Conduit

A RESEARCH AND ALUMNI NEWS MAGAZINE
DEPARTMENT OF COMPUTER SCIENCE
BROWN UNIVERSITY

The Artemis Project

Notes from the Chair: the Latest News from 115 Waterman

Greetings to all CS alums, supporters and friends!

The fall semester is well underway and the CIT is bustling with activity. Great things continue to happen in the department and I am excited to share the highlights with you.

In May, we awarded an all-time high of 42 Master of Science degrees. In addition, 56 bachelor's degrees and 7 Ph.D.s were conferred in the department's 30th year. Congratulations to our fantastic graduates – we hope you'll keep us updated on your careers and life experiences.

I am also happy to report that this fall our Ph.D. program enrolled a record 20 new candidates! We also have 35 new master's students beginning their studies this semester. With undergraduate enrollments also growing, we are thrilled to have so many new faces around the building and look forward to getting to know all of you.

Thanks to the efforts of the Center for Computational Molecular Biology, led by Sorin Istrail, the University will accept doctoral candidates in computational molecular biology (CMB) beginning in fall 2010. This Ph.D. program will train students in computational, mathematical, and statistical sciences while providing a foundation in molecular biology. The program initially will draw from four disciplines at the University – applied mathematics, computer science, ecology and evolutionary biology, and molecular biology, cell biology and biochemistry. The center expects to take up to four students annually during the program's initial phase (projected to be three years), with increased enrollment in subsequent years.

I'm also excited to tell you that the department continues to receive substantial gifts in cash and equipment from companies in support of research projects by several faculty members. In particular, we are grateful to Dynamic Decision Technologies, Google, IBM, Intel, Jane Street Capital, Microsoft, NetApp, Pixar, Sun Microsystems, Vertica, Willow Garage and Yahoo! for their recent research gifts.

We especially appreciate these gifts from industry which allow faculty members to work on cutting-edge research areas that might otherwise remain unexplored. These gifts are a testament to the quality of research performed by our faculty and students and confirm that pursuing innovation remains a strategic priority for the information technology industry, even during challenging times for the economy.

Congratulations are in order for John Savage, selected to serve as a 2009 Jefferson Science Fellow for the U.S. State Department, where he will work on cyber-related issues for one year. The prestigious Jefferson Science Fellows program was established in 2003 as a way of elevating the role of science and technology in the formulation of U.S. foreign policy. John's expertise, leadership, and vision will be a great asset for the State Department. Our government is fortunate to have such a prominent scientist as advisor to policy makers. John and his wife Patricia, who is teaching in the Middle School of the Sidwell Friends School, moved to Washington, DC for the duration of the assignment. We wish you a great year, John and Patricia!

Looking ahead, please mark your calendar for the next Computer Science Reunion and Networking Reception to be held on Saturday, May 29, 2010. We encourage all alums, friends and supporters to stop by. The 2009 event had a fantastic turnout and a terrific time was had by all. We hope to see you this coming May.

Roberto Tamassia
Plastech Professor of Computer Science and Chair
Department of Computer Science
Brown University

Volume 18, Number 2

Published twice yearly by the Department of Computer Science at Brown University, Conduit is distributed free to all computer science alumni, faculty, staff, students and industrial partners.

Queries about this publication can be directed to: conduit@cs.brown.edu or
115 Waterman Street
Campus Box 1910
Providence, RI 02912

PUBLISHER
Industrial Partners Program,
Department of Computer Science

EDITOR-IN-CHIEF
Amy Tarbox

GRAPHIC DESIGN
Brown Graphic Services

COPY EDITOR
Erin Klopfenstein

FEATURED COLUMNISTS
Shriram Krishnamurthi
The Database Group

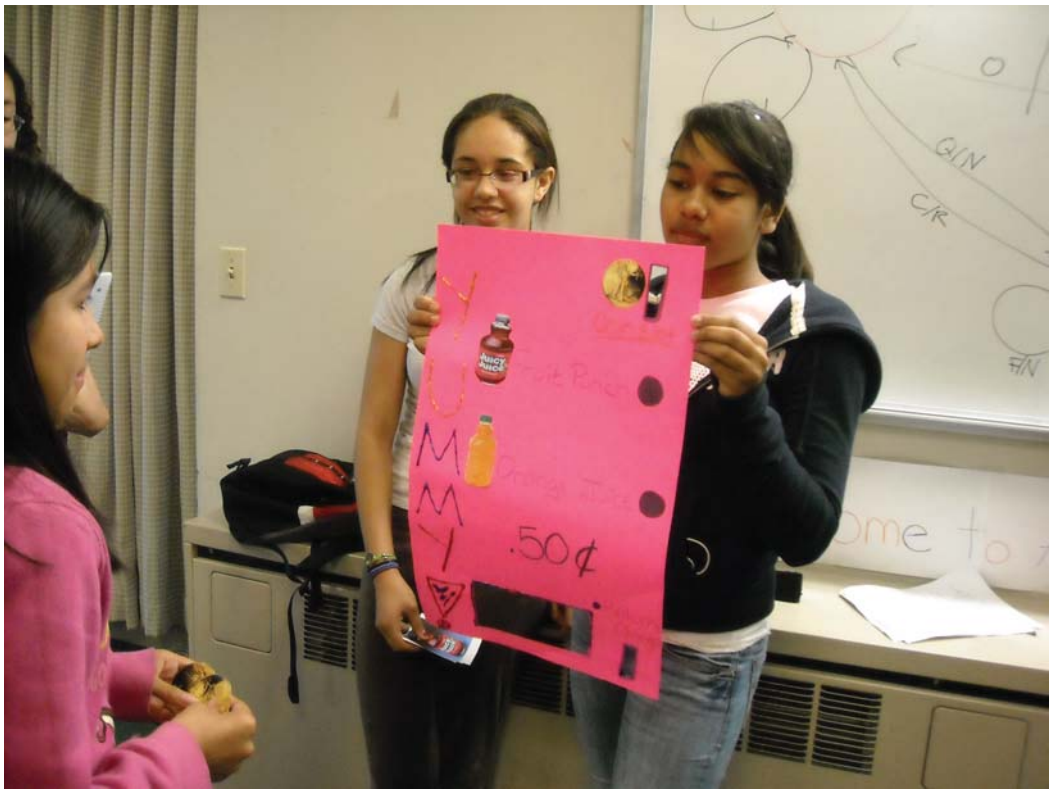
CONDUIT ON THE WEB
John Bazik
Kathy Kirman

PRINTING AND DISTRIBUTION
Brett Turner, Information Services
Brown Graphic Services

Conduit is printed on Burgo's ChorusArt, an acid free and elemental chlorine free paper containing 50% recycled content and 15% post-consumer waste. You are the difference – reduce, reuse, recycle.

The Artemis Project

The Artemis Project, a free summer program offered to rising ninth-grade girls in the Providence area through the computer science department, recently graduated its fourteenth class of eager young women. Artemis, which is coordinated each year by four undergraduate women at Brown, continued this past summer under the direction of Tess Avitabile '11, Adrienne Cohen '11, Nell Elliott '11 and Lu Zeng '12, as well as advisors Amy Greenwald and Anna Lysyanskaya.



Artemis, a program designed to help promote female representation in the fields of math and science—particularly, computer science—hopes to usher in girls by catching their interest as they enter high school. Artemis targets girls at this age, as it is a critical period during which the gender disparity in many of the sciences becomes most pronounced.

Artemis seeks to achieve these goals by showing its participants that many topics in computer science are interesting and understandable, rather than dull and intimidating; by introducing the participants to a community of women who are confident in their abilities and successes in a field in which they are a minority; and, perhaps most importantly, by giving the participants the opportunity to meet other like-minded, intelligent girls with whom they can share their scientific interests, ideas and experiences.

During the five weeks of camp, the students study two topics per day. One topic is taught in a computer lab, where the girls learn to use applications such as Microsoft PowerPoint and Adobe Photoshop. This year, the girls also learned the basics of HTML, CSS, and Visual Basic, and they were introduced to the notion of object-oriented programming. Beyond teaching basic computer proficiency, this past year, the Artemis coordinators drastically modified the curriculum to also give the girls a taste of some of the more theoretical aspects of computer science. The second lesson was taught in a classroom. Using only paper and pencil, the girls explored subjects like cryptography, artificial intelligence, algorithms data structures and models of computation.

The aforementioned list of topics was an endeavor by this year's coordinators to expose the girls to aspects of computer science that they would not likely encounter in high school. Programming is often the sole focus of high school computer science classes. But the coordinators realized that some girls may be interested in aspects of computer science that transcend programming. Artemis gives its students an opportunity to witness some of the breadth of computer science, which they may otherwise never encounter, particularly if they lose interest in math and science during high school and continue to shy away from these fields in college.

Artemis could choose to focus on fewer subjects, and plunge more deeply into those subjects. This year's coordinators feel strongly, however, that presenting as many topics as possible is essential because they are trying to capture the students' interests. As the final student surveys showed, almost every topic that was covered was both a favorite and a least favorite at least once, illustrating the value of a varied curriculum in reaching the wide range of students who participate in Artemis. The coordinators also observed that the girls felt a great sense of accomplishment and confidence in their

own intelligence and abilities when they discovered that as thirteen- and fourteen-year-olds, they were able to understand concepts that their coordinators had not studied until they entered college.

In order to make topics like game-tree search and multi-party computation accessible to rising ninth-graders, the coordinators presented their curriculum in an engaging, interactive way. This approach allowed the girls to study a number of fairly complex topics in a fun and comfortable environment. The girls seemed to thoroughly enjoy the hands-on activities the coordinators created for them, and, at the same time, the activities seemed to inspire the girls to strive to master core computer science concepts. For example, when the girls were split into teams to categorize comical scenarios such as private key encryption, public key encryption, multi-party computation or digital signatures, the coordinators were amazed to see how quickly the girls mastered these advanced topics, and how joyfully competitive they behaved towards one another. It often seemed as if the girls had forgotten that they were learning, so much so that the acquisition of new knowledge came as a side effect of playing a fun game with their friends.

The end of Artemis is celebrated with two sets of final presentations: one to the faculty and staff of the department and one to the families and friends of the students. The coordinators are extremely proud of the work the girls did during camp and are very pleased that the girls had a chance to present it. The girls were both excited and nervous to speak publicly, but ultimately loved having the chance to show off the work they had done. Artemis would like to thank everyone who attended the presentations and supported the girls in the work they have already done and hopefully will continue to do.

The main challenge that Artemis faces is its lack of continuity, both in coordinators and students. Because the coordinators change every year, it is hard for Artemis to maintain constancy in its curriculum and recruitment from middle schools, and furthermore, to follow its students beyond the five weeks they spend at Brown. This year's coordinators are working to organize a reunion for former students, as well as a "shadow day," when Artemis students will be invited to spend a day on campus with their former coordinators, attending classes and eating in the dining halls. The hope is that these changes to Artemis will help to bring some continuity to the program, and in particular will help future coordinators stay in touch with their students so that they can continue to offer them guidance all throughout their high school (and possibly even their college) years.

Another idea we hope to pursue if sufficient funding becomes available involves expanding Artemis beyond Brown. Our idea is very simple: every year, we will invite an undergraduate from another college or university to be part of our team of coordinators, and a faculty member from the same college or university to oversee the student. After the summer, the student and her mentor will endeavor to create an Artemis-like program at their home institution. If successful, the new program will be able to invite colleagues from other institutions who will be able to learn from it and copy it. Our dream is that Artemis will spread in a pyramid-like fashion until it is hosted by every computer science department in the country.

Artemis welcomes any suggestions for further ideas that might be implemented in coming years. Please send any comments to artemis@cs.brown.edu.

Editor's note: Due to budgetary challenges, the Artemis Project is at risk of not being able to run in 2010. If you would like to make a donation, please contact abt@cs.brown.edu

The Faculty Speak Out

Rodrigo Fonseca

Q&A with Rodrigo Fonseca

How did you first become interested in computer science?

I didn't grow up with the Internet around. Rather, I got attracted to amazing things I saw computers do in computer fairs I went to as a kid, all the calculations, graphics, simulations, games, etc. I decided that I wanted to learn how they worked and how to program them and wouldn't leave my parents alone until they got me a computer (if you care to check, my first computer was an MSX and it came with a new technology at the time, a floppy drive!). I did play a lot with computers as a teenager, but then entered college with a declared major of architecture (not computer architecture). After a while, though, I realized that I would rather be creating the advanced software that I was using for my designs than the architecture itself and transferred to the computer science program. I haven't looked back since.

How do you pick your research problems?

I try to look for relevant problems whose solution would really benefit people, and where my skills could be useful. Two examples are how to better understand and program planetary-scale distributed systems, and how to make the systems energy efficient. We should always reevaluate fundamental assumptions of known solutions, such as those about cost, performance, connectivity, or usage patterns, as technological advances are always shifting the balance between these.

"One thing I learned about research problems is that one generally leads to many."

Lastly, one thing I learned about research problems is that one generally leads to many. It is when you start to dig into some idea that new and surprising problems and opportunities appear.

What do you consider the most interesting and exciting challenges of your research?

We are experiencing very dramatic changes in the way we build and interact with computing systems. On the one hand, computers are leaving the desk and integrating into the physical world, with increasing computational power, always-on connectivity, and all sorts of sensors and novel interfaces. On the other side of the 'cloud,' massive datacenters promise to store and process all of our information and power the great challenges of our time, be it 'organize all the world's information,' decode the genome and the brain, or explore the deepest questions of particle physics. These pose formidable challenges to systems and networking research, on how to program, connect, secure and understand these systems, while being robust to failure, energy efficient and making sure that most of the world's population can benefit from this progress.

Do you have a favorite project that you've worked on?

Yes, my recent work on Quanto, which provides a way to track energy consumption of a network of embedded devices, from the level of individual hardware components all the way to high level activities defined by the programmer.

How do you see your field evolving over the course of your career?

I think we are going to see a lot of progress in the challenges I mentioned above and the hope is that it will be easy for anyone to enlist the help of systems with millions of components to solve their problems efficiently, in parallel, regardless of where those components are located.

If you had enough extra time to study one additional area, what would it be?

It's hard to pick one...I think statistical machine learning and/or programming languages.

Erik Sudderth

"In general, I try to let applications drive the statistical models I develop, rather than the other way around."

Q&A with Erik Sudderth

Q. How did you first become interested in computer science?

I grew up in Cupertino, the heart of California's Silicon Valley, so maybe I was destined for computer science. I've been playing with computers for as long as I can remember. In the 80s, you had to do a lot of low-level tinkering to get the latest computer games to run, which got me interested in learning more.

As an undergraduate, I was curious about the hardware side of computer systems and majored in electrical engineering. As time went on though, I became less interested in how computers worked and more in understanding how they can be used to study the world around us. This brought me back to computer science, but in the less-traditional field of statistical machine learning.

Q. How do you pick your research problems?

Machine learning, and more broadly statistics, is the main framework we have for extracting useful information from noisy, real-world data. I tend to look for applications where current computational methods perform poorly; usually this means there are also some interesting conceptual issues to be explored. For many years, I've enjoyed working on computer vision applications like semantic scene understanding and human motion analysis. More recently, I've also explored some challenging problems in geoscience and ecology.

In general, I try to let applications drive the statistical models I develop, rather than the other way around. But I'm always on the watch for new conceptual insights or computational methods that might be applicable in other domains.

Q. What do you consider the most interesting and exciting challenges of your research?

I love searching for patterns that connect statistical problems which seem, on the surface at least, to be very different. One example I've looked at is landslide prediction. Here, the goal is to predict the locations and sizes of likely landslides from remote sensing data (topography, soil thickness, water content, etc.). When you formulate this problem mathematically, there turn out to be close links to "spectral clustering" algorithms, which have been previously used for image segmentation and integrated circuit layout. One practical benefit of this link is that one can draw on an existing literature of efficient computational methods. Interestingly, though, the physics of the landslide prediction task motivates an objective with important differences from standard spectral clustering methods.

Q. Do you have a favorite project that you've worked on?

One recent project I enjoyed adapted methods from the nonparametric statistics literature to analyze visual scenes. Given a collection of images, the goal is to automatically outline or segment the objects depicted in each image and discover recurring "visual categories," such as trees, buildings and pedestrians. Conceptually, this project was nice because we demonstrated a good quantitative match between our model and manual, human segmentations. Computationally, it led to elegant new learning algorithms that might prove useful in other domains. And practically, the results improved on the current state-of-the-art.

Q. How do you see your field evolving over the course of your career?

Machine learning grew up in computer science in the 1980's, as artificial intelligence researchers began to make greater use of data

when designing systems. One trend over the ensuing decades has been greater interaction with traditional statistical disciplines. This is good for both fields: statistics has a rich literature of new mathematical tools to explore, while computer science has the computational tools needed to scale statistical methods to huge datasets. I think there will be more and more interaction of this sort in the future.

Another trend comes from the increasing importance of machine learning methods to companies who deal with massive, internet-scale datasets. A typical "toy" machine learning dataset used to contain a few hundred observations, but now there's interest in algorithms which scale to millions or billions of observations. While huge datasets limit our computational options, they also allow us to think more ambitiously about the scope of machine learning.

Q. What's the "next big thing" in statistical machine learning?

Traditional machine learning research has assumed a great deal of manual supervision: all training data is carefully and correctly labeled in the context of some well-defined task, such as hand-written digit recognition. Real data is much messier: usually only some of it is manually labeled and some labels are likely incorrect. Often, the task itself is something nebulous, like "discover interesting relationships within my data." Advancing methods for such unsupervised or semi-supervised learning is an exciting challenge. There are a number of competing proposals for how this should be done; my favorite approach is to draw on ideas from nonparametric Bayesian statistics.

Q. If you had enough extra time to study one additional area, what would it be?

Definitely music. In college and graduate school, I was involved in several jazz groups as a trumpet player. More recently, I've been listening rather than playing. Whenever I'm at a computer, I'm usually also wearing headphones.

Industrial Partners Program

The primary goals of the Industrial Partners Program (IPP) are to exceed the expectations of our partner companies in terms of recruiting and outreach; to allow our faculty to engage in meaningful research collaborations and to provide resources and employment opportunities to our students.

The department wishes to thank our Industrial Partners for their support:

Premier Partner

Adobe

Affiliates

Apple
Facebook
Google
GTECH
Microsoft
NetApp
Oracle
VMware

Small Business Supporter

LIPIX, Inc.

Individuals

Paul Edelman, *Edelman & Associates*

Robert Khoury, *Worldwide Financial Industry Recruiting Services*

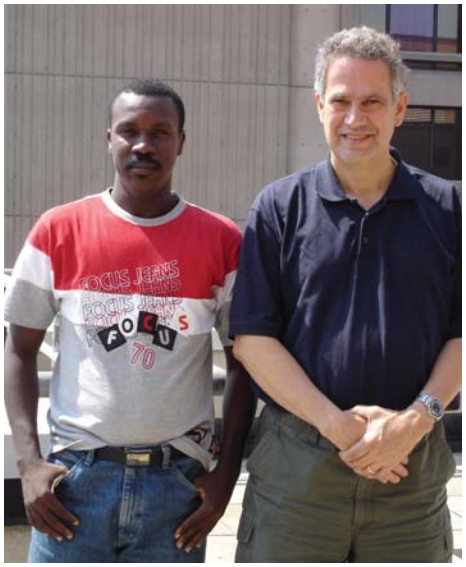
For more information about the Industrial Partners Program, contact:

Maurice Herlihy
Professor and IPP Director
Telephone: (401) 863-7600
mph@cs.brown.edu

Amy Tarbox
Program Manager
Telephone: (401) 863-7610
abt@cs.brown.edu

To learn more about the IPP visit:
http://www.cs.brown.edu/industry

Tom Doeppner



Josue Deleon contacted me last January to seek help in putting together a CS curriculum for Christianville College, a small college in Haiti where he is dean. I obtained a small grant from Brown's Office of International Affairs to explore setting up some sort of relationship with them. Deleon visited me in Providence in August; we worked out goals for what will probably be something equivalent to an associate degree in the US. We are now seeking funding and donations to equip the school with 30 or so desktop computers. Assuming we are successful in this, I hope to travel to Haiti sometime this academic year to visit them.

In addition, The Nature Conservancy recently published Tom's photo of a Saddled Blenny (above), a coral reef fish that is about 1 to 2 inches big and can be found in the Bahamas, the Caribbean and Florida. Tom is an avid diver and enjoys photographing unusual underwater life.

Amy Greenwald

The highlight of Amy's summer was leading a group of 10+ students (2 Ph.D.s, 2 masters, 2 DREUs and the rest Brown undergraduates) on a team research project. Whenever you search for keywords using a search engine like Google, ads show up above and alongside the "organic" search results. These ads are sold in online, real-time auctions (known as ad auctions, position auctions, keyword auctions, etc.). But these auctions are by no means straightforward, so advertisers may not know how to bid in them effectively. The goal of the group's research project was to build an autonomous trading agent to bid in these auctions on behalf of advertisers. They entered their agent in a simulated ad auction game (a new division of the annual Trading Agent Competition) and it finished in third place.

As for travel, Amy took a whirlwind tour of California and New York.

She attended EC at Stanford for one day to watch her student Victor present his Ph.D. paper (joint work with Geoffroy de Clippel). Then she flew on to Pasadena to attend the AAAI Executive Council Meeting.

While in Pasadena, she also served as a mentor at the AAAI Doctoral Consortium and attended the IJCAI Workshop on Trading Agent Design and Analysis, where she met up with most of the students on her agent team. From there, she and Victor took a red eye to Stony Brook, where Amy presented a plenary lecture at the annual Game Theory Festival and Victor again presented his Ph.D. paper. Victor defended his thesis (successfully) on August 3. He is Amy's third Ph.D. advisee to graduate successfully.

John Hughes

Spike attended SIGGRAPH in New Orleans this year with the new role of chair of the Technical Awards Committee.

Sorin Istrail

Sorin made another research visit to the California Institute of Technology in March 2009 to continue the ongoing collaboration he and his lab have with Eric Davidson. He also visited Dr. Jonathan Yewdell at the National Institute for Allergy and Infectious Disease to begin work on immunogenomics research projects. Sorin attended two conferences: RECOMB 2009 in Tuscon, AZ and the Gordon Research Conference on Human Genetics & Genomics in Biddeford, ME.

Sorin gave a keynote lecture at Southern Methodist University on April 22, 2009 and he now serves as member of the UConn CSE Extended Advisory Board.

Sorin welcomed one new Ph.D. student to his lab, Derek Aguiar, as well as two new postdoctoral fellows, Austin Huang, who is coming from MIT and Harvard, and Alper Uzun, who is joining us from Northeastern University.

Sorin's project on the construction of a cis-Lexicon for regulatory genomics has reached a new milestone, containing the regulatory architecture of 200 transcription factors and 100 regulatory genes. This was achieved by Sorin's small army of regulatory genome annotators, under the leadership of Kyle Schutter, the summer leadership of Tim Johnstone and the summer participation of Jake Halpert (from Williams College), who made very valuable contributions to the team.

Sorin and members of the Center for Computational Molecular Biology are happy to announce the establishment of the new Ph.D. program in computational molecular biology.

Shriram Krishmurthi

Shriram has had a pleasant and productive spring and summer. While attending WWW 2009 in Madrid in April, he continued his tour of soccer stadia by watching Real Madrid beat Getafe in a thriller at Bernabèu.

In July he upgraded to a significantly fancier entertainment center (a.k.a., bike), so now he needs to put in some quality miles to justify the decision.

In late August he went for a week to Edinburgh for the International Conference on Functional Programming and unrelated pleasantries. He was very pleased to (almost quite literally) run into Brown alum Sharon Goldwater, who brought along Frank Wood to say hello two days later. Of even greater personal satisfaction, Benjamin Pierce's invited talk ended with an acknowledgment to Brown undergrad alum Michael Greenberg, followed immediately after by a talk by another Brown undergrad alum Dan Licata, followed the next day by one more by Brown Ph.D. alum Jay McCarthy.

Claire Mathieu

Claire Mathieu spent the greater part of the summer in France. She gave seminars at LRI (Paris XI), INRIA (Sophia-Antipolis), an informal seminar at Ecole Normale Superieure and initiated or renewed collaborations with several researchers there. This year for the first time, she engaged extensively in using

Skype to continue meeting and working with students at Brown, thus leading a double life. She has learned that modern technology reduces distances but cannot yet reduce two workdays into a single one! All she needs now is technology that will enable her to clone herself and things will be perfect.

She also spent a week backpacking in the Mercantour area of the Southern Alps and saw some famous, but frankly unimpressive, prehistoric petroglyphs in "Vallee des Merveilles," as well as a supposedly pornographic Latin carving from the 3rd century: "Hoc qui scripsit patri mei filium pedicavit." She wonders if that quote will be censored by the editor of Conduit.

Barb Meier

Animation continues to thrive at Brown. Special thanks go to Pixar for supporting our animation courses this year. We have posted highlights from the last two years of student projects at http://www.cs.brown.edu/courses/cs125/gallery.htm. We'll be adding more links to student projects over the coming months.

After a major overhaul of the animation courses last year, I was able to relax a bit this summer and delve more deeply into oil painting. Talk about slow renders! But seriously, even after all these years, I'm amazed how much one art form can inform another. I hope to translate some of what I learned into better ways of teaching lighting to my animation students.

Franco Preparata

During a recent visit to the National University of Singapore, Franco collaborated in the finalization of the Concurrent Degree Program between Brown and NUS in Computer Science (Computational Biology). This program, run under the joint supervision of faculty of the two universities, will bring to Brown for their ScM. studies a selected cohort of Singaporean students, and may serve as a model for further ties between the two institutions.

He was the general chair of the Frontiers of Algorithmics Workshop (FAW 2009), of which John Hopcroft was the Program Chair. FAW is designed to bring together Eastern and Western peer communities in the field of algorithms.

Finally, Franco presented lectures at two international symposia respectively honoring the 60th birthdays of Der-Tsai Lee in Taiwan and Kurt Mehlhorn in Saarbruecken,Germany.

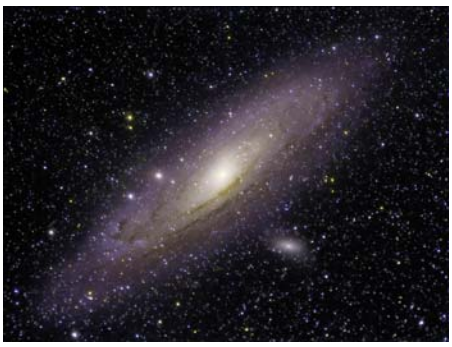
Ben Raphael

Ben taught a new undergraduate course in the spring semester, Computational Methods for Biology, which focused on topics including phylogeny, functional genomics and biological networks. Ben's research group had a very active year of travel to give conference presentations. Due to scheduling conflicts, Ben was limited to domestic locales (to Kona, HI for PSB, Tuscon, AZ for RECOMB and Cold Spring Harbor, NY). Members of his group also enjoyed more exotic international destinations: Sardinia, Italy for ECCB and Stockholm, Sweden for ISMB.

John Savage

John Savage had two papers with Mohammad Zubair accepted for journal publication entitled, "Evaluating Multicore Algorithms on the Unified Memory Model" to appear in *Scientific Programming* and "Cache-Optimal Algorithms for Options Pricing" to appear in *ACM Transactions on Mathematical Software*. In the spring he taught CS 159, Introduction to Computational Complexity, and attended a lecture series entitled, "Cyber International Relations" at MIT and Harvard, given primarily by distinguished current and former government officials. He attended this lecture series to prepare for a year in government service, which began in August.

Don Stanford



In addition to teaching CSCI0020 for the seventh year this fall, I will continue to serve as the acting CTO at GTECH. In fact, I have been retained in that capacity through the end of 2010. I also continue to be a guest instructor in the PRIME masters program in the department of engineering.

Needless to say it has been a busy year and it has required that I cut back on some of my other activities and hobbies. It's great to be busy, but it would be nice to be spending more time at my place in St. Thomas. Above is an image of M31 taken from my observatory in St. Thomas this spring and processed on my PC using ImagesPlus and Photoshop. Clear skies in the islands!

Pascal Van Hentenryck

Pascal became a fellow of the Association for the Advancement of Artificial Intelligence (AAAI) this summer at the Joint International Conference on Artificial Intelligence in Pasadena. Pascal also gave invited talks at EMO'09 in Nantes, at the école Polytechnique in France as part of the opening of a chair on optimization and sustainability and at the French conference on constrating programming. He also took part in the celebration for the retirement of Laurence Wolsey in Louva, Belgium, which attracted "la crème de la crème" in optimization. Laurence has been a leading figure in optimization and it was inspiring to listen to all the stories in the life of an outstanding scientist.

Peter Wegner

Peter celebrated his 77th birthday in London in August by attending a promenade concert at the Royal Albert Hall, not far from Imperial College where he had been an undergraduate in the 1950s. He continues to edit the *Faculty Bulletin* and contributed an article on Isaac Newton and Stephen Hawking in the recent summer issue. Faculty members are invited to submit articles on aspects of their research for a future issue of the Bulletin.

Peter continues to work with Dina Goldin and Scott Smolka, with whom he edited a book on interactive computing published by *Springer Verlag* in 2007. He is currently working on an autobiography that will include discussion of his computer science publications, as well as an account of his survival of the Holocaust by traveling on a *Kindertransport* train from Vienna to London in April of 1939.

Department News and Awards

Artemis and Bootstrap Among Inaugural Google RISE Award Recipients

The Artemis Project, an outreach program designed to encourage young women from local public schools to pursue careers in computer science, received an award from the Google RISE Program. Artemis is a five-week summer program in which its participants — female rising ninth graders — are exposed to the breadth of applications of computer science and are introduced to a variety of the technologies underlying computing. The learning process includes a range of both educational and confidence-building activities. Participants attend lectures from women scientists and other potential role models from both academia and industry. Artemis is provided at no cost to the participants, who come from predominately low-income, minority households. Brown undergraduates Tess Avitabile, Adrienne Cohen, Nell Elliott and Lu Zeng served as coordinators for Artemis 2009 under the supervision of Amy Greenwald and Anna Lysyanskaya. Artemis was mentioned in a New York Times article on initiatives to increase the number of women in the field of computer science.

Bootstrap, a curriculum for middle-school students that teaches them programming through images and animations, also received an award from the Google RISE Program. Bootstrap uses algebra as the vehicle for creating this imaginative content, resulting in much greater student engagement in subsequent math classes. Historically, Bootstrap attendees have been predominantly minority and economically disadvantaged, with about a quarter being female. Shriram Krishnamurthi is responsible for the Bootstrap effort at Brown and for the management of this RISE award. The Bootstrap team also includes Matthias Felleisen at Northeastern, Kathi Fisler at WPI and Emmanuel Schanzer at Harvard. Bootstrap was selected by Google as one of the three projects highlighted in the RISE website. As part of their support for Bootstrap, Google has also provided several Android phones.

Established this year, the Google Roots in Science and Engineering (RISE) Awards are designed to fund, promote and support science, technology, engineering, mathematics (STEM) and computer science education. Out of over 100 proposals, only 30 were funded in the inaugural edition of this program.

Robotics Group Featured in Science Daily

Science Daily recently featured a piece on robotics research at Brown. The robotics group has demonstrated how a robot can follow nonverbal commands from a person in a variety of environments — indoors and outside — all without adjusting for lighting. According to the team's leader, Chad Jenkins, "We have created a novel system where the robot will follow you at a precise distance, where you don't need to wear special clothing, you don't need to be in a special environment and you don't need to look backward to track it."

This achievement was presented at the 4th ACM/IEEE International Conference on Human-Robot Interaction (HRI 2009) March 11-13, 2009, in San Diego. A paper accompanying the video was also presented at the conference. Ph.D. student Matt Loper is the lead author on the paper. Contributors include former Brown graduate student Nathan Koenig, now at the University of Southern California; Carnegie Mellon graduate student Sonia Chernova and Chris Jones, a researcher with the Massachusetts-based robotics maker iRobot Corporation.

Ugur Cetintemel, Eli Upfal and Stan Zdonik Receive NSF Grant to Develop Predictive Databases

The National Science Foundation awarded a research grant in the anticipated amount of $1.2 million to Ugur Cetintemel, Eli Upfal and Stan Zdonik to develop database technology that would simplify building predictive analytics applications over large-scale data. Predictive analytics involves analyzing historical and current data to make predictions about future data values, events and trends, and has a wide range of applications in security, marketing, economics, sociology, genetics and computing. The generic predictive database technology to be developed will make computing with predictions easier to express and far more efficient than the prevalent application-level solutions that are known to be brittle and unscalable.

The concrete product of the work will be a new type of database system called Longview that seamlessly integrates predictive models as first-class primitives by intelligently incorporating them in the process of data management and

query optimization. Longview will develop novel algorithms, data structures and interfaces to automatically load, train, select and execute predictive models. The project will also investigate "white-box" model support, in which the knowledge of the semantics and representation of models, if available, will be used to enhance the quality and performance of predictions. The team expects that the resulting technology will also allow for a deeper understanding and support for user-defined functions in database systems.

Ugur Cetintemel and Stan Zdonik Awarded NSF Grant for Automatic Database Design

The National Science Foundation awarded a research grant to Ugur Cetintemel and Stan Zdonik, in the anticipated amount of $500,000, for the automatic design of next-generation database systems. Advanced database systems are being designed to support complex processing of big data, integrate novel hardware such as solid-state storage and operate on highly distributed, often virtualized computing clouds. The project aims to develop novel, sophisticated automatic design tools for database system configuration and management, addressing the growing complexity and diversity of these newly-emerging systems that render manual solutions ineffective and unscalable.

The project will specifically focus on incremental approaches to automatic design, which will allow systems to progressively move towards better configurations based on principled cost-utility analyses. The PIs expect that the resulting tools will help simplify the successful development and deployment of next-generation data-intensive systems.

Amy Greenwald Receives Career Development Award from Brown University

The Career Development Awards from Brown's ADVANCE program are intended to help faculty establish new collaborations with colleagues at other institutions and explore new research directions. Funded with a five-year grant from the National Science Foundation, the ADVANCE Program at Brown supports new initiatives for formal faculty development.

Amy plans to use the funds to build collaborative relationships with Electronic Commerce (sometimes called algorithmic economics or algorithmic game theory) research labs at Yahoo! and Microsoft. The hope is that these collaborations will lead to joint publications and further funding opportunities through these companies' university relations programs.

James Hays to Join the Department as an Assistant Professor in Spring 2010

The department is pleased to announce the addition of James Hays as a new faculty member. He will start at Brown in spring 2010 after serving as a postdoctoral scholar at MIT and receiving his Ph.D. from Carnegie Mellon University. James' research interests are in computer vision and computer graphics, focusing on image understanding and manipulation leveraging massive amounts of data.

James Hays

With the addition of James, as well as Rodrigo Fonseca and Erik Sudderth who joined the department in the fall, the department now has a record number of 27 tenured and tenure-track faculty in the spring. "We are delighted to welcome James to Brown" said Chair Roberto Tamassia. "He is a brilliant and talented scholar and we look forward to his arrival."

James received his B.S. in computer science from Georgia Institute of Technology in 2003 and expects to complete his Ph.D. in computer science at Carnegie Mellon University in 2009, where he was the recipient of a National Science Foundation Graduate Research Fellowship. He will join Brown after serving as a Postdoctoral scholar at MIT. James has given invited talks at Google, MIT and the University of Illinois.

James' research focuses on using "internet scale" data to improve scene understanding and allow smarter image synthesis and manipulation. His interests span computer graphics, computer vision and computational photography, including topics such as image completion, photo quality assessment and enhancement, place and object recognition, texture modeling and animation. More broadly, James is interested in the connections between human and machine vision.

"I'm thrilled to be joining Brown," said James. I think Brown is a great place to be a teacher and a researcher. The computer science department has great faculty and students who are amazingly friendly and engaged. I look forward to collaborating with many people within the department and the university as a whole."

James Hays, Roberto Tamassia and Andy van Dam Receive Faculty Research Awards from Google

James Hays and Alexei Efros (asstistant professor of Computer Science, Carnegie Mellon University) received an award to investigate the use of Internet imagery for image understanding tasks. Computer vision and computer graphics algorithms benefit from large amounts of training data, and websites such as Flickr and Picasa offer several orders of magnitude more training data than current data sets. However, the annotations and labels that accompany these images are sparse, noisy and in some cases novel to the research community. James and Alexei are researching robust search and learning methods to address the challenges of this data — massive scale and weak labeling — and to drive new image understanding applications (such as geolocation), using Internet training data.

Roberto Tamassia and John Tyler (associate professor of education, public policy and economics) were recently given a research award from Google in support of their research on developing an innovative, web-based school information system that will employ a cloud-computing platform and incorporate advanced techniques for data management, security and privacy. The envisioned system will facilitate communication and data sharing across school districts and will enable large-scale educational research and analysis while providing an access control framework to protect the privacy and confidentiality of administrative and educational school records.

Andy van Dam and his graphics research team also received a research award from Google to study gestural user interfaces on mobile phones. This project will extend the group's ongoing research in multi-touch and pen interaction sponsored by Microsoft on the Surface, a table-top gesture-driven display. Gestural interfaces allow users to simultaneously specify a command and accompanying options (e.g., which item? how much?) in a single motion. In addition, gestures do not require users to look at or target small command buttons when invoking commands. Mobile phones are in many ways an ideal application of gestural interfaces because users are on the go and often multitasking as they use their smartphones, while in line at the grocery store, gas station or airport.

Google Research Awards are provided to facilitate more interaction between Google and academia and also nurture stronger relations and partnerships with universities. The intent of the awards is to support academic research aimed at improving information access.

Chad Jenkins Awarded NSF CAREER Grant

Chad Jenkins is our latest faculty recipient of an NSF CAREER award, a highly selective grant that the National Science Foundation awards to junior faculty members who are likely to become academic leaders of the future.

The project funded by Chad's CAREER grant aims to enable autonomous robots to learn decision making policies from multi-valued demonstrations. Activities to be performed include:

- Creating standardized, accessible and reproducible robot platforms (such as the $700 Brown SmURV platform);
- Developing transferable undergraduate autonomous robotics courses that build on the "control loop" as a unifying concept (similar to the "rendering pipeline" in graphics); and
- Establishing structured pathways for broad populations of society, from secondary schools to research groups, to engage in autonomous robotics.

The Faculty Early Career Development (CAREER) Program is a foundation-wide activity that offers the National Science Foundation's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education and the integration of education and research within the context of the mission of their organizations. Such activities should build a firm foundation for a lifetime of leadership in integrating education and research.

Besides his CAREER award, Chad has also received other prestigious recognitions, including a Sloan Research Fellowship and a PECASE award, an outstanding accomplishment.

David Laidlaw and Andy van Dam Awarded NSF Grant for Next-Generation Cave

Principal Investigator David Laidlaw along with co-Principal Investigators Andy van Dam (computer science), Jan Hesthaven (applied mathematics) and George Karniadakis (applied mathematics) were awarded a National Science Foundation MRI (Major Research Infrastructure) research grant, in the expected amount of $2 million, to develop a next-generation interactive virtual-reality display environment for collaborative research and education.

The new system is expected to support more natural and effective interaction with data than the current 3D point-and-click wand driven Cave by maximally utilizing as appropriate full-body, motion-captured user interactions and gestures. More display information will be made accessible to the human visual system with less user effort by matching or exceeding the perceptual qualities of a modern LCD monitor. An immersive stereo display will be integrated with the perceptual resolution of a desktop display and superior brightness and contrast. Integration of software tools for creating virtual-reality applications quickly will address ease-of-use and reliability. The new tools are expected to be simple, support a spectrum of displays and provide rich support for gestural interaction.

While educating many students, the instrument is expected to enable new advances in a variety of scientific disciplines. This project, developing a world-class interactive large-field-of-view 95 megapixel immersive virtual-reality environment, aims at creating a novel, demonstrably useful, rich and expressive interaction, visualization and analysis that truly leverage the human visual and motor systems in Virtual Reality.

John Savage Named Jefferson Science Fellow

John Savage has been selected to serve as a 2009 Jefferson Science Fellow for the U.S. State Department, where he will work on cyber-related issues for one year. Fellows remain on call as science advisers to the State Department for an additional five years.

The prestigious Jefferson Science Fellows program was established in 2003 as a way of elevating the role of science and technology in the formulation of U.S. foreign policy. Funding is provided by the State Department, but participants are chosen by independent panels of experts at the National Academies of Science, based on the applicants' professional stature, recognition and experience and ability to articulate science and technology issues to the general public. Only 10 fellows were chosen for 2009.

John earned his Ph.D. in electrical engineering at MIT in 1965 specializing in coding and information theory. He joined Bell Laboratories in 1965 and the faculty of the division of engineering at Brown University in 1967. In 1979 he co-founded the department of computer science and served as its second chair from 1985 to 1991. He currently researches computational nanotechnology, the performance of multicore chips and reliable computing with unreliable elements. John was awarded a Fulbright-Hays Research Award and a Guggenheim Fellowship in 1973. He is a fellow of AAAS and ACM and a life fellow of IEEE.

Roberto Tamassia Honored with Named Professorship

The department is thrilled to announce that Department Chair Roberto Tamassia was recently appointed Plastech Professor of Computer Science by the University.

"It is only fitting that Roberto's scientific achievements have been recognized through such an honor," said Dean of the Faculty Rajiv Vohra.

Roberto's research interests include information security, applied cryptography, analysis, design and implementation of algorithms, graph drawing and computational geometry. He has published more than 220 peer-reviewed research articles and has given more than 75 invited lectures worldwide. He has coauthored four books, including a widely adopted textbook on data structures and algorithms, now in its fourth edition. He is an IEEE Fellow and the recipient of a Technical Achievement Award from the IEEE Computer Society. He is listed among the most highly cited computer science authors by Thomson Scientific, Institute for Scientific Information (ISI). His research has been funded by the Army Research Office, the Defense Advanced Research Projects Agency, the NATO Scientific Affairs Division, the National Science Foundation and several industrial sponsors. He received his Ph.D. in electrical and computer engineering from the University of Illinois at

This is the first unveiling of the software that Shriram Krishnamurthi's CS190 class wrote to support recovering substance abuse patients in Brazil.

Urbana-Champaign in 1988 and the Laurea degree in electrical engineering from the University of Rome "La Sapienza" in 1984.

"I am delighted to have been awarded this named chair," said Roberto, "and I am grateful to the University for bestowing on me this honor."

Roberto joins the department's other named professors: Eugene Charniak, university professor of computer science, Sorin Istrail, Julie Nguyen Brown professor of computational and mathematical science, Franco Preparata, An Wang professor of computer science, and Andy van Dam, Thomas J. Watson Jr. university professor of technology and education.

Pascal Van Hentenryck Named AAAI Fellow

The Association for the Advancement of Artificial Intelligence recently elevated Pascal Van Hentenryck to fellow for his "significant contributions to constraint satisfaction and reasoning under uncertainty, the development of the widely used CHIP, Numerica, OPL and Comet systems, and his pioneering role in the inception of constraint programming and its integration in operations research."

The AAAI Fellows program was started in 1990 to recognize individuals who have made significant, sustained contributions to the field of artificial intelligence. Fellows' accomplishments range from pioneering advances in the theory of artificial intelligence to unusual accomplishments in artificial intelligence technology and AI applications.

"It is a great honor to share this distinction with so many brilliant minds in AI," said Pascal. "I would like to thank all my collaborators and students who have contributed to this honor in so many ways over so many years."

Pascal Van Hentenryck is professor of computer science at Brown University and the director of the department's optimization laboratory. Before coming to Brown in 1990, he spent four years at the European Computer-Industry Research Center (ECRC), where he was the main designer and implementer of the CHIP programming system, the foundation of all modern constraint programming systems. During the last 15 years, he developed a number of influential systems, including the Numerica system for global optimization, the optimization programming language OPL and the programming language Comet, which supports constraint-based local search, constraint programming and mathematical programming. These systems are described in books published by the MIT Press and have been licensed to industry. Pascal also implemented the generic abstract interpretation system GAIA.

Pascal is the recipient of a 1993 NSF National Young Investigator (NYI) award, the 2002 INFORMS ICS Award for research excellence at the interface between computer science and operations research, the 2006 ACP Award for Research Excellence in Constraint Programming, best paper awards at CP'03, CP'04, and IJCAI'07 and an IBM Faculty Award in 2004. In 2008, he received the title of Doctor Honoris Causa from the University of Louvain. He is also the author of five books and more than 170 scientific papers.

Pascal joins the department's two other AAAI Fellows: Eugene Charniak and Tom Dean.

Ph.D. Students Andrew Bragdon, Jesse Butterfield and Trevor O'Brien Receive NSF Graduate Fellowships

Computer science Ph.D. students Andrew Bragdon, Jesse Butterfield and Trevor O'Brien recently received fellowships from the National Science Foundation's Graduate Research Fellowship Program, a prestigious and highly competitive program.

Andrew is interested in human-computer interaction broadly, and in particular, developing methods of making computing tasks more fluid, natural and cognitively lightweight. His recent work improves the approachability of gesture-based interfaces. He recently presented "GestureBar: Improving the Approachability of Gesture-based Interfaces" at the 27th International Conference on Human Factors in Computing Systems.

Jesse's proposed plan of research is to design graphical models for coordinating teams of robots or coordinating human robot teams. Well structured mathematical models will unify multi-robot techniques allowing easier analysis and comparison. An additional goal of this project is to provide a structure for learning

multi-robot coordination. His recent paper, "Modeling Aspects of Theory of Mind with Markov Random Fields," was featured in the January 2009 edition of International Journal of Social Robotics.

Trevor's research aims to develop computational and human-computer interaction techniques to facilitate analysis of medical and scientific imagery. He has proposed to design a set of quantitative models for detecting and predicting degenerative joint conditions from skeletal kinematic data captured via high-speed X-ray and CT. As an interdisciplinary effort with both clinical and research implications, Trevor's project will include collaborators from Rhode Island Hospital and Brown's department of ecology and evolutionary biology. His recent work, "Two-Handed Visualization: Bimanual Interaction Techniques for Exploring Time-Varying 3D Data," was presented at the IEEE Visualization conference in October 2008.

The NSF Graduate Research Fellowships provide three years of support leading to research-based master's or doctoral degrees and are intended for individuals in the early stages of their graduate study in the fields of science, technology, engineering and mathematics. Awards are granted based on previous research experience, the proposed plan of research and the student's ability to make a "broader impact" in their program of study in terms of educational, industrial and societal relevance. NSF Fellows are expected to become experts who can contribute significantly to research, teaching and innovations in science and engineering.

Since 1952, NSF has funded 43,000 Graduate Research Fellowships out of more than 500,000 applicants. Twenty of them have gone on to become Nobel laureates.

Ph.D. Student Micha Elsner Receives Google Fellowship

Micha Elsner, a Ph.D. student researching natural language processing with Eugene Charniak and Mark Johnson in the Brown Laboratory for Linguistic Information Processing (BLLIP), was recently awarded an inaugural Google Fellowship. This two-year fellowship includes financial support for tuition and fees as well as funding for conference attendance and travel, a personal computer and an Android-powered phone.

Micha's research focuses on computer programs for understanding discourse — the way the meanings of individual sentences in a document merge to form the meaning of the whole. His work has been presented at several conferences, most recently at the NAACL-HLT 2009 Workshop on Integer Linear Programming for Natural Language Processing and the Conference on Human Language Technology and North American chapter of the Association for Computational Linguistics (HLT-NAACL 2009).

According to Google, "these awards have been presented to exemplary Ph.D. students in computer science or related research areas. We have given these students unique fellowships to acknowledge their contributions to their areas of specialty and provide funding for their education and research. We look forward to working closely with them as they continue to become leaders in their respective fields."

"There is increasing interest in probabilistic mathematical models of discourse — for both theoretical and practical reasons. Micha is already one of the leaders in this area," Eugene Charniak, Micha's Ph.D. advisor, said.

Ph.D. Student Chris King Wins Second Prize in Dyalog Programming Contest

Chris King recently received second place in the Dyalog 2009 Worldwide Computer Programming Contest. The purpose of this contest was to encourage students and others to investigate APL (A Programming Language). According to the contest's judges, "what set Chris' entry apart was the brevity and compactness of his solutions. He made extensive use of operators, reduction, composition, power limit and compose."

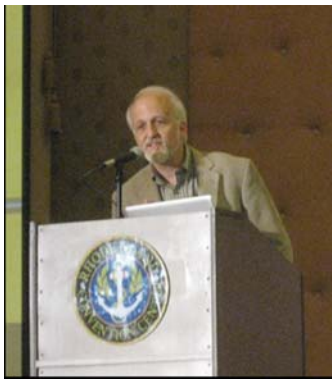
Chris says, "I've always had a love for learning new languages, ever since my dad taught me BASIC as a wee lad. Prior to the contest I had never written a line of APL, so it proved to be a great learning experience for me."

Commencement

Major Database Conference comes to Providence

by **The Database Group**

This summer, Ugur Cetintemel and Stan Zdonik organized the ACM SIGMOD/PODS 2009 conference (Special Interest Group: Management of Data/Principles of Databases), which was held from June 29 to July 2. The preparations necessary for this event started shortly before the end of last year's conference. The conference turned out to be a complete success — over 500 attendees arrived at the Rhode Island Convention Center for four days of discussing the latest topics in database systems and theory research.



Stan Zdonik welcomes attendees to the conference.

Volunteer Andy Pavlo judges SIGMOD demos with recent grad Yanif Ahmad.

In the months leading up to the conference, Stan and Ugur amassed a group of volunteers and workers to make it possible. Ugur and Stan purposed this army to a variety of tasks from heavy lifting to guiding volunteers through the convention center. Student volunteers from Brown University as well as other local schools, such as Brandeis University, UMass Amherst and Worcester Polytechnic Institute helped with this effort. Easily identifiable by their bright red shirts, student volunteers entertained everything from the mundane to the most unusual requests. Lori Agresti also helped organize the effort.

Highlights from the conference included two keynote addresses. The first was by Hasso Plattner, software giant SAP co-founder and academia benefactor. In his talk entitled, "Enterprise Applications — OLTP and OLAP — Share One Database Architecture," he discussed a possible hybrid system that supports in-memory column stores. Our second keynote address was delivered by Fernanda B. Viegas and Martin Wattenberg from IBM entitled, "Transforming Data Access Through Public Visualization."

Finally, on Wednesday night we concluded with a banquet in Newport. It started with the attendees' choice of either a harbor cruise or scenic tour of downtown. The cruise highlighted Fort Adams and the Newport Yachting Center. Scenic tour-goers were treated to a glimpse of the gilded-age mansions and museums. All of the attendees converged to the yachting center for a lobster dinner after their tours.

Two Brown graduate students also presented papers accepted into the conference. Tingjian Ge (Ph.D. '09) presented his paper "Top-k Queries on Uncertain Data: On Score Distribution and Typical Answers," and Andrew Pavlo (Ph.D. candidate) was first author on the paper "A Comparison of Approaches to Large-Scale Data Analysis."

Report on 42nd IPP Symposium

by Maurice Herlihy

On April 30, 2009, we hosted a symposium entitled **"Standardizing Transactional Memory"**

The speakers represented most of the industry groups active in software and hardware transactional memory. The symposium opened with our only academic speaker, Yossi Lev of Brown University. He described "A Generic Debugging Infrastructure for Transactional Programs," ongoing work on how to structure a portable debugging library for transactional programs. Next was Ulrich Drepper of Red Hat whose talk, "Introducing TM into the Real World," described the challenges that arise when providing TM support in a commercial system. David Christie of AMD asked, "Can Mainstream Processors Support Hardware Transactional Memory?." He covered some of the difficulties in providing HTM support and what a best-effort approach might look like for the x86 architecture. Srinivas Sridharan of the University of Notre Dame described "A Scalable Software Transactional Memory System for the Chapel High-Productivity Language." Ben L. Titzer of Sun Microsystems described the Maxine Virtual Machine and some experience on the early stages of adapting Maxine to support a STM system, as well as a perspective on how STM may affect the future design of optimizing compilers. Mark Moir, Sun Microsystems, presented "Transactional memory at Sun," describing work related to transactional memory going on at Sun, particularly related to interfaces at various levels. Ali-Reza Adl-Tabatabai, Intel, gave a talk entitled, "Towards a Common Language and Runtime Interface for Transactional Memory in C++," which described ongoing efforts and standardizing language interfaces. Maged Michael of IBM talked about "IBM STM API and X10 Extensions," how to structure an STM runtime to support common programming patterns in high-performance languages. Finally, Rob Schreiber of HP closed with an overview of the remaining challenges in this area.

http://www.cs.brown.edu/ipp/symposia/ipp41/ibm.html

Parenthetically Speaking

By **Shriram Krishnamurthi (but really, by Lauren Clarke)**

Brown has two introductory sequences: cs15-16 (Java programming in the first course, algorithms and data structures in Java in the second course) and cs17–18 (algorithms and data structures spread across two courses; functional programming in Scheme and ML in the first course, object-oriented programming in Java in the second course). This is, in itself, somewhat unusual, especially for a university of our size. Even more unusual is that would-be computer science majors are free to choose between them. The outcome of this free choice is therefore of great interest to people designing curricula at other universities. Unfortunately, we have done very little formal measurement of the impact of this choice. This not only makes it impossible for others to learn from our experiment, it also replaces facts with anecdotes and biases, which can be significantly off-base.

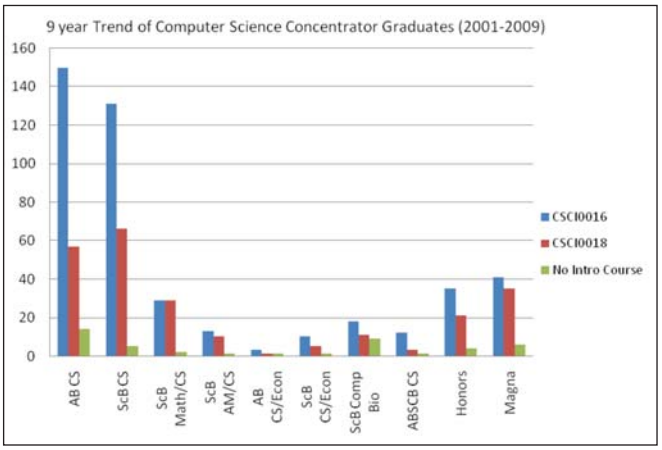
To replace speculation with facts, I asked Lauren Clarke, faculty and student affairs manager, for help with gathering some data on these two sequences. This being Lauren, she didn't just "help"; she took over the task, made several excellent observations and suggestions, got the data from the registrar's office and compiled it into useful forms. A thousand thanks to her.

We focused on how the two courses (and the third option: neither) produced concentrators. We compiled these data for nine years, 2001–2009, to allow a little time for the effect of 17–18 to percolate into the system. We ignored 15 and 17 entirely and counted only 16 and 18 (or neither), both to reduce work and to eliminate from consideration the many reasons students might take only the first course but not the second. We also ignored grades, but we did count students who completed honors theses or graduated *magna*. (We ignored the Senior Prize since it is less purely academic.)

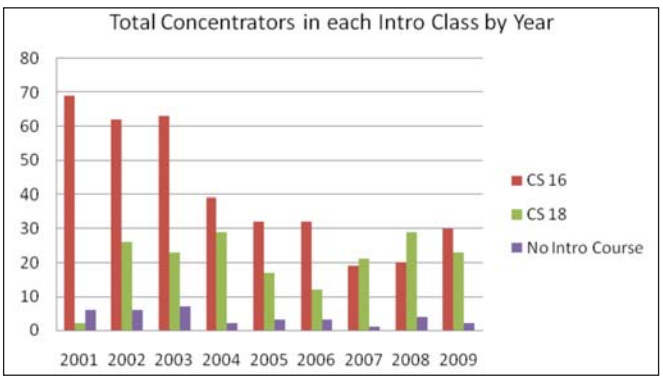
The first graph (A) shows, for the many CS-related concentrations we have, which introductory sequence the concentrators came from. However, it does not distinguish by year and in the earlier years our concentrators came predominantly from cs15/16. The second graph (B) shows how many concentrators (across all concentrations) came from each intro course in each year.

Graph (C) answers the question, "For each student who completed 16 or 18 but did not complete one of the CS concentrations, what did they eventually concentrate in?"

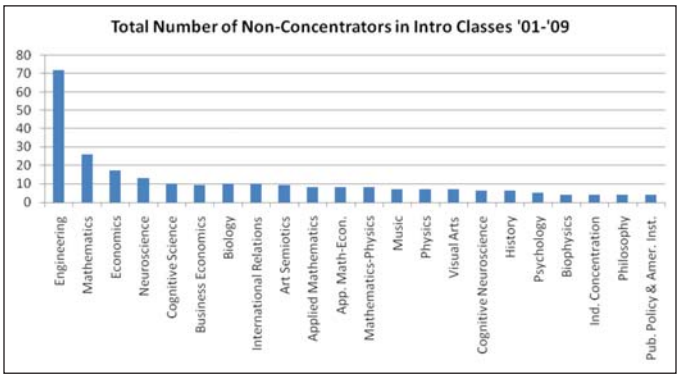
(A)



(B)



(C)

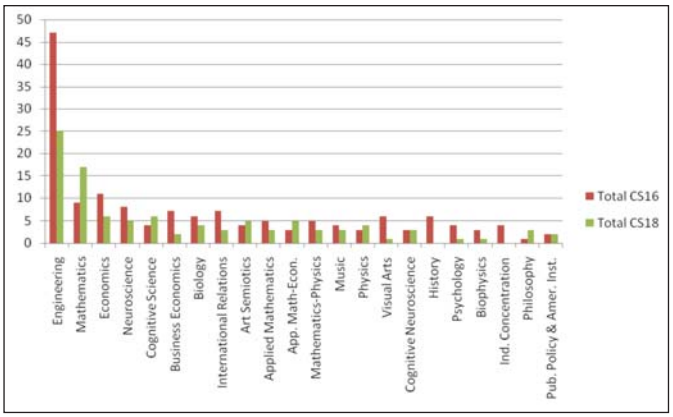


Of course, of the concentrations that got these students, some were much more popular than others. For those that received more than three students, Lauren also counted which introductory sequence they took (graph D).

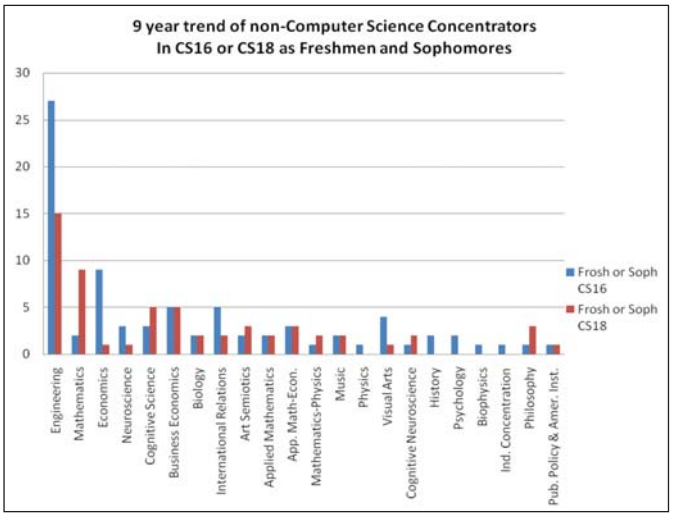
For all those who took an introductory sequence and then ended up not concentrating in any CS discipline, we wanted to see *when* they took the course. For students who took it late in their career, it's clear that CS was not on their radar early on and they took it out of either late interest or necessity. Those who took it early weren't necessarily contemplating a CS concentration (and some may have already known it wasn't for them), but some potentially did consider CS or at least had the time to do so. There are four charts here: (E) 16 vs. 18 for underclass students, (F) 16 vs. 18 for upperclass, (G) 16 under-class vs. upper-class, and (H)18 under-class vs. upper-class. We only looked at concentrations that got four or more concentrators.

The purpose of this article is not to try to draw any conclusions, though some are apparent from the data (and in other cases, there are patently no conclusions to be drawn). The goal of this exercise is only to document the first decade (roughly) of how this "experimental" sequence has worked relative to a highly established one; in particular, to offer data to other institutions who would like to learn from the wonderful curricular freedom and initiative that we have at Brown.

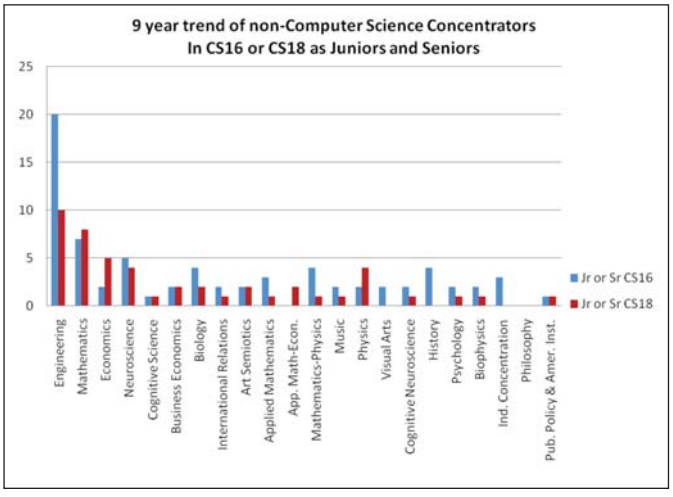
(D)



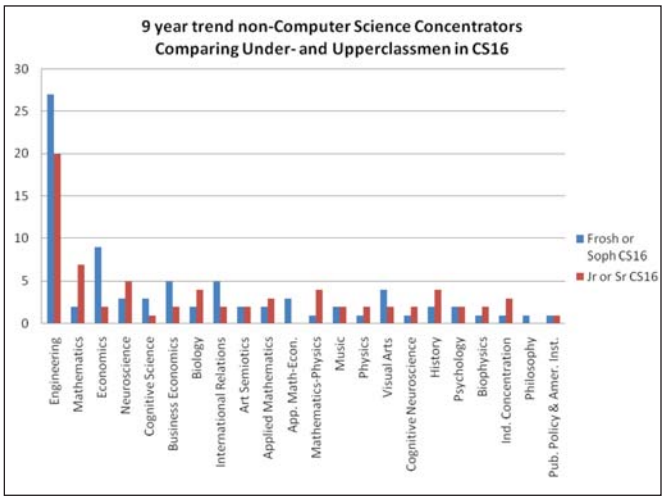
(E)



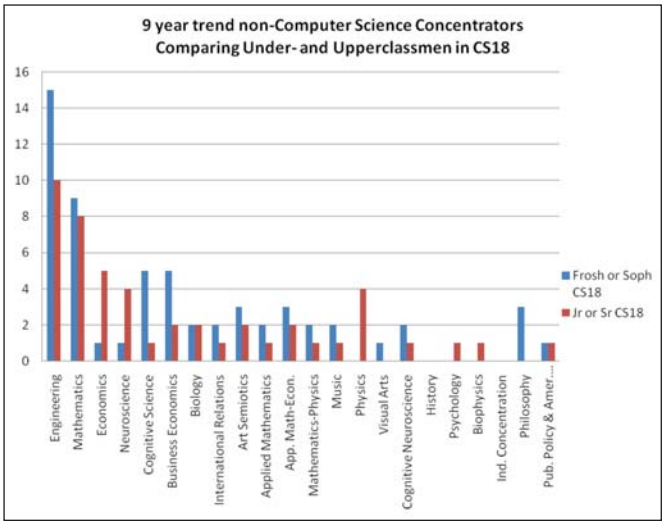
(F)



(G)



(H)



In Response to "Taking Down the SciLi"

By **Lee Pedersen**

In a column in the Spring/Summer 2009 issue of *Conduit: A Research and Alumni Magazine*, Professor Krishnamurthi raised a number of interesting questions about the University Library's service to faculty and students at Brown. In my role as Scholarly Resources Librarian for the physical sciences, I want to address Professor Krishnamurthi's proposal for greater faculty involvement in the selection of Library materials. At a time when Library resources are limited and when access to the right information at the right time is essential, we are eager to have more input from faculty regarding what materials will be most useful to you and how best to make these materials available.

Professor Krishnamurthi and I have discussed his proposal and his underlying concerns. Our continuing explorations will provide a better understanding of his particular needs and frustrations. We will report back on the results of these deliberations in a future column.

In the meantime, I would like to highlight some of the Library services currently employed to help connect researchers with the materials they need. We use an array of methods for ordering books, including approval plans for automatically acquiring books that meet specific pre-determined criteria consistent with the scope of our collection and the interests of Brown faculty. Librarians refine these plans so that book budgets are used to select titles of relevance to the teaching and research of each department or program. In addition, we encourage and welcome suggestions and requests for purchasing materials for the collection by faculty and students. When needed, we can "rush" order these. Further, we are especially interested in hearing from faculty about electronic books – acquiring and making available copies of e-books can happen much more quickly than with printed books, and they have the added advantage of instantaneous online access 24 hours a day. We are eager to utilize this format when it proves suitable.

Of course, like any library, Brown cannot own everything, so faculty and students may request books and articles not available at Brown through interlibrary loan or through our EasyBorrow system [http://dl.lib.brown.edu/libweb/services/easyBorrow.php] which delivers many books in 24-48 hours. Regardless of the source from which we acquire scholarly resources, Library staff make every effort to get materials to users as quickly as possible, but there is always room for improvement.

Based on all of the services the Library provides, a scenario suggests itself to address the proposal that Professor Krishnamurthi has made in the column. A faculty member or graduate student identifies a needed title. Using the online Request a Purchase of Library Materials form at http://dl.lib.brown.edu/libweb/forms/purcreq.php the subject librarian is emailed the bibliographic information including the ISBN number along with a Comment about print or ebook format and a needs-by date. If a quick turnaround is essential, the title will be "rush" ordered. This adds cost for shipping and for the Library to process the book for circulation. If needs-by is not designated, book ordering systems will be used that provide for a cost discount of about 15% and shelf-ready delivery which means more cost reduction for the Library. While waiting for a notification of the arrival of the title, the requestor may use the EasyBorrow system to borrow a copy. Shortly after the column came out, Professor Krishnamurthi was served by the rush order system. Within two business days, he picked up a book after requesting me to purchase it. In these economic times, we hope that requestors will be satisfied with the discount purchase system backed up by EasyBorrow but we are also prepared to place rush orders when absolutely necessary. When used judiciously, both systems can meet the expectation that the proposal advocates: "the most important benefit is that this gets books in the hands of people who need them – fast."

One other point about the proposal that needs to be considered is the cost to the Library of keeping track of details such as the balance of a faculty member's account in any fiscal year, fair application of a reimbursement policy including publication year, condition, and quality of a title, keeping receipt records, etc. The Library does not have systems or people-power to function like a bookstore that buys used books.

Finally, I do want to address one impression about Library funds that may have been left by Professor Krishnamurthi's article. The Library does not have funds in its materials budget that go unspent. We carefully manage our acquisitions budgets and the various means by which we acquire materials. In doing so, we may at times adjust these allocations to maximize their buying power and effectiveness (e.g., shift some money from approval plans to direct orders or vice-versa), but we always expend our entire allocation. This is certainly true for computer science. In fact, we maintain "wish lists" of materials that we would purchase if we had additional resources at our disposal.

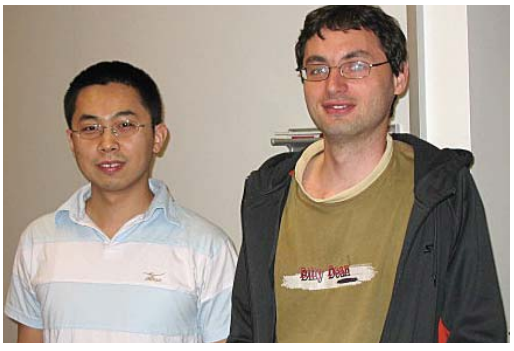
The Library shares Professor Krishnamurthi's desire – indeed the desire of all faculty members – to connect them with the books and other materials they need, when they need them. We strive to do this in a manner that is both convenient to the user and cost-effective in wisely expending our finite resources. Also, look for new patron-driven recommendation/acquisition electronic services from the Library in addition to Request a Purchase.

I look forward to continuing my conversations with Professor Krishnamurthi and also invite other faculty members to share their ideas about how the Library can better meet your needs. Please feel free to contact me at Lee_Pederson@brown.edu or 863-3807.


Anniversary 79-04

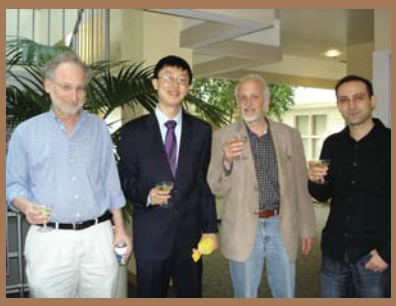

JOE
PATO


brown computer science



Recent Ph.D.s

David McClosky



Tingjian Ge

Matt Lease

Victor Naroditskly

Dan Grollman

Alumni Update

Adam Doppelt '98

Since graduation I've been lucky enough to work for five startups and at this point I can describe myself as a serial entrepreneur without eliciting laughter. Special note to undergrads - it turns out that working as a TA for Andy develops the exact same skills required by technology startups.

My first job after Brown was in Silicon Valley working for Marimba, a then-hot startup. I lived and worked with many Brown CS grads. Eventually I tired of El Camino Real and moved to Seattle. That first gray winter was difficult, but I fell in love with the city and I've lived here happily ever since.

I met my wife Shannon shortly after moving to Seattle. We have a two-year-old daughter, Elizabeth, with another baby on the way. Together we share a little house on a hill. When you look out the back you can see Puget Sound in the distance, dotted with ferries and sailboats.

My skills are a mile wide and an inch deep. I've worked on distributed systems, scalable servers, enterprise software, ops, embedded systems, crawlers, device drivers, websites and consumer electronics. I spend most of my hours glaring at Emacs, as I've done every day since the introductory CS class at Brown. My pinkies are very strong. These days I try to use Ruby as much as possible, which has improved life tremendously.

My latest startup is Urbanspoon, a restaurant search site with a popular iPhone application. We founded the company a few years ago and its currently used by 7 million people each month. I still remember the mortification I felt when my CS32 final project crashed repeatedly on stage and I strive to keep Urbanspoon running smoothly at all times.

David Ellis '07.5

David C. Ellis enjoyed a pseudoëxpedited exit from Brown, followed by semifrequent recruiting visits, furthered by research collaboration (past <=> future). Now living in San Francisco, working in the Valley [of virtual worlds], he hears the call of language and speaks in tongues of reply, hoping any who harbor similar interests will [re]join in. Discipuli et magisteri, ecce!

bllip – a p{aper,reso} on social language modeling @textgraphs (@ acl-ijcnlp (@singapore))) is in your honor, given as "alum emeritus"

plt – remember Father c++? well... our paper-in-progress is close* to having legs: a connection with parsing of dynamic text cgc - sincere apologies [cc: tstaff] for flubbing, and thanks for exciting opportunities

I am still learning to moderate my e{agerness,nthusiasm}, or at least have a bit o' balance in life, nor neglectful of duties, though continuing through garden paths none [human/machine] should be expected to parse, and yet we must always try, ですね？

*despite its weakness, I submitted to PLDI 2009 (hoping to learn from reviewers' harsh criticism)

Nancy Goldstein Mond MS '84

Hi,
I recently returned from a trip to Brown to attend the computer science open house for perspective students, with my daughter. I know it is a cliché, but how time flies! Twenty five years ago I was a graduate student in computer science at Brown and now I am a mom doing college tours with my daughter.

I have to admit that when she said that she wanted to attend the open house, I was excited about the prospect of visiting Brown and reconnecting with the computer science department. When we entered the room I was surprised and delighted to see two of my former professors, Andy van Dam and Tom Doeppner. It was great to be able to get a chance to say hello and to see how the program has grown!

After graduating from Brown I moved to New Jersey and worked at Bell Laboratories/Bell Communication Research/Telcordia for 23 years. I worked on many telephone company applications including service creation systems, order management systems and telephone provisioning systems.

I am currently at Rutgers University in the IT department working on a new identity management system. This project is being implemented as a ja-sig open source project.

All the best,
Nancy
nmond@rutgers.edu

Margo Lustig '82

I reconnected with some friends at the CS Reunion in May 2009. It was great to see old faces and catch up. Andy suggested I write in to Conduit. Considering I haven't written anything ever, I figured it was time to send in an update.

After graduating in 1982, I worked as a software engineer at Applicon, doing CAD-CAM software. In 1985, I joined a startup, DSC, which was part of Allen Bradley. I developed an interest in writing user interfaces and discovered this was a great way to combine my technical and artistic talent. In 1988, I went back to Mass College of Art to work on a painting degree part-time. I found pursuing a more formal art education to be greatly relevant to designing graphics software. I was hired as a software engineer by Lightspeed, a company that builds software for graphic designers on a Mac. It was a pre-cursor to Adobe and the company was small (40 people), full of artists and programmers, in a loft in downtown Boston…I loved it! Unfortunately, the company was bought out and I realized that I needed a more social career, so I cast myself as a user interface designer and went to work for Lotus in 1991 to work on SmartSuite. It was during this time that I got married and had my two children. Max is now 16, Mara is 13. Here's a family picture, taken at my daughter's recent Bat Mitzvah.

In 2000, I left to become a user interface consultant and worked on a variety of projects (usability, user interface design and information architecture). Like everyone else at the time, I paired up with a colleague to design and implement a variety of websites for small, local companies.

In 2004, IBM/Lotus hired me back as a contractor, and I've been there since, working on collaborative software. Today, I'm the team leader of a user experience group for Quickr, a Document Sharing/Team Collaboration product, based on the Notes/Domino platform. I interact with engineers, marketing and customers daily to build an innovative and successful user experience.

I'd love to keep in touch. I live in Newton, MA and go by my married name Margo Lustig Ezekiel. I can be reached at margo@ezekiels.net.

Rosie Perera '85

I left Microsoft in 1996 after eleven years. I moved up to Vancouver to study theology at Regent College, where I received my masters degree in 2004. My masters paper on technology and spirituality is online at http://rosieperera.com/docs/TechSpir.pdf. I still live in Vancouver and am now involved in all kinds of things.

Of most relevance to my Brown CS degree, I'm doing computer tutoring and troubleshooting (just discovered Instant Housecall for remote support and love it), beta testing cool software, and writing a regular technology column for Comment Magazine. My columns are at http://cardus.ca/contributors/rperera. I'm also blogging at http://blog.faithandtechnology.org, among other places. I spoke at a conference on Technology & Identity in Edmonton in September 2009. I'm planning to return to Brown for my 25th reunion in May 2010. Hope to see other CS alums there.

4377 W. 11th Ave.
Vancouver, BC V6R 2L9
Canada
rosie.perera.85@alumni.brown.edu
http://www.facebook.com/rosie.perera

Department of Computer Science
Brown University
Box 1910
Providence, RI 02912
USA

Ping!

Where are you and what are you doing?

Let us know what's happening in your life! New job? Received an award?
Recently engaged or married? Use this form to submit your news or e-mail conduit@cs.brown.edu.

First Name

Last Name

Class Year

Address

City

State

Zip

E-Mail

My news:

Mail to: Conduit, Department of Computer Science, Brown University, Box 1910, Providence, RI 02912