systems engineering leaders. Her first rotational assignment is with the BACN program in San Diego, CA. Previous to her selection as a SEA, she spent four years as a program manager for multiple SIGINT hardware development programs at Northrop Grumman in Chantilly, VA. Christy is a certified project management professional and holds an MS in engineering management from George Washington University. ■ JERRY SUN (MS '05) is the senior e-commerce manager for BuildASign.com in Austin. ■ RYAN COVER (BS '05) is a patent examiner at the U.S. Patent and Trademark Office. He was married last summer and is a part-time law student at George Washington University in Washington, D.C. ■ TAYLOR GESSE (BS '05) works for Deloitte Consulting and is taking advantage of “alt travel” to see the Midwest and the world. Since graduating, ERIK M. JOHNSON (BS '05) has worked as a field sales engineer in Washington, D.C., Austin, and now the Silicon Valley for National Instruments. He enjoys the cross-disciplinary work in areas such as medical technology, semiconductors, consumer electronics, and military/aerospace. Most of his free time is taken up playing hockey and spending time with his girlfriend. ■ BRIAN (BYUNG MOO) LEE (BS '05) was recently married. He works as a lead programmer for Unleaded Software. ■ JESS MURPHY (MS '05) currently works in embedded software at Ball Aerospace. ■ BRIAN OVERSTREET (BS '05) is a software engineer at Sun in Emerald Hills, CA. ■ MATT RUTHERFORD (PhD '05) is an assistant professor at the University of Denver, where he teaches software engineering and systems. His software engineering research is in the security of distributed, parallel, and embedded systems. ■ EUN WOO SONG (BS '05) recently accepted a job with SecondMarket in New York City and is very much enjoying the large city. ■ THOMAS STROHMANN (PhD '05) is a software engineer for Google. He lives in Sunnyvale, CA, with his wife Jessica Liu. They are expecting their first baby early this year. ■ ERIC TRUMPFER (BS '05) has been working as a software engineer at Cisco for three years. At the moment, he is working on buying his first home, and he recently adopted an absolutely wonderful dog from the Boulder Humane Society. ■ SCOTT WILLIAMS (BS '05) is currently a software engineer at Google in Sunnyvale, CA. He has been able to keep contact with CU through campus recruiting, faculty lunches, and visits to favorite professors. This coming year he will be married to his girlfriend of five years. They’ve already adopted a wonderful little miniature dachshund named Ringo. ■ LAO LENG (LENG) XIONG (BS '05) is a software developer at Amadeus Consulting Group in Boulder. He and his wife have settled in Erie and are planning to start a family. ■ RICH BEAUDOIN (BS '07) is an application development consultant for EMC in Somerville, MA, where he has worked on projects for both companies and educational institutions. He’s hoping to return to school for his MS degree. ■ ABELARDO PARDO (PhD '07) is an associate professor at Carlos III University of Madrid where he conducts research in technology-enhanced learning. ■ JACOB MELVIN (BS '07) works in Glendale, CA as a technical director at DreamWorks Animation. His projects to date include the animated movies “Kung Fu Panda” and “How to Train Your Dragon.” Melvin was recognized in IEEE Spectrum magazine as having one of the top 10 jobs of 2010. ■ Directly after graduation, JAMES SANDERS (BS '07) began work on server, web, and desktop Java for ReadyTalk’s web conferencing service and customer portal. In late winter of 2008, he transitioned to working on collection of social online content for a Boulder-based startup, Collective Intellect, using both Java and Ruby on the server side. Since then, he has been keeping very busy with an enterprise class, demand-response control and monitoring application at Converge, Inc. (converge.com) using Ruby on Rails. He remains in Boulder and enjoys all the typical things that entails. ■ GRAHAM SCHELLE (PhD '07) is a research scientist with Intel in Palo Alto. He says that he enjoys the Bay Area, but misses the Mountain Sun. (He didn’t mention whether that was the radiative orb in the sky or the pub on Pearl Street.) ■ DANIEL VON DINCKLAGE (MS '03, Phd '07) is a senior software engineer at Google in Mountain View, CA. ■ MARTIN COCHRAN (PhD '08) lives in San Francisco where he is a software engineer for Google. ■ JASON HELD (BS '08) is a web developer at SageFire (sagefire.com) in Boulder. You can find his blog at heldit.com. ■ JYH-HOW HUANG (PhD '08) is a post-doctoral researcher at National Taiwan University. Last year, he summited Everest, which concludes his seven summits project to climb and summit the highest peaks on each of the seven continents. ■ GEORGE ENGBRECHT (BS '09) is a computer engineer with the National Telecommunications and Information Administration in Denver. ■ MICHAEL HARBINSKY (BS '09) is a software engineer at Webscan, Inc. (webscaninc.com) where he enjoys investigating and using new technology. He and his fiancée, Christina, will be married this coming August. ■ LIEUTENANT DAVID KNUTZEN (BS '09) is the officer in charge of TDC Data (Theater Deployable Communications, Data/Network systems) for the 31st Combat Communications Squadron at Ali Base in southern Iraq. He also runs the technical support shops for small computers and the communications focal point. Additionally, he says, he makes the best coffee in the Area of Operations, and is on a quest to back squat 350 pounds. ■ TIPP MOSELEY (PhD '09) is a software engineer with Google in Mountain View, CA. ■ MATTHEW STRAUSS (BS '09) is an entry level engineer with Deep Space Systems. His work started as an internship, and after the school semester started, he stayed on. In January, he became an actual employee—his first CS job! Besides that, he has been enjoying his first year of no school, living with his parents, and saving up money to buy a new place.

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http://engineering.colorado.edu/alumni
Giving Back

Support Computer Science

The generosity of alumni, corporations, parents, and friends enables Computer Science to fund a variety of important initiatives. Donations of any kind, no matter what the amount, are integral to the success of programs such as undergraduate and graduate research, scholarship and community outreach, innovation, faculty and student awards, among many others. If you are already a regular contributor to the Department of Computer Science, we offer our sincere thanks. Your gifts are a critical part of our success and we appreciate your continued support. If you are not yet a donor, we invite you to become a part of the future of our department by making your contribution today.

Budget cuts have impacted all departments at the University of Colorado, including Computer Science. The University of Colorado receives less than seven percent of its total operating budget from the state of Colorado. We need your support now more than ever to bridge the gap between state assistance and the true cost of education. Private gifts are vital in order to help us attract and retain the very best faculty and students, to ensure that our students receive an exceptional education, and to enable the department to remain competitive with other top computer science departments around the world.

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Thank you for your support!

Donations from individuals, corporations and foundations allow the Computer Science Department to pursue education and research projects that would otherwise not be possible. We sincerely appreciate the support of alumni and friends whose gifts to the department help to continue its tradition of excellence and keep the department at the forefront of its field.

We would also like to acknowledge recent corporate donors to whom we are truly grateful for their support, including: The Anita Borg Institute for Women and Technology, Ball Aerospace and Technology, CISCO Systems Inc., Colorado Tech, Comcast, Google Inc., Hewlett Packard, IBM, Imagine, Intel Corporation, LGS Innovations, Microsoft Corporation, The National Center for Women and Information Technology, Nokia, SAP Labs LLC, SRA Key Technology Laboratory, Sun Microsystems, VMWare.

“Gifts from an alumnus funded my graduate position in the Computer Science Education Labs, helping me to afford the master's degree that has been invaluable to my career. In turn, I was able to establish virtualization-based services that helped to bring coursework to life for computer science undergraduate students.” — Mark Dehus (MS CompSci '08)

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HAL GABOW served on the faculty from 1973 to his retirement in 2008. He received a doctorate from Stanford University, under the supervision of Harold Stone (Stanford) and Gene Lawler (UC Berkeley). His thesis was on efficient algorithms for matching on graphs, an interest he pursued throughout his career. Gabow’s research and teaching interests are in the design of efficient combinatorial algorithms and data structures, problems on graphs, combinatorial optimization, and using linear programming for good algorithms. His former doctoral students are currently on the faculties of Colorado State University, Gustavus Adolphus College, North Carolina State University, the University of California Santa Cruz, and the University of Georgia. Gabow was active in the ACM, including serving as founding editor-in-chief of ACM’s Transactions on Algorithms. He was named an ACM Fellow in 2002. Since retiring he has done a lot of piano playing.

BOBBY SCHNABEL left CU after 30 wonderful years to become dean of the School of Informatics at Indiana University in 2007. He became an emeritus professor of computer science at CU, although he has never been as unretired in his life; currently he also is serving as IU’s interim vice president for research.

Schnabel helped build the computer science department in a number of ways: serving as principal investigator of three successive (1985-2000) NSF research infrastructure grants to the department, totaling nearly $7M; chairing the faculty search committee many times and helping to recruit many of the department’s faculty; and serving as department chair from 1990-95. Subsequently he served as associate dean for academic affairs in the College of Engineering and Applied Science from 1995-97, founding director of the ATLAS (Alliance for Technology, Learning and Society) Institute from 1997-2007, and vice provost for academic and campus technology from 1998-2007. In his earliest days as a faculty member, he would bake a carrot cake for the students in his introductory class to help illustrate the concept of an algorithm, but that’s a longer story.

Schnabel’s wife, Edie Stevenson, continues to reside primarily in Boulder, as do their two grown children, Heidi and Cory. Whenever he truly retires, Bobby and Edie plan to remain in Boulder.

WILLIAM WAITE began his studies in physics in 1956 at Oberlin College. After graduation, he married Joanne Ilene Lischer and entered graduate school at Columbia in electrical engineering. He completed his doctorate, “The Synthesis of Multidimensional Iterative Networks,” at Columbia University in 1965 and joined the electrical and computer engineering department at CU-Boulder the following year. The Waites’ son, William Frederick, was born in 1970, the same year as the birth of the computer science department, and Waite become a member of the department while continuing to serve on the ECE faculty. His career was marked by wide travel with visiting positions at 17 universities around the globe. In 2006, after 40 years on our faculty, he retired and was appointed professor emeritus. Throughout his career, he published six books more than 70 research papers, many of which were collaborations with his research students.

Waite continues to develop the Eli translator construction system with colleagues in Germany and Australia. He has joined the Civil Air Patrol, and serves as a flight instructor and check pilot. In December, he completed a week-long course at Cessna to transition to the “Technically Advanced Aircraft” now entering the Civil Air Patrol fleet.

KARL WINKLMANN joined the computer science department in 1984. He recently retired after more than 20 years on the faculty including two years as chair. Prior to his arrival at CU, Winklmann completed his PhD at Purdue University, was a postdoctoral research assistant at the MIT Laboratory for Computer Science, an assistant professor at Washington State University, and an associate professor at the University of Alberta.

His career at CU focused on management of the computer science undergraduate program. Aside from his many administrative contributions to the department including service as associate chair, Winklmann was a prominent instructor in computer science courses from introductory programming to the theory of computation. Winklmann also won advising awards within the engineering college and campus-wide. His research interests have been in the intrinsic limitations of classes of algorithms.

He remains in Boulder with his wife, Renée, and daughters, Nan and Rika. He tells us that since retirement, he has focused on starting as many projects as he can without finishing any. So far, he says, he is doing very well.

MARGA POWELL, long-time computer science staff member and office manager, retired after 22 years of service to the department that included being the administrative assistant for our first large departmental grant from the NSF. She keeps busy pursuing her passion for rock climbing and is succeeding at leading higher-difficulty climbs each season, both locally (Boulder Canyon and Eldorado Canyon) and in various other locations (all in the northern hemisphere—so far). Her children, Ben and Megan, are pursuing degrees at CU-Boulder. You might even see Ben around the Engineering Center finishing up his mechanical engineering degree, while Megan majors in psychology with minors in philosophy and communications.

PAT WARRICK began working for CU in 1996, and she joined the computer science department as receptionist in 2004 where she worked until retiring last year. The first few months of her retirement were filled with renovating a condo that she owns. “Choosing new colors, carpet, and appliances was fun—painting and cleaning was not,” she told us with her usual good humor. She and her husband have traveled in recent months to Bear Tooth Pass near Cody, Wyoming, where she also reconnected with the teacher who supervised her more than 40 years ago. In September they took a trip to the Western Slope and to the East Coast. Recently, she was recruited by her daughter to work as a volunteer in a first-grade classroom, so now her Fridays are filled with lots of hugs and funny stories to share. “So far,” she says, “retirement has been great although I do miss my computer science friends.”
A Brief History of Computer Science Senior Projects by Bruce Sanders

Senior Project...two simple words that elicit many memories for practically any CU computer science alumnus who has completed one, whether a member of last year’s class or the first senior project class offered more than 20 years ago.

Since the Computer Science Senior Project has been a critical component of the curriculum for the vast majority of graduates of the department, we thought alumni might be interested in a bit of history about the course.

The Department of Computer Science was formed in 1970 with Professor Lloyd Fosdick as its founding chair. The department initially was created as a graduate-only program—offering only MS and PhD degrees in computer science—and remained that way until the mid 1980s.

While the department had offered service courses to undergraduates in other departments, a curriculum leading to a BS in computer science was not created until 1984 when we began offering courses specifically for students pursuing this degree. The curriculum required courses in introductory programming, data structures, algorithms, programming languages, and operating systems...all of the typical courses one would expect in a computer science degree program of the time. The curriculum also required a senior project, which these seniors would need to begin in the fall. But he envisioned three characteristics of the course that would indeed make it unique:

- Group Projects: The projects would all be completed by teams of students working together, rather than the individual senior design project typical for the day. Since software was increasingly being developed by teams, rather than by individuals, a team-based development experience would more accurately reflect the real world and would better prepare our students for their careers.
- Two-Semester Duration: Fosdick proposed that projects be completed over the course of an entire academic year, rather than over the course of a single semester as was, again, typical for the day. This would allow for the development of significantly larger software projects, which would better exhibit critical issues in software engineering.
- Industry Sponsor: The projects would all...

I was hired by the department in the spring of 1987 after working in the software development industry for a number of years (at Bell Labs, NBI, and Integrated Solutions). I became a member of a software engineering research group with the idea of providing industry experience and perspective to an academic research project. But soon after my arrival, Professor Fosdick approached me with his novel senior project ideas.

He noted that the first group of computer science undergraduates were about to become seniors. He also noted that the curriculum required a senior project, which these seniors would need to begin in the fall. But he envisioned three characteristics of the course that would indeed make it unique:

- Group Projects: The projects would all be completed by teams of students working...

Can you spot Bruce Sanders (and his moustache) in this photo of the first senior project class (1988)?
be completed for industry sponsors, rather than simply based on ideas of the students or the instructor as was (yet again) typical for the day. This would allow students to work on real problems for real customers, rather than on “made-up” projects to be graded and then forgotten.

Professor Fosdick asked me to develop and teach this course, a challenge I gladly accepted. While the implementation of the course has evolved considerably over the years, Professor Fosdick’s novel ideas—group projects, two-semester duration and industry sponsors—remain fundamental characteristics of the course today.

This unique nature of the course has led to tremendous project diversity of software development projects over the years, reflecting the extremely broad spectrum of the discipline of computer science. Variation has included:

- Problem Domains: communications, entertainment, education, medicine, publishing, security, genetics, weather, business, aviation, energy, gaming, social networking, imaging, networking, space, mobile computing ...
- Technologies: Linux, Java, iPhone OS, C++, Ruby, Perl, Android, CSS, Struts, OpenGL, VoiceXML, .NET, JDBC, Vista, C#, Second Life, AJAX,...
- Sponsors: large companies (IBM, HP, Microsoft, Sun Microsystems,...), small companies (Lijit Networks, Kerpoof, ReadyTalk, Applied Trust,...), research labs (NREL, NCAR, NIST, NOAA,...), nonprofits (Cleveland Clinic, United States Olympic Committee, Deep Space Exploration Society,...)
- Geographic Locations: Boulder and Boulder County, of course, but also Denver, Greeley, Fort Collins, Colorado Springs,... and beyond Colorado to Washington, California, New Mexico, Texas, Nebraska, New Jersey, Michigan, Ohio,... and outside of the country with projects in London and Tokyo.

And last, the most important number ...

1,347 number of students who have completed a senior project and made this course a tremendous success.

A special thanks to all of you who made it happen!
2009 Theses

Congratulations to our 2009 graduates who wrote theses at the bachelor's, master's, and PhD levels.

ANDREW BARKER (PhD) “Parallel monolithic fluid-structure interaction algorithms with application to blood flow simulation,” advised by Xiao-Chuan Cai.

SCOTT BUSCH (BS) “Linear system solver scalability for applications of the bidomain cardiac simulations,” advised by Xiao-Chuan Cai.


JAMES CARLSON (PhD) “Surface wrapping: a deformable mesh approach to semi-automatic 3D volume segmentation,” advised by Clayton Lewis.


JASON COPE (PhD) “Data management for urgent computing environments,” advised by Henry Tufo.

SEBASTIAN DE LA CHICA (PhD) “Generating conceptual knowledge representations to support students writing scientific explanations,” advised by Tammy Sumner.

LAURA DE VESINE (PhD) “Calvin: producing expert arguments about geological history,” advised by Liz Bradley.


JOHN FRENCH (BS) “Constructing a Gravitational Simulator for the Cell Processor,” advised by Michael Main.

KENNY GRUCHALLA (PhD) “Progressive visualization-driven multivariate feature definition and analysis,” advised by Liz Bradley.

QIAN YI (PhD) “Personalized information-seeking to support intentional learning,” advised by Tammy Sumner.

MICAH HAMADY (PhD) “Exploring microbial sequence and community diversity on an unprecedented scale,” advised by Rob Knight.

BENJAMIN KADLEC (PhD) “Interactive GPU-based ‘visualization’ and structure analysis of implicit surfaces for seismic interpretation,” advised by Henry Tufo.


BARDIA KHALILI (MS) “A framework for undistorting the picture of a non-planar surface,” advised by Jane Mulligan.

KIRILL KIREYEV (PhD) “Applications of distributional vector space models to modeling of psycholinguistic phenomena,” advised by Jim Martin.

LANNY KNESS (MS) “Parallel fully-coupled fluid structure interaction simulation of several benchmark problems with scalability results,” advised by Xiao-Chuan Cai.

MATTHEW KOCH (Matthew Aaron) (MS) “PhoneTag: In search of place,” advised by Mike Eisenberg.

WANG-TING LIN (PhD) “Robust QoS scheduler in the open real-time systems,” advised by Gary Nutt.

SI LIU (PhD) “Parallel fully coupled domain decomposition algorithm for some inverse problems,” advised by Xiao-Chuan Cai.

A.J. LINDELL (MS) “Ambient environments and agile software development metrics,” advised by Ken Anderson.


SCOTT MACKAY (MS) “Restful web service application: Generation and analysis,” advised by Ken Anderson.

JONATHAN MARBACH (PhD) “Supporting multiple users in single-stereo-pair immersive virtual reality environments,” advised by Clayton Lewis.

DAMON MCCOY (PhD) “Quantifying and improving wireless privacy,” advised by Doug Sicker.

IGOR MELNYK (MS) “Empirical investigation of models produced by kernel LARS-type and SVM-type algorithms,” advised by Greg Grudic.

TIPP MOSELEY (PhD) “Performance accountability for optimizing compilers,” advised by Dirk Grunwald.

TODD MYTKOWICZ (PhD) “Supporting experiments in computer systems research,” advised by Amer Diwan.

BAISHAKHI RAY (MS) “SecureWear: Securing wearable mobile social networks,” advised by Rick Han.

CHRISTOPH REICHENBACH (PhD) “Program metamorphosis,” advised by Amer Diwan.

TRAVIS RUPP-GREENE (BS) “Analysis of software evolution over time,” advised by Amer Diwan.

IGOR SAVELZON (MS) “Supporting network rational democracy with ICTs,” advised by Skip Ellis.

DONGHUN SHIN (MS) “Maximum entropy-based Korean word sense disambiguation,” advised by Jim Martin.

SOONTAREE TANARAKSITAVORN (PhD) “Privacy preserving and reliable Byzantine fault-tolerance in group communication system,” advised by Shivakant Mishra.

ELIZABETH WHITE (PhD) “Pattern-based recovery of argumentation from scientific text,” advised by Larry Hunter and Liz Bradley.

GHASSAN ZAYOUN (MS) “AMR: a web application for animation multimedia,” advised by Buzz King.
The Fall Engineering Design Expo featured more than 300 students who showcased 78 projects developed in GEEN 1400: First Year Engineering Projects, GEEN 3400: Invention and Innovation, or ASEN 2500: Gateway to Space. Over 300 attendees voted for the “Peoples Choice Award”, which was given to the Bike Block Bash project from the GEEN 1400: Games for Health. Members of the student team creating the winning project were Michael (Mo) Andrews, Evan Archuleta, Sean Edwards, Jonathan (Johnny) Ernster, Michael Shannon, and Christopher Taylor.

Bike Block Bash (B3 for short) is a fun and entertaining way to engage in physical activity by combining stationary biking with a popular puzzle game Tetris. The faster a user pedals, the slower the puzzle pieces fall on the screen. A user moves pieces back and forth across the screen by moving the stationary bike’s handle bars and rotates pieces by pushing a button on the handlebars.

The entire system cost $195.21 to create — $75 for a used stationary bike and approximately $120 in sensors. The game was programmed completely from scratch in LabView. Students experimented with different sensors to sense cadence, handle bar rotation, and various button presses (rotation, start/pause game, changing direction of handle bars and screen visualization). In addition, the students programmed their own unique sound track for the game.

The project also received the “Best in Section” award. This recognition was given by industry judges based on interviews with each project team, demonstrations of each project, and evaluation of each project’s results by the judges.

Four other projects from the class were also rated highly by the judges: The Incredibles and Slice and Dice teams created two types of musical stairs that were informed by Volkswagen’s The Fun Theory and the Boston Museum of Science. Team Marlin and Friends spread the word about engineering and computing by evaluating their interval trainer and pedometer project in the CU Recreation Center. Team Ubermunch evaluated their light-up, adjustable roller uberblades in a CU dormitory.

The class was directed by Professor Katie A. Siek along with teaching assistant Muhammad Awan.
Amorphous Computational Wall

The image above depicts a proposal by CS Faculty Nikolaus Correll, Gregor Henze and Rick Han for an amorphous computational wall. Each cell can change its opacity and ventilation properties. The cells can also sense light, air and occupancy and will integrate with heating, ventilation and air conditioning.

More of Correll’s research is featured on p. 6