There’s a new face to Penn CIS -- and I’m not just talking about our latest faculty hire in distributed systems, Andreas Haeberlen, the cool new SIG Center for Computer Graphics, or the revamped Distributed Systems Lab and computing classroom complex. Two new undergraduate programs are soon to be unveiled -- Computer Engineering (coming September 2010) and the Singh program in Market and Social Systems Engineering (coming September 2011) -- and a new specialized masters programs in Embedded Systems was premiered in September 2009 as a component of the new Penn Research in Embedded Computing and Integrated Systems (PRECISE) Center. These programs build on new and exciting Penn CIS research strengths.

Take Computer Engineering, for example. Following Penn’s great tradition of technology invention, starting when Mauchly and Eckert designed the ENIAC (and women like Kathleen Antonelli and Jean Bartik understood how to program it), this project-based degree program has been created to educate the next generation of designers and engineers of the computer systems that entertain us (MP3 players, video games, digital video recorders), keep us in touch with each other (advanced cell phones, wired and wireless networks), reduce our work (robots), increase our safety (anti-lock brakes, traction control) and save lives (medical equipment and devices). Computer Engineering builds on the creativity and strength of faculty like Amir Roth and Milo Martin in CIS, and Andre DeHon in Electrical and Systems Engineering (ESE).

Similarly, the new Singh program in Market and Social Systems Engineering will prepare students to become business and technology leaders in the increasingly networked global economy. The program’s scope goes far beyond electronic commerce or keyword auctions, financial networks or networked power grids and offers an immersion in relevant technical programming skills and academic concepts. Directed by professors Michael Kearns in CIS and Ali Jadbabaie in ESE, with educational design and oversight by Zack Ives in CIS, the MKSE program will build on our department’s strengths in systems, algorithms and theory, as well as our connections to economics and sociology.

It’s an exciting time to be in Penn CIS! Read on to learn more about our truly exceptional faculty, programs, alums, students and outreach activities.

Susan B. Davidson
Weiss Professor and Chair, Computer and Information Science Department
Andreas Haeberlen Joins CIS Faculty

What do the Internet, peer-to-peer systems, and cloud computing platforms have in common? Each belongs to an emerging class of distributed systems that present researchers with new challenges such as how to detect misbehavior, create incentives for cooperation, ensure privacy, improve efficiency and prevent catastrophic failures.

Andreas Haeberlen, a systems researcher who joined Penn Engineering’s CIS Department as an assistant professor in January 2010, is exploring new ways to address these types of challenges. They arise because distributed systems such as the Internet aren’t managed and run by a single entity. Instead, they’re managed by multiple administrative domains comprised of many different organizations and individuals that often have conflicting interests or goals but still must work together to ensure that the system as a whole continues to function.

Recently Haeberlen developed techniques using accountability, an ‘offline’ concept, to make distributed systems more reliable. Accountable distributed systems automatically detect a large class of faults and produce irrefutable evidence linking each fault to a faulty node. Accountability in a distributed system makes it possible to detect when one domain misbehaves and empowers other domains to correct the miscreant.

Haeberlen has additionally developed techniques to make distributed systems more scalable and robust, and has studied the properties of existing systems with multiple administrative domains, such as Internet access networks. His results in this area have been widely publicized by the New York Times, the Associated Press and the FCC; regulators in Singapore and Greece have used his data on network neutrality violations in cable and DSL networks as well.

After receiving his Ph.D. from Rice University in 2009, Dr. Haeberlen conducted post doctoral research at the Max Planck Institute for Software Systems. In addition to joining CIS, Haeberlen is affiliated with Penn’s new Market and Social Systems Engineering program.

Faculty Awards

Ben Taskar became our latest Alfred P. Sloan Research Faculty Fellowship award winner, following Steve Zdancewic and CIS secondary faculty Josh Plotkin who were awarded it in 2009. Dr. Plotkin’s primary appointment is in the Biology department.

Peter Buneman, a former professor in CIS and currently at the University of Edinburgh, was elected a Fellow of the Royal Society.

Boon Thau Loo received an NSF CAREER Award for research, “Towards a Unified Declarative Platform for Composable Verifiable Networks.”

Ani Nenkova received an NSF CAREER Award for research, “Capturing Content and Linguistic Quality in Automatic Extractive and Abstractive Summarization.”

Zack Ives has been invited to join the DARPA Information Science and Technology (ISAT) Advisory Panel.

Max Likhachev has been invited to participate on the DARPA Computer Science Study Panel for his work “Towards A New Generation of Robots: Robust Robots.”

Ben Taskar was invited to participate on the DARPA 2009 Computer Science Study Panel for his work “Precise Structured Learning from Imprecise Supervision.”

Rajeev Alur has been awarded the George H. Heilmeier Faculty Award for 2009-10, one of the highest research awards given in the SEAS at Penn.

Mitch Marcus and Ani Nenkova hosted the North American Computational Linguistics Olympiad (NACLO) competition for high school students in 2009 at Penn and February, 2010 at the Franklin Institute.
Penn Creates First Engineering Program to Cultivate Leaders of Networked Economy

The University of Pennsylvania has launched a first-of-its-kind program to prepare undergraduate students to shape technologies that are integral to the networked global economy.

Made possible by an $8 million gift from the entrepreneurs for whom the program is named, the Rajendra and Neera Singh Program in Market and Social Systems Engineering (MKSE) is the first engineering program to fully integrate disciplines needed for the emerging science of market and social systems engineering.

While the MKSE program is designed for the type of person who would build the next Google or eBay, the program is much larger than Internet advertising markets and electronic commerce. It will prepare graduates to become technology and business leaders with the technical engineering skills needed to create and manage networks used in virtually every sector of the economy.

“We’re talking more Silicon Valley than Wall Street,” says Ali Jadbabaie, Faculty Co-Director for MKSE. “The focus is on the network aspect, incentives, how network structures and markets interact, underlying mathematical principles behind various kinds of networks and how to build predictive models. We’re giving people tools to shape how the world is connected economically, socially, strategically and technologically.”

The MKSE program focuses on developing students’ technical expertise in computers and electrical and systems engineering, and includes courses such as: Algorithmic Game Theory and Mechanism Design, Human Peer Production Systems, Economics of Networks, Non-Traditional Markets and Collective Intelligence. The curriculum will include relevant concepts from disciplines as diverse as economics, sociology, mathematics, finance, epidemiology and psychology.

“Our goal is to inspire a new generation of engineers to think in a visionary way not just about technology but about the integrated aspects of technology,” says Michael Kearns, MKSE’s founding Faculty Director. “This program is about the interaction of technology with the incentives of the users who adopt that technology, how companies monetize that usage and what might subvert that technology. Our graduates will understand the science and technology well enough to create complex networks, and will also be prepared to generate the big ideas that are essential to profitability.”

The MKSE curriculum includes a popular Penn course that Kearns developed, Networked Life, which engages students in hands-on analysis of the networks in which they participate every day. Kearns is also the National Center Chair in Resource Management and Technology at CIS and holds secondary appointments in Statistics and Operations and Information Management at the Wharton School.

“Technical skills alone are wholly inadequate in this new field,” says Jadabaie, Skirkanich Associate Professor of Innovation in Electrical and Systems Engineering. “The world is hungry for young people with the academic grounding to realize the potential—and foresee the pitfalls—of a networked world.”

The MKSE program will welcome its first class of undergraduates in the fall of 2011. Zachary Ives, Associate Professor in CIS, joins MKSE as undergraduate chair.
Penn Engineering Home to PRECISE Research Center & Master’s in Embedded Systems Program

As digital bandwidth becomes faster and cheaper, computers and communication devices are increasingly embedded in everyday objects and structures. From home appliances to medical devices to advanced unmanned air vehicles, modern engineered products now typically rely on software for sensing, actuation and decision-making. Reliability of real-time software in these cyber-physical systems is critically important to monitoring, coordinating, controlling, and integrating device computing and communication.

Penn has taken a leadership position in this rapidly evolving field by cultivating scientific breakthroughs and leadership via a recently established research center and related master’s degree program.

The collaborative research center, Penn Research in Embedded Computing and Integrated Systems (PRECISE), was founded in September 2008 “to leverage our members’ expertise to establish the missing theoretical and engineering foundations for cyber-physical systems,” says Insup Lee, PRECISE Director and the Cecilia Fildor Moore Professor in Computer and Information Science. “Our mission is to establish Penn as a global leader in research and development activities for next-generation embedded computing and integrated systems.”

Expertise among the center’s faculty from the CIS and ESE departments includes: George Pappas, control theory; Rahul Mangharam, sensor networks; Rajeev Alur, software reliability; Oleg Sokolsky, formal methods; and Insup Lee, real-time systems.

In the fall of 2009, Penn Engineering introduced an innovative new degree program, the Master of Science in Embedded Systems (EMBS), offered jointly by CIS and ESE within the PRECISE degree program. The degree focuses on the fundamentals of embedded computing and communication.

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Business Week Features CIS Alumni Among Finalists for Best Young Entrepreneurs in 2009

Among Business Week’s listing of America’s Best Young Entrepreneurs for 2009 was a company founded by four Penn alumni that simplifies how companies buy advertising on web sites.

Business Week described the firm, Invite Media, as “a Bloomberg machine for online media” for the way it enables companies to buy online display ads through a single site that integrates multiple advertising inventory sources. The honor was heady stuff for a company just two years old, founded in 2007 while its principals were still undergraduates at Penn.

Invite Media’s team of founders, Scott Becker EAS’08 of CIS, Michael Provenzano EAS’08 of Material Science, and Zack Weinberg W’08 and Nat Turner W’08 both of Wharton, were selected from among 600 nominations by Business Week readers of people age 25 and under who were running companies with strong growth potential.

Currently supported by venture capital, Invite Media is used by 45 top ad agencies. The firm makes its money selling ads and is headquartered in New York with offices in Philadelphia, San Francisco and London. The company has 35 employees and has projected revenues of $10 million for 2010.

Bid Manager, Invite Media’s flagship product, gives media buyers access to more than 12 billion highly-targeted impressions per day through one central interface. The Bid Manager platform allows buyers to optimize online campaigns in real time across multiple inventory sources (including Yahoo’s Right Media Exchange, Google’s DoubleClick Ad Exchange, AdECN, and AppNexus). Invite Media defines itself as a technology company, not a service company, because the firm’s core mission is to provide a technology platform upon which agencies, ad networks and media buyers can build and manage their businesses.

At a campus gathering of Penn CIS alumni Nov. 13, Scott Becker and CIS alum JJ Geewax EAS’08, also with Invite Media, discussed their career experiences with students in the throes of their own search for jobs and internships.

“It’s important to decide not what you can build, but what you should build. We try not to reinvent the wheel,” Geewax said, noting that he uses his CIS training daily. “Students should know that what they are learning in computer science is not just a theoretical idea that they will not see again.”

Becker said he especially valued the opportunity he was given in computer science classes to write code built on the open source code of others because that’s precisely what he does for Invite Media.

At the campus gathering, Geewax and Becker discussed the firm’s ambitious revenue projections and put a plug in for CIS interns – especially women. The firm currently has two female employees. “We need good engineering interns from Penn,” said Becker. “Internships at Invite Media can lead to jobs as software engineers and account managers. We project 300 percent growth over the next five years; and everyone at Invite Media has a stake in the company. However, on the engineering side, we need people who are passionate about writing software. What we do isn’t just a day job. We are looking for people who love what they do.”

Alumni Panel

On November 13, 2009, ten of CIS alumni returned to speak with undergraduates about what they do in their jobs, and how they have used their academic training. The students learned a lot about life “in the real world,” and truly appreciated their insights. Many thanks go to: Avidan Ackerson (Lockheed Martin), Scott Becker (Invite Media), Atish Davda (AQR), Gayle Laakmann (Career Cup, Seattle Antifreeze, 1st year MBA at Wharton), Henry Lai (Working Library), Laura Lin (2nd year MBA, Univ. of Maryland), Iqram Magdon-Ismail (TicketLeap), Hena Meta (Goldman Sachs), Douglas Petkanics (Frogmetrics) and Salim Zayat (Center for Autism Research, UPenn).

If you’d like to be part of a future alumni panel, or participate in a social networking site where you could connect with other alumni, please email Jackie@cis.upenn.edu.
Philadelphia and suburban high school girls were invited to spend a day in CIS with faculty and students to learn more about what computer scientists do. This year’s event will be held on April 28, 2010. Interested high school girls can register at www.cis.upenn.edu. WICS HS Day was funded by a Microsoft Research seed grant administered by the National Center for Women and IT.

Guidance Counselors and Teachers Day
CIS partnered with SEAS Advancing Women in Engineering (AWE) in November to host guidance counselors and computer science teachers from area high schools, and show them the opportunities available to students in computer science. This event was made possible by a Microsoft Research seed grant administered by the National Center for Women and IT.

Penn Gems (Girls in Engineering, Math and Science) is a week-long day camp dedicated to providing hands-on activities to engage middle school girls in bioengineering, nanotechnology, materials science, graphics and computing. This summer Penn GEMS will be held from Aug. 2 to 8, 2010, see www.seas.upenn.edu/awe/gems/.

Service Learning Course
Senior Lecturer Jean Griffin instructs CIS undergraduates Sam Riggs and Stephen McGill on methods to teach computer programming to Philadelphia Public High School students. The Service Learning course is funded by a National Science Foundation Broadening Participation in Computing (BPC) grant recently awarded to CIS.

Congratulations from the Faculty and Staff in CIS!
CIS and ESE Senior Stephen McGill Presents Robotics Research on Capitol Hill

Penn Engineering undergraduate Stephen McGill was selected by the IEEE to participate in the 2009 Washington Internships for Students of Engineering (WISE), sponsored by the American Association of Engineering Societies (AAES). Twelve WISE students are selected each year to spend the summer in Washington DC and learn how government officials make decisions on complex technological issues, and how engineers can contribute to legislative and regulatory public policy decisions.

McGill explored the public policy side of robotics research, and specifically how applications of US military-funded robotics projects could be brought to the civilian sector. The summer experience culminated in McGill’s presentation of his paper “Government Applications of Robotics: A Treatise on the United States’ Need to Embrace Robotics” in the Rayburn House Office Building on Capitol Hill to the Congressional Robotics Caucus.

Stephen McGill is a senior at the University of Pennsylvania majoring in electrical engineering and computer science, and is pursuing a master’s degree in robotics. In CIS McGill also participates in a new NSF-funded experimental course, Service Learning, whereby Penn students teach programming and specifically how applications of US military-funded robotics projects could be brought to the civilian sector.


Student Awards

Nate Foster and Jenn Wortman were the 2009 co-winners of the SEAS Rubinoff Award, conferred on graduating PhDs “whose dissertation has resulted in or could lead to innovative applications of computer technology.”

Colin Blundell was awarded an IBM Graduate Fellowship for 2009-10.


CIS Senior Design Awards

1st Place: Dwayne Bent & Jateen Joshi (Advisor: Jonathan Smith) “Screener: A Shared Media Player”


3rd Place: Stephen Pike & Jeffrey Weinstein (Advisor: Zack Ives) “AtLongLat: Location Aggregation ... Platform Stephen Pike & Jeffrey Weinstein were also awarded Second Place in the SEAS Senior Design Competition.

CIS Senior Design Awards;
http://www.seas.upenn.edu/~cse400/CSE400_2009_2010/index.html

PhDs in 2008-2009

Pavol Cerny
Advisor: Rajeev Alur
Position: Post-Doctoral Researcher, Institute for Science and Technology (IST), Austria

James Alexander
Advisor: Jonathan Smith
Position: Software Engineer, Cisco Systems, San Jose, CA

Jan Allbeck
Advisor: Norm Badler
Position: Assistant Professor, Dept. of Computer Science, George Mason University, Fairfax, VA

Timotee Cour
Advisor: Ben Taskar
Position: Postdoctoral Researcher, École normale supérieure, INRIA, Paris

Mark Dredze
Advisor: Fernando Pereira
Position: Assistant Research Professor, Computer Science Senior Research Scientist, Human Language Technology Center of Excellence, The Johns Hopkins University

Nate Foster
Advisor: Benjamin Pierce
Position: Postdoctoral researcher, Dept. of Computer Science, Princeton University In Fall 2010, Assistant Professor, Cornell University

Todd J. Green
Advisor: Zack Ives & Vil Tenner
Position: Assistant Professor, Dept. of Computer Science, University of California, Davis

Vasileios Kandylas
Advisor: Lyle Ungar
Position: Software Systems Development Engineer, Yahoo

Gregoris Karvounarakis
Advisor: Zack Ives & Vil Tenner
Position: Computer Scientist at LogicBlox, Inc. & Postdoctoral Researcher at ICS-FORTH

Qian Liu
Advisor: Fernando Pereira
Position: Software Engineer, KaChing Group Inc., Palo Alto

Gaurav Shah
Advisor: Matt Blaze
Position: Researcher, Google

Michah Sherr
Advisors: Matt Blaze & Boon Thau Loo
Position: Postdoctoral Researcher, CIS, University of Pennsylvania

Jeff Vaughan
Advisor: Steve Zdancewic
Position: Postdoctoral Fellow, Center for Research on Computation & Society, Harvard University

Jennifer Wortman Vaughan
Advisor: Michael Kearns
Position: Computing Innovation Fellow, School of Engineering & Applied Sciences, Harvard University. Fall 2010, Assistant Professor, UCLA

Liming Zhao
Advisors: Alla Safonova & Norman Badler
Proudly Announcing Our New SIG Center for Computer Graphics

Made possible by a generous donation from Susquehanna International Group, LLP, The H. Stone Animation Studio in the SIG Center is the largest motion capture facility in the region with 800 square feet of space. The studio is outfitted with the same equipment used by The Walt Disney Company, DreamWorks Animation SKG and Industrial Light & Magic.

Photo courtesy of the studio of Barry Halkin