Chair’s Perspective

As fall ushers in a new academic year, we have a lot to celebrate at Penn CIS. From the prestigious research and teaching awards won by our faculty, to the awesome accomplishments of our students and alumni, it has been an amazing spring and summer. And the cherry on top is the latest NRC Ranking of Computer Science graduate programs, in which each department was given a range of ranks: the Penn CIS range was 3 - 16, which was the 6th best!

Sloan Research Fellowships are awarded to “unusually creative researchers at an early stage in their careers”, and are extremely competitive. The Sloan Fellows represent the next generation of top scholars in our field; a surprising number win high honors later in their careers. Setting a record at Penn CIS, over the past two years, three of our junior faculty have been awarded Sloan Fellowships: Ben Taskar, Steve Zdancewic and Josh Plotkin. We highlight their exciting research in this newsletter.

Centers and institutes are typically started by senior faculty, or at the very least by tenured faculty members. However, with the newly formed Penn Research in Machine Learning (PRiML) center the vision and leadership has come from two assistant professors: Ben Taskar and Sasha Rakhlin. The center pulls together remarkable strength in machine learning from across the university, and addresses emerging problems of prediction and analysis based on large scale, high dimensional, network-centric and weakly-supervised data.

We have all chosen to be faculty members because we love to teach and work with students. It is therefore especially gratifying to see professors Sanjeev Khanna and Zack Ives honored by our students in receiving teaching awards. Equally gratifying is seeing our students’ success while at Penn and after going out into the “real world.” We highlight two of our alumni, Gayle Laakman, Iqram Magdon Ismail and Scott Becker, describe current student Brittney Exline’s excellent summer project in Cameroon, and salute the graduating Class of 2010.

Read on to learn more about these and other happenings at Penn CIS!

Susan B. Davidson
Weiss Professor and Chair, Computer and Information Science Department
Ben Taskar awarded a Sloan Fellowship for research on structured machine learning

Machine learning is helping transform the way many fields make sense of data, from engineering and science to medicine and business. A key goal of Assistant Professor Ben Taskar’s research is to make computers “understand” complex information: for example, automatically analyze a video to detect objects, people and actions or parse a news article to extract entities, events and relationships between them. Accurate systems that can recognize thousands of objects and actions or extract thousands of entity and relationship types have remained beyond reach. A primary obstacle is the limited availability of “supervision” – human-annotated data – which requires impractical amounts of expertise and time. However, the advent of truly massive peer-produced media, which interlinks text, images, audio and video, promises to provide indirect supervision for many tasks. For example, large collections of web images and videos are labeled by captions and summaries, but precise locations of objects and people in the image are unspecified, making standard machine learning methods inapplicable. Dr. Taskar’s work addresses the pressing need for principled, declarative, robust methods that allow flexible, indirect supervision and take advantage of enormous amounts of data without requiring hand-labeling.

Dr. Taskar is the Magerman Term Assistant Professor of Computer and Information Science with a secondary appointment in Statistics.

Joshua Plotkin awarded a Sloan Fellowship for research on a quantitative understanding of molecular evolution

Joshua Plotkin uses mathematics and computation to study the evolutionary forces that shape the living world. As revolutionary as it was, Darwin’s theory of evolution was largely qualitative. However, the structure of DNA provides a common currency for quantitative models of evolution, allowing us to resolve a huge diversity of biological questions -- for example, when the common ancestor of humans and chimpanzees walked the earth, or whether a new strain of influenza virus will cause an epidemic. Despite these successes, we remain ignorant of what determines even the most basic patterns of molecular evolution – such as the rate of nucleotide substitutions in a replicating population of bacteria. Dr. Plotkin works to address these questions by developing realistic mathematical models and applying them to quantify the forces that shape genetic variation in nature. His theoretical aims are guided by continual contact with microbial sequence data and experiments. Microbes evolve rapidly, and therefore offer an extraordinary opportunity to elucidate the principles of molecular evolution in general.

Dr. Plotkin is an Assistant Professor of Biology and the Martin Meyerson Assistant Professor of Interdisciplinary Studies with a secondary appointment in Computer and Information Science.

Steve Zdancewic awarded a Sloan Fellowship for language-based computer security research

Most computer users are familiar with the problems of software reliability and computer security – their programs crash, viruses and worms plague the Internet, and the news is full of stories of on-line identity theft and leaked confidential electronic data. Steve Zdancewic’s research seeks to address these problems by creating tools and techniques that can help software developers build more robust, reliable, and secure programs. The theoretical aspects of his work combine programming language semantics, type theory, and logic to study programming models in which strong security policies can be precisely specified and understood. In practice, these ideas yield tools that programmers can use to monitor the flow of secret data through their software, protect access to shared resources in a distributed system, or ensure that a program follows the right communication protocol, all of which are significant steps towards improving the quality and trustworthiness of our computing infrastructure.

Dr. Zdancewic is an Associate Professor of Computer and Information Science.
Ani Nenkova awarded NSF CAREER Award for automatic summarization

Ani Nenkova received an NSF CAREER award for her work in capturing content and linguistic extractive and abstractive summarization. As part of the award, Ani is developing computational models of text quality, allowing summarization and translation systems to quantify how well, or how poorly, a text is written. Ani is also exploring the possibility of integrating her work in tools that will aid people to write better by providing automatic feedback on their writing beyond grammar and spelling.

Dr. Nenkova is an Assistant Professor of Computer and Information Science.

Boon Thau Loo awarded NSF CAREER Award for composable verifiable networking

As sophisticated, bandwidth-intensive, and even mission-critical services are being deployed in today’s Internet, there is increased demand for the network to provide extensible support for new capabilities. Boon Thau Loo’s research seeks to address these challenges by proposing an extensible networking platform where distinct parts or elements of existing networks are rapidly combined via declarative specifications to create network with new functionalities.

Dr. Loo is an Assistant Professor of Computer and Information Science.

Alexander “Sasha” Rakhlin awarded NSF CAREER Award for statistical and computational complexities of modern learning problems

Machine Learning has been successful in designing and analyzing algorithms that extract patterns from data and make intelligent decisions. Nowadays, when we point our camera to take a friend’s picture, the camera detects the face and focuses on it automatically, so the detection algorithm running inside the camera has to be fast and accurate. Statistical Learning Theory provides a framework for studying the accuracy of learning and prediction, while theory of optimization guides us in the choice of fast methods for computation. The two fields have developed almost independently; the goal of this research is to study the statistical and computational aspects of learning in tandem. A better understanding of the interaction between Statistics and Computation is likely to lead to faster and more precise methods.

Dr. Rakhlin is an Assistant Professor in Statistics in the Wharton School with a secondary appointment in Computer and Information Science.

Notable Grants

Led by Kostas Daniilidis, Penn has become a member of the Robotics Collaborative Technology Alliance, which will receive $9.8M from the U.S. Army over 5 years. Collaborators are General Dynamics (Lead) and approximately 40 PIs from Penn, Carnegie Mellon, Central Florida, Florida A & M, CalTech/JPL, Foster-Miller, and Boston Dynamics.

Inseop Lee, Director of Penn Research in Embedded Computing and Integrated Systems (PRECISE) center, will receive $5M from the National Science Foundation on “Assuring the Safety, Security and Reliability of Medical Device Cyber Physical Systems.”

André Dehon, Benjamin Pierce, and Jonathan Smith, were recently awarded $5M to develop SAFE -- a Semantically Aware Foundation Environment - as part of CRASH, a larger DARPA-funded effort to design new computer systems that are highly resistant to cyber-attack.

Jonathan Smith, Matt Blaze and Boon Thau Loo were awarded $3.3M as part of a DARPA SAFER award with colleagues from Georgetown University for development of the SAFEST platform—Selective Anonymity for Enabling SAFER Telecommunications.

A $3.0M NSF IGERT training grant on “Complex Scene Perception” led by Kostas Daniilidis will join the Institute for Research in Cognitive Science (IRCS) and GRASP robotics faculty to train 12 PhD students in Perception.

Jonathan Smith, Steve Zdancewic, Max Mintz, and Benjamin Pierce were awarded $1.8M as part of a team led by Telcordia to develop the “Quantum Programming Environment” for the IARPA/Quantum Computing Science project.

Milo Martin was awarded $1.25M as part of a NVIDIA-led team funded under DARPA’s UHPC (Ubiquitous High Performance Computing) program.

In an effort led by Maxim Likhachev, the GRASP lab was one of eleven recipients worldwide of the PR2 Beta robots sponsored by Willow Garage. The GRASP lab aims to tackle some of the challenges facing household robots.

Daniel Koditschek won a $7.5M AFOSR MURI grant on “Control Science for Next Generation Sensing,” leading researchers from Penn, Minnesota, Berkeley and Melbourne.

The Department of Energy awarded George Pappas, member of GRASP and PRECISE centers, $2.25M as part of a $129 million DOE Energy Innovation Hub that will be based at the Philadelphia Navy Yard.

CIS welcomes lecturer Christian Murphy this fall. Dr. Murphy teaches computer architecture courses in the Master in Computer and Information Technology (MCIT) program. Dr. Murphy was awarded the Ph.D. from Columbia University in 2010.
**PRiML: Penn Research in Machine Learning**

In Spring 2010, CIS launched the Penn Research in Machine Learning (PRiML) center, co-directed by CIS Assistant Professor Ben Taskar and Wharton Statistics Assistant Professor, Sasha Rakhlin. Although SEAS and Wharton are long-time collaborators in educational programs, PRiML is the first formal research bridge across the two schools. Making the most of synergies between Wharton’s strong program in mathematical analysis of machine learning, and expertise in computational aspects of machine learning in SEAS, PRiML brings together faculty and students from both schools to address emerging problems of prediction and analysis based on large scale, high dimensional, network-centric and weakly-supervised data.

The center is comprised of 10 primary faculty: Dean Foster, Shane Jensen, Sham Kakade, Mikhail Traskin and Sasha Rakhlin from Statistics, Dan Lee from Electrical and Systems Engineering, and Michael Kearns, Fernando Pereira, Lyle Ungar and Ben Taskar from Computer and Information Science. The range of interests of PRiML faculty is quite broad: from Bayesian statistics to statistics of baseball; from game theory on networks to gene regulatory networks; from humanoid robot soccer to human activity recognition in video; from gambling with one-arm bandits to learning to grasp with robotic arms, and much more. PRiML faculty, postdocs and students hold a weekly seminar and reading group meeting. On October 1, PRiML also hosted a Kick-off Colloquium showcasing Penn’s strength in Machine Learning with distinguished invited speakers from neighboring universities: Rob Schapire (Princeton), Mehryar Mohri (NYU), Michael Littman (Rutgers) and talks and posters from PRiML faculty and students. More information about PRiML can be found at http://priml.upenn.edu.


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**Sanjeev Khanna receives the S. Reid Warren Jr. Award**

Sanjeev Khanna was awarded the S. Reid Warren Jr. Award, which is presented annually by the undergraduate student body and the Engineering Alumni Society in recognition of outstanding service in stimulating and guiding the intellectual and professional development of undergraduate students. Dr. Khanna is the Rosenbluth Faculty Fellow and Professor in the Computer and Information Science department. He teaches courses in algorithms and complexity theory, and has authored over 100 papers on these topics. His research has been supported by a Sloan Fellowship, a Guggenheim Fellowship, an IBM Faculty Award, and the National Science Foundation.

**Zack Ives honored with the Lindback Award**

Zachary Ives has been awarded a Christian R. and Mary F. Lindback Award for Distinguished Teaching, Penn’s highest teaching honor. Dr. Ives has taught at Penn since 2003, and has since been a leader in curricular innovations, developing courses on Internet and database systems in which students build their own search engines or database-powered websites. Dr. Ives is an Associate Professor in the department of Computer and Information Science and the undergraduate chair of the school’s new program in Market and Social Systems Engineering.

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**Faculty Awards and Honors**

- **Junhyong Kim**, Co-Director of the PGF1, was awarded a 2010 Guggenheim Fellowship, for his research, “Genome-Scale Higher Order Evolution.”
- **Ben Taskar** was named a 2010 Young Investigator Program recipient by the Office of Naval Research.
- **Rajeev Alur** received the LICS Test-of-Time Award for his paper, “Model-Checking for Real-Time Systems.”
- **Milo Martin** was awarded tenure and promotion to Associate Professor of Computer and Information Science. Dr. Martin conducts research and teaches courses in Computer Architecture.
- **Peter Freyd** received the LICS Test-of-Time Award for his paper, “Recursive Types Reduced to Inductive Types.”
- **Andreas Haeberlen** was awarded the Otto Hahn Medal by the Max Planck Society for outstanding scientific achievements.
- **Matt Blaze** served as a witness to the Congressional House Judiciary subcommittee investigating mobile location services and privacy to update the Electronic Communications Privacy Act of 1986.
- **Roch Guerin** is the 2010 recipient of the IEEE INFOCOM Achievement Award for his “pioneering contributions to the theory and practice of QoS in networks.”
Gayle Laakmann, CIS’04, MSE’05, Wharton MBA, class of 2011

Whenever Gayle Laakmann presents her book, Cracking the Coding Interview, to CIS undergraduate and Master’s students, the large Wu and Chen lecture hall is filled to capacity. Gayle has also given this talk at the University of Washington, where she taught programming courses in 2005, as well as at Columbia University.

Gayle’s professional career began after her freshman year, when she landed a coveted Microsoft software engineer internship. She went on to intern at Microsoft three more times as well as at Apple. In her final two years at Penn, she became the Microsoft campus representative, serving as a liaison between Microsoft and Penn’s students and faculty.

Gayle leveraged her years of hiring and recruiting expertise at Google and other high-tech companies to launch Career-Cup.com and write Cracking the Coding Interview, available on Amazon.com. Growing out of Gayle’s own experiences as a corporate interviewer, the book and web site offer interview advice, and questions and solutions for software engineers looking to land the top programming jobs.

Because Gayle felt strongly that computer science students need hands-on experience, during her senior year at Penn she designed and taught a Software Design Development course under the supervision of Professor Max Mintz. This initiative was so popular that the course morphed into a half credit practical skills course. It has subsequently been taught by students Ravi Chugh (currently a PhD candidate in computer science at University of California, San Diego) and Zach Goldberg (currently working for Google in New York City).

In addition to working for major tech companies, Gayle founded Seattle Anti-Freeze (www.seattleantifreeze.com), which organizes social and athletic events for young professionals in Seattle. Seattle Anti-Freeze is backed by custom ticketing technology (built by Gayle) that enables it to operate more efficiently in terms of both time and money.

Gayle’s current project, The Google Resume: How to Prepare for a Career and Land a Job at Apple, Microsoft, Google, or any Top Tech Company, will be published in April 2011 by John Wiley & Sons. The Google Resume will tackle a wide range of career options — everything from programming to marketing — and will start with the question of what a college student should be doing to prepare for a successful job search and career path. The book will include interview advice, suggest negotiation strategies, and discuss how to perform well on the job.

Want to keep involved with CIS by participating in a career panel or judging a poster contest? Tell us about your job changes and career moves too! Send email to jackie@cis.upenn.edu

Google Acquires Invite Media for $70 Million

As reported in our Spring 2010 newsletter, Invite Media was founded by CIS alums Scott Becker’08, MSE alumn Michael Provenzano’08, and Wharton alums Nat Turner’08 and Zach Weinberg’08. Invite Media builds and operates a “universal buying platform” for display media called Bid Manager, which allows buyers to optimize online campaigns in real-time across multiple inventory sources, including Yahoo’s Right Media Exchange and Google’s DoubleClick Ad Exchange.

Invite Media was purchased by Google in June for $70M. Google plans to leave Invite Media as a stand-alone unit, which will work at arm’s length with other advertising exchanges. The startup was attractive to Google for its technology as well as its talent, which includes CIS alum Zach Goldberg’10 (who will be staying with Google as a product manager); and Dan Zhou’09, Gilad Buchman MSE’09, Clarence Tso’10, and Jay Fiddleman’10, also left for other opportunities.

Pen alums Iqram Magdon Ismail’06 and Andrew Kortina’05, founders of Venmo, named in “30 Under 30: America’s Coolest Young Entrepreneurs” by Inc.

Iqram Magdon Ismail and Andrew Kortina met in freshman year at Penn when they were randomly paired as roommates. With their shared interest in entrepreneurship, the two became fast friends. Iqram majored in computer science and Andrew in philosophy with a computer science minor. After graduation, Iqram went off to work for Ticketleap and Andrew to Bit.ly. However in spring’10, the two paired up to found Venmo.

Named through a combination of the words “vendor” and “mobile,” Venmo is a mobile-based platform that allows friends to exchange money using their phones. Targeted at a young market, Venmo allows a subscriber to use an iPhone or Android to pay a friend her share of the tab simply by texting Venmo who will charge the subscriber’s registered credit card or bank account. Peer-to-peer mobile payments are free, while Venmo will charge a fee to participating merchants. Currently in beta testing, Venmo expects to roll out services city by city later this year.
“Cascading mentorship” the focus of CIS outreach

Through EAS 285, a new service learning course, Penn undergraduates learn educational theory and computational thinking to teach computing concepts to high school students in Philadelphia public schools. Summer EAS 285 participants from left: Sam Riggs, Jean Griffin (Instructor), Stewart Mein, Safat Ahmad, Yanis Solomon, William “Quinn” Burke (GSE PhD student) and Jefia Jawi.

Google CS4HS@Penn
In August, CIS hosted 22 Philadelphia public high school computer science teachers for a three day workshop funded by Google. The workshop included programming in Java and Scratch, CS unplugged and e-textiles, and culminated in a visit to Google, New York.

WICS High School Day for Girls
The Women in Computer Science (WICS) and CIS co-hosted the fourth WICS High School Day for Girls on April 28, 2010. This event shows girls the exciting opportunities in computer science and encourages them to major in computer science and engineering in college. 80 high school girls participated from 32 area public, parochial and independent high schools. Pictured from left: Michele Grab, Director, Advancing Women in Engineering (AWE), with WICS members Gaby Moreno-Cesar, Lauren Frazier, Brynn Shepherd and Yiyi Zhou.

Boot up Camp!
EAS 285 student Safat Ahmad teaches a high school student how to sew a microcontroller and an assortment of sensors and actuators on cloth with conductive thread to build e-textiles. Campers from Philadelphia public high schools also help teach middle school students the computing concepts that they have mastered.

A Boot up camper teaches a middle school Penn GEMS camper how to program in Scratch. 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 computer science, bioengineering, nanotechnology, and materials science.

AWEsome Pre-orientation—Engineering women freshmen move in early to learn about Penn Engineering, meet faculty and get to know their fellow class of 2014 women engineers as well as the city of Philadelphia in a special program organized by Advancing Women in Engineering.

36 students participated in Summer Undergraduate Research in Computer Science. Directed by Assistant Professor Ben Taskar, students worked in 12 faculty research groups and participated in a summer-long series of seminars on topics ranging from Matlab and technical report writing to poster design and life in grad school. Congratulations to the winners of the summer undergraduate research poster contest: Samantha Raja, first place; Zachary Meister, second place; and Jessica Wetstone, third place.
Brittney Exline

**Brittney Exline** made headlines in 2007 for being the youngest African American woman to enter the Ivy League when she came to Penn as a freshman at the age of 15. More recently, Brittney distinguished herself through her volunteer activities in Cameroon with One Laptop Per Child (OLPC), a non-profit founded to provide technology education to children in developing countries.

Brittney was the technical member of a Penn student team that was awarded a grant from OLPC. The team worked with the United Action for Children (UAC) in Africa to develop a sustainable way for children to benefit from the laptops. During the summer of the 2009, the Penn team delivered 100 XO laptops to villages near Buea in Cameroon, oversaw the installation of wireless internet and outlets, and set up an easy way of charging the XOIs with power strips.

Brittney’s prior experience was mostly in software engineering, but in this summer experience she learned about hardware by helping set up routers, networks, and generators to charge the laptop batteries. Brittney also worked with teachers in the primary school run by the UAC to introduce laptops into the curriculum, and taught area students how to use the equipment and surf the web.

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CIS Senior Design Awards

**1st Place:** Jay Fiddelman (Advisor: Lyle Ungar)  
“RADICAL: Radiology Content Alignment”

**2nd Place:** Andrew Schaye and Matthew Feczko (Advisors: Mitch Marcus & Ani Nenkova)  
“SentiSummary: Sentiment Summarization for User Product Reviews”

**3rd Place:** Sam Lerer and Eric Tieniber (Advisor: Jonathan M. Smith)  
“Wireless Ice Hockey Personnel Management System”

**Honorable Mention:** Chris Sulmone, and Noir Nigmatov (Advisor: Jonathan M. Smith)  
“TEC: A Cross Platform Game Engine”

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Student Awards at Commencement

**Stephen McGill** - William L. Everitt Student Award of Excellence Fellowship  
**Zachary Goldberg** - John Grist Brainerd Award  
**Lu Chen** - Stuart Eichert, Jr., Memorial Prize  
**Jonathan McCaffrey** - Walter Korn Award  
**Huanwu Li** - Management and Technology Naren Udayagiri Scholarship  
**Grace Fong** - The Dawn and Welton Becket Digital Media Design Achievement Award  
**Nathaniel Conrad** - The Computer Science Academic Award  
**Nechemya Kagedan** - The Ben and Bertha Gomberg Kirsch Prize for applied science  
**Andres Felipe Velazquez** - The Albert P. Godsho Engineering Prize  
**Brynn Shepherd** - The Wolf-Hallac Award  
**William C. Jordan** - The Hugo Otto Wolf Memorial Prize

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Alumni Bits

**Alyssa Rosenzweig’09**, currently a graduate student at the University of Toronto, and **Victoria Schwanda’09**, a PhD student at Cornell University, were awarded Graduate Research Fellowships for Computer Science/Human Computer interaction from the National Science Foundation.

**Michael Gottlieb’09** and **Derek Dahmer’09** along with Evan Kramvis are building a startup, Prepfly, to provide online tools for students to study for standardized tests.

**Jeff Weinstein’09** was recently promoted to lead comScore’s mobile analytics products, launching as beta this month.

**Ari Gilder’07** recently launched a beta of a new venture called Love@FirstTweet (http://www.loveatfirsttweet.com) and is currently accepting new beta testers for users of Twitter.

**Steven Flisler’06** took on a new role as the Manager of News Operations and Strategy for the NBC News division and the Media Production Partners division at NBC Universal. Steve is also leading the evolution at NBC of transitioning News Coverage to new digital tools and workflows.

**Nathan Schreiber’03** has been nominated for an Eisner award for Best Digital Comic by Comic-Con International for his work, Power Out.

**Eric Fosler-Lussier’93** was promoted to Associate Professor with tenure at Ohio State University (OSU). Eric is currently a member of the Computational Linguistics and Language Technology (CLLT) Group at OSU.
CIS proudly presents our Class of 2010 graduates!