



# most significant bits

newsletter of uw computer science & engineering

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university of washington



By playing Foldit, thousands of novice players worldwide produced a collection of protein structures that were recently published in *Nature*. In this game, players compete to discover the most compact protein folding structure by collaborative direct manipulation of proteins. The calculated molecular energy of the structure is the game score.

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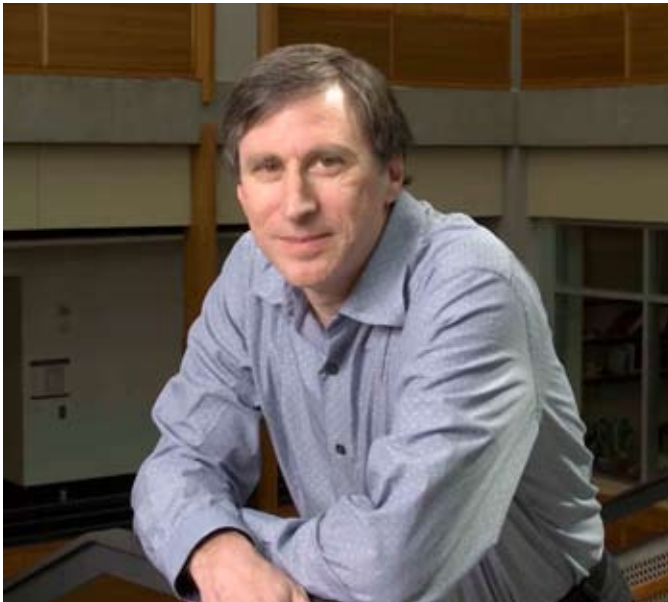
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## Center for Game Science: Putting science into games and games into science

The world is full of important very hard problems that currently cannot be solved with computers or people alone. Zoran Popović, the director of the new Center for Game Science, believes that a symbiosis of people and computers that leverages the computational and creative strengths of each can make significant advances in science and in education, and perhaps can even lead to a more peaceful world. The new center aims to discover a general framework for solving hard problems using this symbiotic structure. For people to be highly effective problem solvers, they need to be engaged and involved for an extended period. Conversely, computers will be maximally effective in this framework only when they are optimally enabling human problem solving, creativity, and collaboration. Due to these unique requirements, the center will focus on games as an ideal mechanism capable of engaging people long enough to turn them into experts, and building the most effective human-enabling computer programs. The center will study automatic methods to guide this coevolution by creating self-adapting games that iteratively refine themselves based on large-scale data analysis of game play. Initially the center will focus on scientific discovery in biochemistry and bioengineering and creating student-specific learning games that

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## From where I sit...



By the time you read this letter, we'll be launched into the next decade. It's hard to know what our field will produce in the years ahead as we continue on a dizzying pace, but as I noted in a previous message, we and others are increasingly focused on having impact on important global problems, such as health care, education, and energy.

Since my last message, I'm happy to report that our faculty has grown. Josh Smith will join us as Associate Professor in February. Josh is our third hire in the ExCEL ("Experimental Computer Engineering Lab") initiative, which seeks to enhance our computer engineering effort by hiring joint faculty on the border between CSE and Electrical Engineering. Josh joins previous ExCEL hires Shwetak Patel and Georg Seelig. He received his Ph.D. from MIT and has been working at Intel Labs Seattle for the last six years, where his research focuses on wireless sensors and robotics. We're very excited about the strength Josh brings to UW in these areas.

A recent event that was incredibly fun was our annual CSE industrial affiliates meeting. For the first time this year we combined our affiliates meeting — which showcases CSE students, faculty, and research to our industrial partners — with an evening social event for our alumni. This allowed friends and alumni to meet and network with old friends, to chat with faculty, to see student posters on the latest CSE research distributed throughout the building, and, of course, to eat good food! Over three hundred local alumni joined us for the event, making it one of the best attended and most exciting events ever held in the Allen Center. We hope to repeat this event in the future and are looking forward to seeing as many of you as the fire marshal will allow.

Finally, as many of you know, this is my 5<sup>th</sup> year in what is normally a 5-year term as CSE department chair. In September, Dean Matt O'Donnell asked me to serve an additional two years following this term, and I've agreed to do so. It's been extremely fulfilling to serve CSE over the last 4 1/2 years, and I look forward to seeing our CSE community achieve continued success in the future.

Wishing all of you a happy and healthy new year!

Henry M. Levy  
Chairman and Wissner-Slivka Chair



CSE's 2010 Distinguished Lecturer Series featured speakers such as Steve Ballmer (CEO, Microsoft) and John Hennessy (President, Stanford University). Information regarding all of the lectures may be viewed at: <http://www.cs.washington.edu/news/newdshome.html>

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Additionally, please be sure to add [msb@cs.washington.edu](mailto:msb@cs.washington.edu) to your email list of contacts.

## Mobile Midwives' Ultrasound Project

Every day 1,500 women die from pregnancy or childbirth-related complications, and 99% of all maternal deaths occur in the developing world. World Health Organization (WHO) estimates for 2008 indicate that women in developing regions had an estimated 1 in 120 chance of maternal death in their lifetime, compared to 1 in 4,300 for developed regions. Many of these deaths could be prevented by the use of ultrasound to identify problems prior to delivery. If potential pregnancy complications are detected early, mothers have improved opportunities to seek proper medical care at appropriate facilities. Ultrasound imaging is an effective tool for identifying maternal mortality risk factors. Unfortunately, ultrasound is nearly absent in many rural healthcare facilities in developing regions due to the high costs of both equipment and required training.

Computer Science & Engineering joined with Human-Centered Design and Engineering to offer a year-long senior undergraduate capstone design course on "Designing Technology for Resource-Constrained Environments." (This is the third year that the departments worked together on this senior capstone course.) As one of the projects this past year, a group of students worked to develop a low-cost, easy-to-use portable ultrasound system for midwives that will be field-tested in Uganda — the Midwives' Ultrasound Project.

To leverage existing healthcare systems commonly found in these contexts, the team focused their efforts on increasing the diagnostic capabilities of midwives — often central medical figures in rural and low-income communities — and creating a user interface that was most attuned to their needs and capabilities. The group put together a low-cost portable ultrasound platform from off-the-shelf components consisting

of a USB ultrasound probe (from Interson with software drivers provided by researchers at Washington University in St. Louis) and a touch-screen netbook for a total cost of around USD3500. Compared to currently available ultrasound devices, they greatly simplified the user interface while maintaining functionality to allow midwives to detect three common obstetrical conditions: placenta previa, multiple gestations, and breech presentation. To evaluate their solution, they tested the accuracy of ultrasound measurements, image quality, and whether midwives could properly use the device for diagnosis. Testing performed by nine clinicians indicated the platform would be appropriate for identifying these three conditions. The modular design approach allows for easy modification, and the device is designed to utilize existing local healthcare resources, namely midwives rather than ultrasound specialists, in order to create a sustainable solution that does not depend on continuous foreign assistance.

The project team includes Waylon Brunette (CSE), Wayne Gerard (CSE), Matthew Hicks (iSchool), Alexis Hope (HCDE), Mitchell Ishimitsu (CSE), Pratik Prasad (CSE), Ruth Anderson (CSE), Gaetano Borriello (CSE), Beth Kolko (HCDE), and Rob Nathan (UW Radiology). Initial project funding came from a \$2,500 undergraduate research award from the College of Engineering. Learn more about the Midwives' Ultrasound Project by viewing this video:

<http://www.engr.washington.edu/giving/capstone.html>

In October 2010, the midwives' ultrasound project was granted a Bill & Melinda Gates Foundation \$100,000 Grand Challenges Exploration Grant — an initiative to help scientists around the world explore bold and largely unproven ways to improve health in developing countries. To receive funding, applicants show in a two-page application how their idea falls outside current scientific paradigms and might lead to significant advances in global health. Grantees, chosen from more than 2,400 proposals, represent 16 countries on five continents.

The UW students and faculty are testing their low-cost ultrasound platform this month on pregnant women at the UW Medical Center and Harborview. They will use the grant to travel to Uganda to test their system in its ultimate capacity as a tool to increase access to ultrasound and lower childbirth-related mortality in rural developing world communities.

Learn about Change, the cross-campus collaboration under which dozens of remarkable projects such as this take place, at:

<http://change.washington.edu/>



The team designed a simple interface specifically for midwives. Five slider bars adjust the image settings; four buttons control other functions, such as freezing the image or accessing the main menu.

*(Continued from first page)*

## Center for Game Science

cover key bottlenecks in early STEM education. The intention is to develop general set of principles applicable to all hard problems facing humanity.

### Foldit: A problem solving science discovery game

Foldit is a game designed to tackle the problem of protein folding. Proteins are small "machines" within our bodies which handle practically all functions of living organisms. By knowing more about the 3D structure of proteins (or how they "fold"), we can better understand their function, and we can also get a better idea of how to combat diseases, create vaccines, and even find novel biofuels.

It turns out that protein folding is a very hard problem. Although laboratory processes to determine the protein shape exist, they are expensive and very slow. For this reason, there has been a considerable research focus to predict the structure of these proteins computationally, primarily through large-scale distributed computing. Unfortunately these distributed computing projects have shown promising but limited success. Seth Cooper (CSE grad student, and now Creative Director of the Center for Game Science) and Adrien Treuille (CSE Ph.D. alum, currently faculty at CMU), together with their advisor Zoran Popović, developed a game that augments the computational search for protein folds with large-scale human spatial reasoning ability. The state-of-the-art biochemistry simulations embedded within the game are created by a team lead by UW professor David Baker, a world-renowned expert in proteomics.

In Foldit, players are presented with a model of a protein, which they can fold by using a host of provided tools. The game evaluates how good of a fold the player has made, and gives them a score. Scores are uploaded to a leader board, allowing for competition between players from all around the world. Since its release, Foldit has gained over 200,000 players from all walks of life. In fact, the best Foldit players have little to no prior exposure to biochemistry. These players have helped to push Foldit to the forefront of protein folding capability, showing that for some particularly hard proteins, Foldit-produced predictions outperform the best known computational methods. These results were recently reported in the journal *Nature*, marking the first time the leading scientific journal has published a paper with over 75,000 authors, the vast majority of whom with no background in biochemistry. More generally, Foldit has shown that it is possible to effectively "crowdsource" human problem solving to solve very hard scientific problems, and that the gaming environment is capable of turning novices into highly-skilled researchers. The goal of the Center for

Game Science is to generalize and expand the success of Foldit to a wider range of problems in science, education, and beyond.

To play Foldit, please visit: <http://fold.it/portal/>

### Discovering optimal pathways for learning early mathematics

In an effort to relieve the crisis in STEM education, CSE grad students Erik Andersen and Yun-En Liu and Professor Zoran Popović are leading a team of undergraduate students and artists to create video games that can discover optimal pathways for learning. They have focused so far on early math, including topics such as fractions and algebra, which are some of the main bottlenecks preventing students from pursuing a career in science. Currently, there are many competing theories for how best to teach these subjects, and a lack of experimental data to evaluate these methods prevents development of provably effective learning mechanisms. Large-scale in-school pen-and-paper studies can be prohibitively expensive and time-consuming.

However, children naturally gravitate toward video games, which can attract tens or hundreds of thousands of players. The goal of this project is to leverage this popularity to acquire huge amounts of learning data and discover the best ways to teach early mathematics. If players receive different versions of a game that have particular concepts changed or introduced differently, and the game records how players perform, researchers can use this data to understand how students learn. An additional goal is to make the game adapt to every player, so that it will never be too easy or too difficult and each student will always be working on the next concept he or she needs to learn.



The Center's first prototype math game, Refraction, recently won the Grand Prize in the Disney Learning Challenge. Refraction targets conceptual understanding of fractions, one of the key bottlenecks in early math education.



Using data from Refraction, an early prototype game, Andersen and Liu developed a new visual datamining method to analyze the behavior of large numbers of players to quickly uncover game design flaws and common player confusions. They also used the game's analytics framework to run large-scale experiments on player motivation, by randomly removing sound, music, animations, and optional rewards for some players and observing the change in play time and return rate. Ongoing in-school educational trials are evaluating the effectiveness of the games for improving pen-and-paper test scores.

These games have already become a hit in the community. Refraction won the Grand Prize in the Disney Learning Challenge at SIGGRAPH 2010. Over 100,000 people have played Refraction since its release on Flash game website Kongregate.com ([www.kongregate.com](http://www.kongregate.com)), and dozens of elementary school students are already playing the game at school. In the coming year, the game will reach up to 50,000 students through K12 Virtual Academies, helping to gather the data necessary to answer big educational questions.

To play the game, please visit:

<http://games.cs.washington.edu/refraction/>

### Photocity: Reconstructing the world in 3D

Imagine a real world video game stretching across the whole of UW campus. There are virtual flags to capture and real territory to defend; you could even become the ruler of Suzzallo library! All you need to play is a digital camera, and you capture flags and buildings by taking photos of them.

This game is a reality. Developed by CSE grad student Kathleen Tuite, from the Center for Game Science, PhotoCity is a real-world video game for collecting thousands of photos. The purpose of the game is to collect enough photos to reconstruct not just the UW campus in 3D, but eventually the whole world.

To play, PhotoCity players at UW go outside and take dozens (or sometimes hundreds) of photos of the buildings on campus from all different angles and then upload their photos to the website ([www.photocitygame.com](http://www.photocitygame.com)). The game automatically adds their photos to a giant, ever-expanding 3D model of campus, and awards points and virtual conquests to players who grow the model the most. As players take photos of different parts of campus, we get a more complete reconstruction that will eventually extend to cover all of UW. We currently have over 50,000 photos of UW.

Taking thousands of photos may remind you of Google Street View, where Google drives a car mounted with cameras down every single street so that you can see a picture of any place in

town. PhotoCity is a lot like Street View in some respects, but very different in others. For starters, the Street View car cannot drive everywhere on campus. There are narrow footpaths and stairs that only humans on foot can get to. Secondly, it is expensive to get a car, special cameras, and gas. We want to collect photos for free! Essentially, PhotoCity crowdsources the photo collection process, and players use whatever cameras they already have, including cell phone cameras. Thirdly, and perhaps most interestingly, is how PhotoCity uses the photos: to make accurate, detailed 3D models.

PhotoCity is one of several 3D reconstruction projects out of UW. It is a direct descendant of Noah Snavely's (CSE Ph.D. alum, now faculty at Cornell) Photo Tourism project, which may be more familiar as Microsoft's Photosynth. More recently, the Rome in a Day project used hundreds of thousands of Internet photos to reconstruct all popular landmarks in Rome. We imagine using PhotoCity to fill in the gaps and connect all Rome in a Day models, essentially using our game to incentivize people to take the "missing" photos of Rome that are not on Flickr, but that are necessary for building a complete reconstruction of the city.

PhotoCity wraps a real world game around amazing 3D reconstruction technology and puts the ability to model a city or school campus in the hands of the players. It lets them compete for points, flags, and glory, but also collaborate on a 3D reconstruction without requiring special skills or equipment (beyond a digital camera and an Internet connection). To see how the UW campus is coming along or view the models growing in 21 cities and 7 different countries around the world, visit:

<http://www.photocitygame.com>



PhotoCity is played in the real world rather than in front of a computer. To compete, players provide images that contribute most toward reconstruction of real world geometry. This image depicts locations of images contributed by players during the competition to reconstruct the UW campus.

## Datagrams

### Greg Barnes scores in foodie treasure hunt

To celebrate its 60<sup>th</sup> birthday, Canlis Restaurant sponsored a local treasure hunt: find a 1950's menu, pay 1950 prices. Always up for good treasure hunt, CSE Ph.D. alum Greg Barnes was not daunted when he read the December 2<sup>nd</sup> clue: "Have no fear, Church is here. But how did she get from here to there?" With help from his spouse, CSE Ph.D. alum Elizabeth Walkup, they found a reference to a plane on display at the Museum of Flight. He recognized the plane and recalled reading about it at one of CSE's pit parties in the late '80s. From that, he found the menu. This proves it: It pays to attend CSE's parties!



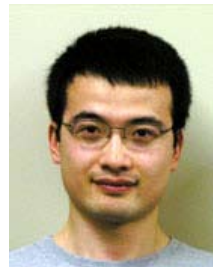
### Ed Lazowska named to Energy Efficiency and Renewable Energy Advisory Committee



CSE's Ed Lazowska has been named to the Department of Energy's Energy Efficiency and Renewable Energy (EERE) Advisory Committee. The 19 member committee will meet twice a year and report directly to Energy Secretary Steven Chu. They will advise him on long-range strategies, program funding, and other issues in the EERE.

### Li Zhang receives Packard Award

CSE Ph.D. alum Li Zhang, now faculty at the University of Wisconsin-Madison, was the only computer scientist to win a 2010 Packard Fellowship in Science and Engineering from the David and Lucile Packard Foundation. Zhang — who recently won both an NSF CAREER Award and a Sloan Research Fellowship — studied with Steve Seitz in UW's superb Graphics and Imaging Laboratory. Zhang's research supported by the award will seek to restore stereo 3D vision for blind people by developing new computational imaging and vision techniques that work with artificial retinas.



### Zoran Popović named "Most Influential" by Seattle Magazine



Seattle magazine names CSE's Zoran Popović and his UW Biochemistry collaborator David Baker among its 2010 "Most Influential" for their collaboration on the protein folding game Foldit. Zoran joins Oren Etzioni (2008, Technology "Mr. Predictability"), Yoky Matsuoka (2008, Science "Bionic Woman"), and Ed Lazowska

(2004, Technology "Hello Mr. Chips") in being recognized by Seattle magazine.

### Shwetak Patel recognized as "Top Innovator"; "Newsmaker of the Year"

Seattle Business named CSE's Shwetak Patel a 2010 "Top Innovator" and placed him on the front cover. The magazine recognized him for "turning the unique 'music' of appliances into energy savings." And in December 2010, Patel was voted TechFlash's "Newsmaker of the Year," edging out other familiar Seattle names such as Allen, Ballmer, Bezos, Huh, and Sack. Patel was recognized as "a 28-year-old assistant professor in the UW Department of Computer Science & Engineering [who] sells home energy monitoring startup Zensi to Belkin and separately develops a novel method of using electrical wiring as a wireless antenna system, spawning another startup."



### "VizWiz" receives Best Paper Award at UIST 2010



UW CSE Ph.D. alum Jeff Bigham (now faculty at Rochester), CSE grad student Chandrika Jayant, and their coauthors received the best paper award at this year's ACM Symposium on User Interface Software and Technology (UIST) for their paper

*VizWiz: Nearly Real-Time Answers to Visual Questions.* VizWiz is an iPhone application aimed at enabling blind people to recruit remote sighted workers to help them with visual problems in nearly real-time.

### dub wins best paper at Ubicomp 2010

Two papers by the dub group received a best paper award and a best paper honorable mention award. *ElectriSense: Single-Point Sensing Using EMI for Electrical Event Detection and Classification in the Home*, authored by Sidhant Gupta, Matt Reynolds, Shwetak Patel, received the best paper award. *SNUPI: Sensor Nodes Utilizing Powerline Infrastructure*, authored by Gabe Cohn, Erich Stuntebeck, Jagdish Pandey, Gregory D. Abowd, Brian Otis, Shwetak Patel, received a best paper honorable mention. Congratulations to the dub team!

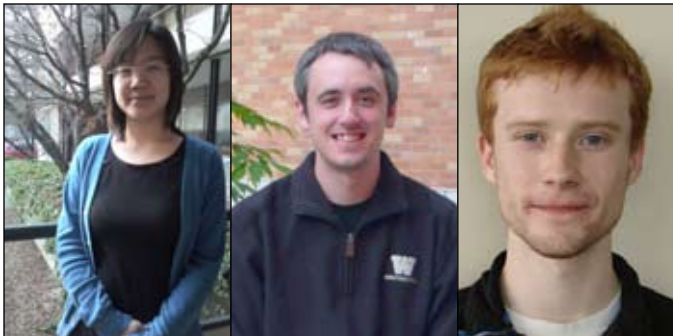


### Yoky Matsuoka is UW Medicine's "2010 Emerging Inventor of the Year"

CSE's Yoky Matsuoka has been recognized by UW Medicine as the 2010 Emerging Inventor of the Year. Matsuoka is developing an anatomically correct robotic hand to



## CRA award competition recognizes three UW CSE students



UW CSE seniors (l-r): Joy Kim, Jeff Rasley, Colin Scott

Each year the Computing Research Association recognizes a small number of the nation's undergraduates with the CRA Outstanding Undergraduate Research Awards. UW CSE continues its tradition where our students are recognized by these awards. In the 2011 competition, three CSE students received honorable mentions: Joy Kim, Jeff Rasley, and Colin Scott.

Joy works on the MobileASL project, which aims to help make sign language communication possible over mobile phones. She created the tools that collect data from the phone during field studies. After graduation, Joy plans to go to graduate school to pursue a PhD studying human-computer interaction. In particular, she is interested in studying web accessibility to allow Internet users with disabilities equal access to the information the web has to offer.

Since December 2009, Jeff has worked with the Seattle project (a distributed test bed research project). He initially worked on verifying the security of its programming language sandbox; and from this work, he coauthored a security paper that appeared in the ACM Computer and Communications Security conference earlier this year. His honor's thesis focuses on formally verifying the portability of various software interfaces, where he is focusing on rigorously verifying Seattle project's API and creating tools that will help quantitatively verify other system's portability. After graduation, he plans to pursue a Ph.D.

Colin's research involves Internet measurement. He has focused on developing techniques such as vantage point proximity prediction for improving the scalability of the reverse traceroute system. His senior thesis is on the use of controlled spoofing for isolating the location of network failures. Next year, he hopes to start graduate school in computer science.

Congratulations to Joy, Jeff, and Colin! They join 35 previous CSE undergraduates who have been recognized by CRA since the inception of this award in 1995. As of a year ago, UW CSE was ranked #1 in the nation in the number of undergraduates recognized with CRA Outstanding Undergraduate Research Awards in the preceding decade; that record should continue.

### Update on two of last year's recipients:

Alum Justine Sherry is continuing research in networking in the Ph.D. program at UC Berkeley. She recently presented her work on IP timestamps, for which she won the CRA award, at the Internet Measurement Conference. She is currently designing a framework to allow application programmers to better configure and interact with the networks they use.

Alum Rita Sodt will start the 5<sup>th</sup> year masters program in UW CSE in January, where she will continue with the same research, which involves enhancing a mathematical model that quantifies and predicts the growth of gliomas (a highly invasive type of brain tumor). Following graduation this past June, she completed a summer internship at Google, followed by three months of living in Portugal and travelling.

## CSE's annual pumpkin carving



CSE hosted its annual pumpkin carving bash on October 29<sup>th</sup>, on the heels of our successful Industrial Affiliates meeting and alumni event on the 27<sup>th</sup>. While it was as messy as usual, fun was had by all! Photos by our own Bruce Hemingway.



(Continued from page 6)

## CSE Alum Ed Felten Named Chief Technologist at FTC



CSE alum Ed Felten (PhD, '93) is one of the nation's foremost experts on the high-profile, high-stakes technology issues of computer security and privacy. A professor of computer science and public affairs at Princeton, he is founding director of the university's Center for Information Technology Policy (CITP), which explores the interfaces of technology, government policy, and the social sciences. In the policy arena, Felten has focused on intellectual property, the impacts of technology regulation, Internet software, and consumer issues.

His own rising profile now includes appointment as the Federal Trade Commission's first Chief Technology Officer, a one-year assignment beginning in January. He will advise the agency on cybersecurity and online privacy, consumer protection, and antitrust matters, including tech-industry mergers and anticompetitive behavior. Felten has testified before the House and Senate on technology matters and is founder and lead contributor to the influential technology blog Freedom to Tinker.

"Ed is extraordinarily respected in the technology community, and his background and knowledge make him an outstanding choice to serve as the agency's first chief technologist ... we are thrilled to have him on board," said FTC chairman Jon Leibowitz.

Felten looks forward to putting his expertise into practice in government. "This is a chance for me to apply what I've been studying and see the policy-making process from the inside," he said.

The UW College of Engineering honored Felten with the 2007 Diamond Award for Early Career Achievement — clearly a prescient selection.

## Datagrams (cont.)

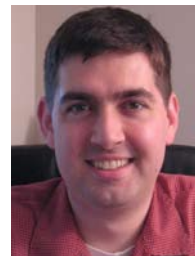
investigate the neural control of human hand movements. The goal of this work is a prosthetic hand capable of executing detailed hand movements autonomously or with natural neural signals.

### *Scott Saponas named to Technology Review's 2010 TR-35*

CSE Ph.D. alum Scott Saponas is the latest alum cited in the *Technology Review* TR-35 list of the 35 most promising innovators under the age of 35. While a CSE grad student, Saponas developed software to process the jumble of signals from the muscle mass in the arm. A jogger using the armband system could tense hand muscles to switch tracks on an MP3 player without breaking stride, or a mechanic repairing an engine could use it to control a heads-up display. Now at Microsoft Research, Saponas continues to improve his system by combining the muscle interface with other sensors, including accelerometers and gyroscopes, to provide additional precision. Saponas joins the other CSE alums that have received this honor: Tapan Parikh (now at UC Berkeley), Karen Liu (now at Georgia Tech), Jeffrey Bigham (now at Rochester), and Adrien Treuille (now at CMU).



### *Doug Downey selected 2010 Microsoft Research Faculty Fellow*



Each year, Microsoft Research recognizes outstanding new faculty members who represent a selection of the best and the brightest in their fields. Doug Downey, a CSE Ph.D. alum advised by Oren Etzioni and now on the faculty at Northwestern University, received this significant distinction. Downey studies methods for automatically extracting knowledge from the web. His work aims to enable advanced web search engines, capable of answering complex questions by synthesizing information across multiple web pages. Building on techniques from natural language processing, machine learning, and artificial intelligence, Downey is currently investigating how to harness human interaction to improve knowledge extraction systems.

### *Anne Condon appointed Head of UBC Department of Computer Science*

Professor Anne Condon, a CSE Ph.D. alum, has been appointed Head of the University of British Columbia Department of Computer Science. Condon is internationally recognized for her research in complexity theory and bioinformatics, and a leading Canadian proponent for women in science and technology. Her four-year term begins on July 1, 2011.





## Josh Smith joins UW CSE and EE Departments



Joshua R. Smith joins the CSE and EE departments in February 2011. Previously, he worked at nearby Intel Labs Seattle, where, from 2004-2010, he collaborated with many UW students and faculty. He holds Ph.D. and S.M. degrees from MIT, an M.A. in Physics from Cambridge University, and B.A. degrees in Computer Science and Philosophy from Williams College.

Smith's research interest is in the area of sensor systems: inventing new sensor systems, devising new ways to power them, and developing algorithms for using them. The research has application in the domains of ubiquitous computing, robotics, and human-computer interaction (HCI). He is currently working on 3 projects: novel sensors for robotic manipulation, resonant (non-radiative) wireless power transfer, and (radiative) wirelessly powered UHF-RFID-compatible sensing platforms.

At Intel, he has led research projects in the areas of wireless power and robotics. He is the principal investigator of Intel's WREL (Wireless Resonant Energy Link) project, which aims to transfer tens of watts wirelessly. He also leads a project called WISP (Wireless Identification and Sensing Platform). WISP is a battery-free platform for sensing and computation. It consists of a fully-programmable, 16-bit microcontroller that is powered wirelessly by radio waves: it harvests all the energy it needs from a standards-compliant UHF RFID reader. It also receives data from and sends data to the RFID reader.

One recent afternoon, Smith took his yet-to-be-named new



humanoid robot out for a spin. They stopped at ReBoot for a shot of caffeine and to meet one of our local baristas.

## 2011 IEEE Fellows

Professors Gaetano Borriello and Steve Seitz have each been named a Fellow of the Institute of Electrical and Electronics Engineers, effectively January 1, 2011. They are the 11<sup>th</sup> and 12<sup>th</sup> UW CSE faculty members to be named a Fellow of IEEE. UW Ph.D. alumna Fran Berman was also named a Fellow of IEEE.

Gaetano Borriello, the Jerre D. Noe Professor of Computer Science & Engineering, has been named a Fellow "for contributions to embedded computing devices and systems." His research interests include ubiquitous computing, sensor systems, and embedded systems. An Adjunct Professor in Electrical Engineering, Human-Centered Design and Engineering, and the Information School, and the Founding Director of Intel Labs Seattle, Gaetano most recently led the development of Open Data Kit (ODK), a free and open-source set of tools that help organizations author, field, and manage mobile data collection solutions.



Steve Seitz has been named a Fellow "for contributions to three-dimensional computer vision." His research interests include many aspects of computer vision and computer graphics, particularly capturing the structure, appearance, and behavior of the real world from digital imagery. Steve was twice awarded the David Marr Prize for the best paper at the International Conference of Computer Vision, and has received an NSF Career Award, an ONR Young Investigator Award, and an Alfred P. Sloan Research Fellowship. His work on PhotoTourism (with graduate student Noah Snavely and Microsoft researcher Rick Szeliski) was central to Microsoft's Photosynth offering. He currently is on leave at Google Seattle working on a computer vision project.

UW Ph.D. alumna Fran Berman (advised by Bob Ritchie) has also been named a Fellow "for contributions to high-performance computing, development of performance analysis techniques, and leadership in the area of high-performance and grid computing." She is Vice President for Research and Professor of Computer Science at Rensselaer Polytechnic Institute.



## 2010 Industrial Affiliates Annual Meeting Huge Success!

CSE held its 2010 annual Industrial Affiliates meeting on October 27<sup>th</sup> and 28<sup>th</sup>. New this year, we tested a few changes to the meeting's first day schedule:

- Added more research presentations during the day
- Moved the keynote presentation to mid-day
- Shifted the poster session to the evening and invited Seattle-area alums

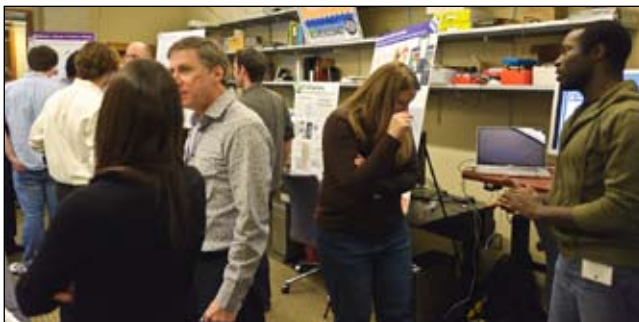
And the formula seemed to be a hit! More than 125 representatives from affiliate companies participated in a day of research presentations, as well as the keynote presentation by Linden Rhoads, UW Vice Provost and head of the Center for Commercialization. Abstracts and research presentations may be viewed at:

<http://www.cs.washington.edu/affiliates/meetings/talks1011.html>

At the end of the day, approximately 300 Seattle-area alumni joined for an evening of posters, demonstrations, and fellowship. Introduced this year was the "People's Choice Award" for the posters. (Attendees were encouraged to tweet their votes.) To view a list of posters and demos, please check:

<http://www.cs.washington.edu/affiliates/meetings/postersdemos1011.html>

While it may be hard to top this year's meeting, stay tuned for information regarding annual meeting dates for 2012.



Posters and demos



Affiliates and alums, mixing and mingling during the poster session



**Got jobs?** On the 28<sup>th</sup>, 42 companies, from Adobe to Zynga, participated in the recruiting fair. Over 100 representatives spent the day recruiting CSE undergraduate and graduate students. Our next career fair will be held on January 25, 2011.



Matt McIlwain presents the Madrona Prizes to the 2010 winners.

### 2010 Madrona Prize Winners

**Winner:**

*Prefab: Modifying Any Graphical User Interface*  
Morgan Dixon & Daniel Leventhal

**Runner-Up:**

*SNUPI: Sensor Nodes Utilizing Powerline Infrastructure*  
Gabe Cohn

**Runner-Up:**

*Comet: An active distributed key-value store*  
Amit Levy & Roxana Geambasu

**Runner-Up:**

*Scalable Distributed Network Management*  
Colin Dixon & Dane Brandon

### 2010 People's Choice Winner

*Experimental Security Analysis of a Modern Automobile*  
Karl Koscher, Alexei Czeskis, Franzi Roesner



## CSE Bay Area alumni event



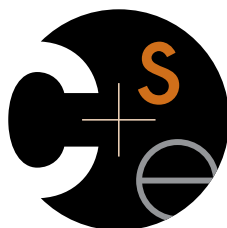
On June 27<sup>th</sup>, more than 60 Bay Area alumni gathered at the home of Jeff Dean and Heidi Hopper, where they were joined by UW CSE faculty members Gaetano Borriello, Dan Grossman, and Ed Lazowska. Many thanks to Jeff and Heidi for hosting a terrific event!

To keep in touch with CSE, please see:

<http://www.cs.washington.edu/info/aboutus/UWCSEOnePage.pdf>

## Give to CSE and make an impact

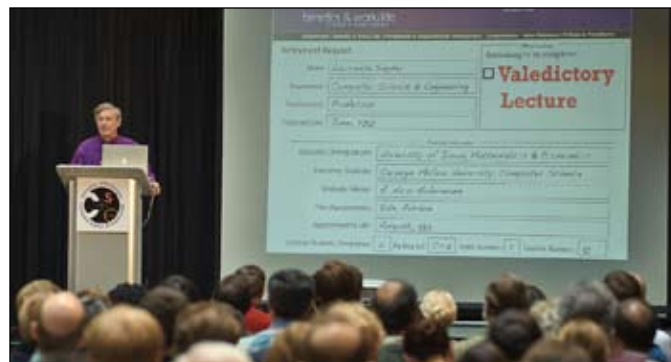
We all know the difference one line of code makes to the success of new software. In the same way, one gift of any size makes a difference to the success of CSE teaching and research.



Your gift provides the department with resources for scholarships, fellowships, research support, and funds to build the CSE community we hope you value. Small gifts might not seem significant by themselves, but when pooled together they make great things possible.

As you think about your giving, please consider making a gift to CSE. Every gift, regardless of size, helps maintain a quality experience for students that reflects the sense of community you've come to expect from us. An easy way to make a gift is online. Go to our website ([www.cs.washington.edu](http://www.cs.washington.edu)) and select "Support CSE." You'll find a variety of funds that can benefit from your support.

## Larry Snyder Gives His Valedictory Lecture



After more than 25 years on the UW CSE faculty (preceded by stints at Purdue and Yale), Larry Snyder marked his retirement with a valedictory lecture on June 3, 2010. This 'last' lecture was attended by more than 200 friends and colleagues.

Larry advertised the talk, "A Micro-Century of Computational Miscellany," as follows:

"A micro-century (uC) is 52.6 minutes, the optimum length for a college lecture in the opinion of people who worry about such things. A valedictory lecture, a concept with a British pedigree, is a ponderous speech on an arcane topic of no apparent interest to anyone but the speaker. (Retiring academics, after several thousand micro-centuries in the classroom, are wonderfully well prepared to deliver them.) Miscellany, of course, is a collection of diverse things, odds and ends with no unifying theme.

"In this decidedly non-technical talk, I describe interesting odds and ends about computing that have caught my attention over the years, because, unfortunately, the dog ate my notes for the originally planned lecture: 'Apposition or Opposition: Dialectic Analysis of 'binary' in Post-modernist Computer Science Thought.'"

Thanks to Larry for nearly three decades of contributions to UW CSE! To watch his lecture, please visit:

<http://norfolk.cs.washington.edu/htbin-post/unrestricted/colloq/details.cgi?id=940>





b

# most significant bits

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## Introducing Ms. Sprocket



CSE's Bruce Hemingway debuted his 'Art Critic Robot' project — appropriately named Ms. Regina Sprocket — on October 8<sup>th</sup> at the Kirkland Arts Center event "REDUX 2010."

The MOmA — Seattle Museum of miniature Art — is an adaptable and modular space for artists to think big on a small scale. Designed and built by architect Ariel Kemp, the model is new contemporary exhibition space, and artists are invited to create their own wings to the museum, including the art work that fills each wing. MOmA is also home to Regina Sprocket, its resident critic. Ms. Sprocket is designed to move through the gallery space, find art on the walls,



and transmit her critical comments, which are projected via a webcam in the four of the attached wings showing scale views of the galleries. The verbiage all came from local art critics and published reviews. Her critical, and sometimes nonsensical, comments include:

"It's difficult to enter into this work because of how the iconicity of the facade endangers the devious simplicity of a participation in the critical dialogue of the 90s."

"Although I am not a painter, I think that the optical suggestions of the spatial relationships visually and conceptually activates the inherent overspecificity."