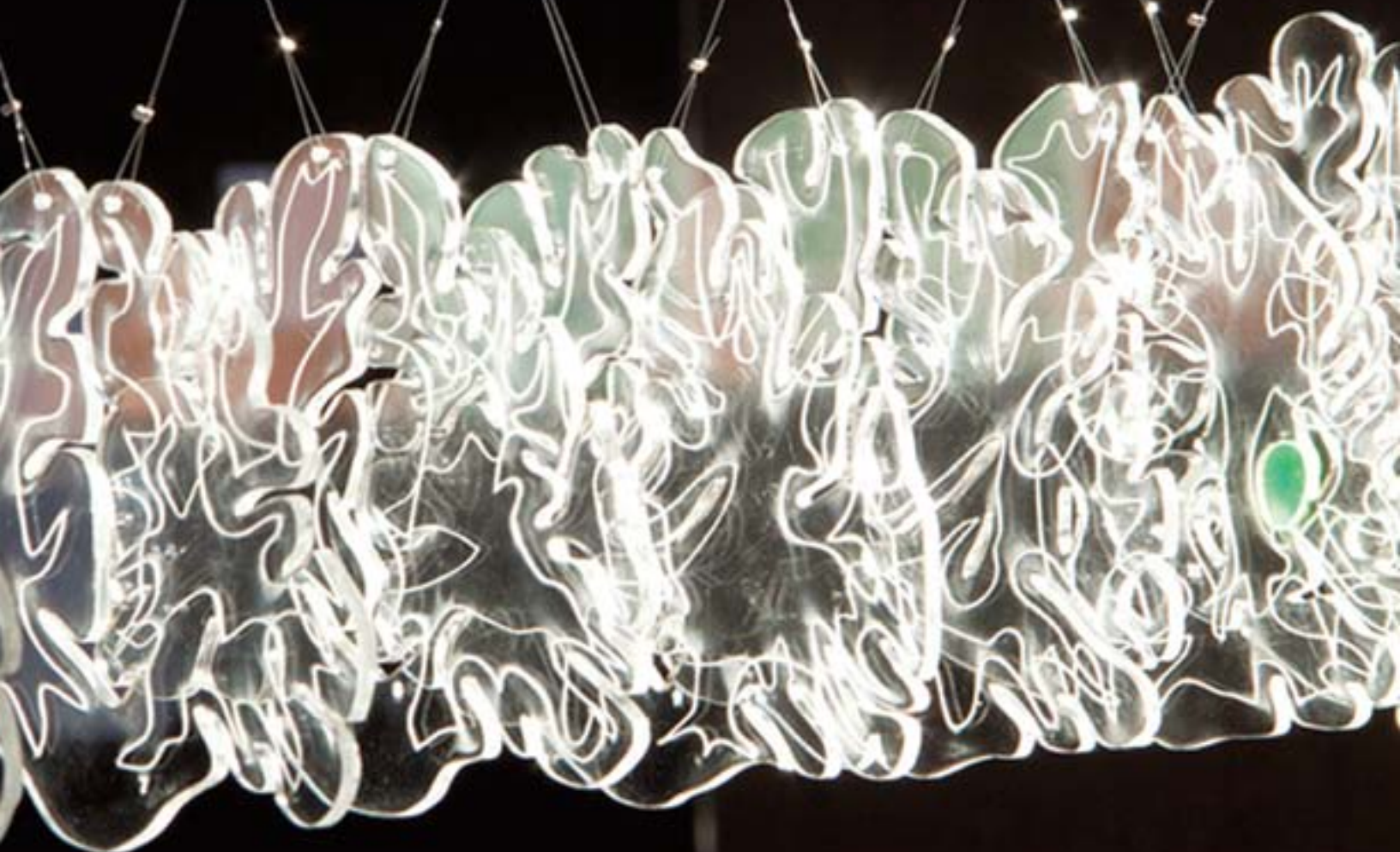


Conduit

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



VISWEEK 2011

ALSO INSIDE:

- Update from the Women in Computer Science
- 2011 Kanellakis Lecture



Notes from the Chair: the Latest News from 115 Waterman

Greetings to all CS alums, supporters and friends.

The spring semester is flying by and the CIT is as busy as ever. Fantastic things continue to happen in the department and I am thrilled to be able to share the highlights with you.

More than 70 graduates are expected to receive diplomas at this year's commencement, compared to 54 in 2011 and 48 in 2010. We continue to be delighted by the increase in the number of Brown students who have chosen computer science as their major.

Congratulations are in order for several faculty members who have received prestigious honors in recent months:

- Pascal Van Hentenryck, who received the title of Docteur Honoris Causa from l'Universite de Nante late last year. This is Pascal's second doctor honoris causa, the first from the Universit catholique de Louvain in 2008.
- The Association for Computational Linguistics recently named Eugene Charniak among its founding group of Fellows for his significant contributions to natural language parsing. The ACL Fellows program recognizes ACL members whose contributions to the field have been most extraordinary. He was also awarded the 2011 Calvin & Rose G Hoffman Prize for a Distinguished Publication on Christopher Marlowe.
- James Hays is the latest faculty recipient of an NSF CAREER award, to investigate "detail synthesis" tasks which alleviate camera shake, motion blur, defocus, or low resolution.

I'm also excited to report that Intel will include hardware support for transactional memory in their mainstream "Haswell" processor architecture. Developed two decades ago by Maurice Herlihy, in collaboration



with Eliot Moss at the University of Massachusetts, transactional memory is a technique that allows multiple parallel processors to make changes to shared resources safely and efficiently. Congratulations Maurice!

In addition, I look forward to working with University President-elect Christina Hull Paxson and I would like to take this opportunity to thank President Ruth Simmons for her tireless efforts and many significant accomplishments over the last decade.

Finally, please share your professional and personal stories for inclusion in upcoming issues of Conduit. Your support of and participation in departmental activities are always appreciated and we are grateful to have such a close community—thank you!

Roberto Tamassia
Plastech Professor of Computer Science
Chair, Department of Computer Science

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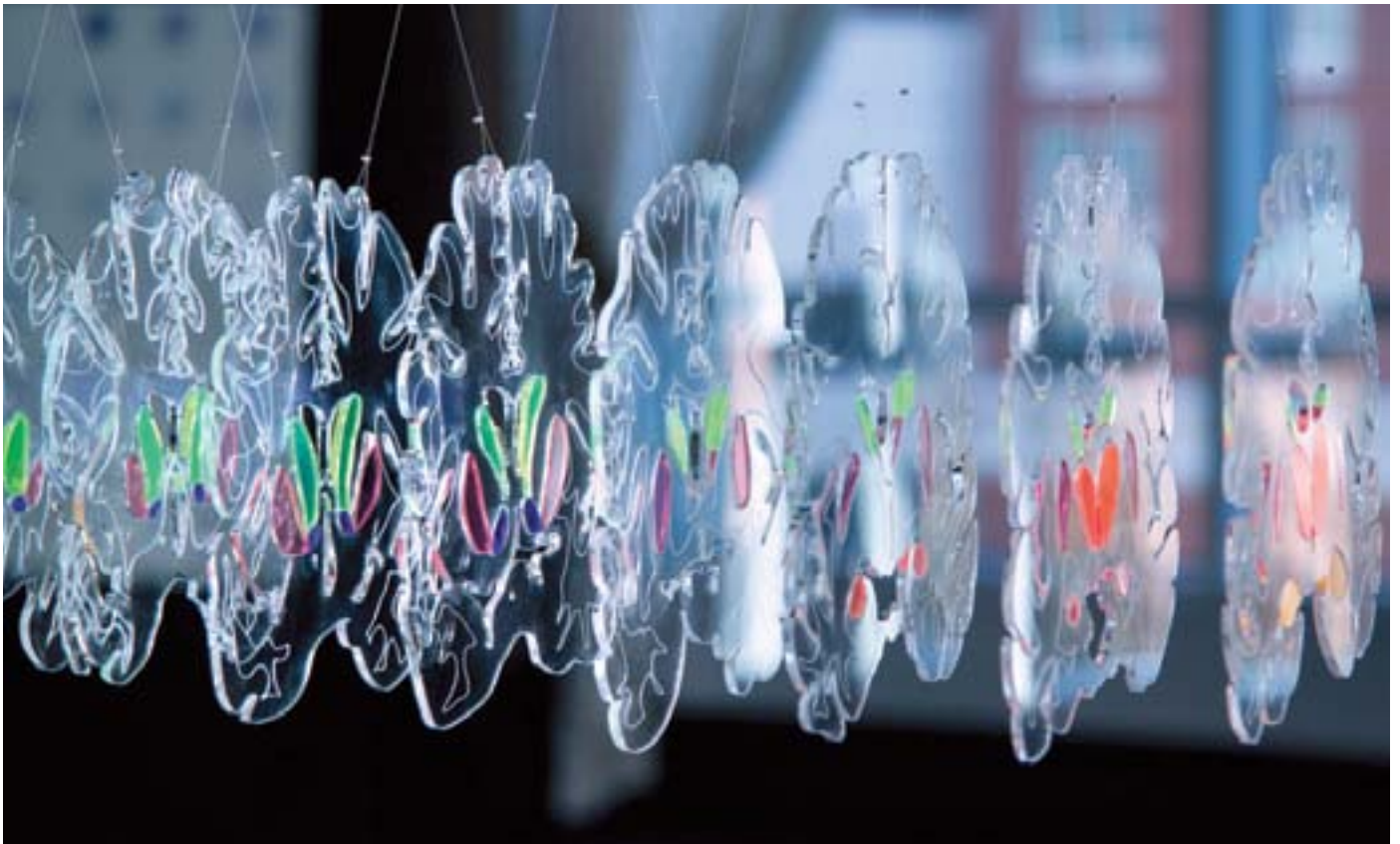
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VISWEEK 2011

In October, David Laidlaw was the Chair for IEEE VisWeek 2011, a set of conferences that brought almost 1,000 visualization researchers and practitioners with a shared interest in tools, techniques and technology to Providence. The conference included research presentations, tutorials, workshops, panels, demonstrations, posters, exhibitions and a juried art show.



LIMBIQUE is a true art-science collaboration between Pinar Yoldas (artist) and David Paulsen (neuroscientist). Neural mechanisms of emotion are visualized through a three dimensional interface that highlights the tangible and spatial aspects of the human brain which gives rise to the intangible and the volumeless. Image by Samuel Huron

VisWeek is one of the largest and most important gatherings of researchers and professionals who specialize in the visual analysis of data and includes three subconferences: the IEEE Visualization Conference (Vis), the IEEE Information Visualization Conference (InfoVis) and the IEEE Conference on Visual Analytics for Science and Technology (VAST). Vis traditionally looks at data with a spatial structure while InfoVis involves more abstract data and has been a bit more inclined to bring in psychological principles and experimental approaches such as user studies.

During the planning stage, there were several changes that David wanted to incorporate into VisWeek 2011 (in addition to figuring out how to provide reliable WiFi for 1,000 vision researchers). He tapped Brown alums to help bring them to fruition.

VisWeek 2011 Art Show

The first of these changes was to feature a juried art show during the conference, something that hadn't been done in many years. David hoped to leverage Providence's creative culture and the heritage of Brown and RISD to spark interest in this idea.

CS alum Dan Keefe (PhD 2007) co-chaired the Art Show at IEEE VisWeek 2011 together with RISD professor Bruce Campbell. This was the first exhibition of art to be associated with a major visualization conference in many years and the first ever at VisWeek. The goal of the show was to highlight the exciting and increasingly prominent intersections between art and visualization and to foster new communication between artists and scientists.

The show included an invited featured exhibition of 30 urban rail network maps from more than 10 years of work by artist, designer, and psychologist, Maxwell Roberts. Roberts developed the maps as an exploration into how different design rules can dramatically change the presentation of information. The maps were displayed in the hallways of the Rhode Island Convention Center and sparked many discussions among attendees.

The show also included artwork submitted to a competitive jurying process. Thirteen international artists and collaborative teams participated; most had never attended VisWeek before. The group included painters, printmakers, sculptors, multimedia artists, digital photographers, video producers, interaction designers, and procedural algorithm developers. Many of the artists wear multiple hats as they engage with information, science, and technology, and many of them team with scientists and technologists to push the boundaries of their discipline(s). The artwork shown was some of the latest and greatest in the



MOSTON is a 12-foot-tall suspended inflatable sculpture. Its three-dimensional form and two-dimensional surface design conjure the technology-driven amalgamation of the two geographically distant cities – Moscow and Boston. Sculpture by Anya Belkina, Image by Samuel Huron

digital art and graphic design scene. Several leaders in these communities participated.

Highlights of the work shown at VisWeek included: Moston, a 12-foot-tall suspended inflatable sculpture; a neuroscientific visualization in the form of a see-through sculptural installation; 3D printouts of hand-made digital sculpture sketches; data-inspired prints and pen and ink illustrations of the 2011 Japanese earthquake; and more. More images and a digital catalog for the show can be found at: <http://bit.ly/rCLY1m>

Helping Unite the Visualization Research Community

Publication in journals and conferences has traditionally been two distinct processes. At VisWeek this has changed over the last few years. All Vis and InfoVis papers are published as an issue of the journal IEEE Transactions on Visualization and Computer Graphics (TVCG). This year, for the first time, authors of TVCG papers about visualization topics were invited to present their work at the conference, making the relationship commutative. Although there was some friction in making this work, it was received well by attendees and authors, and David hopes that it will be a continued practice.



Sketching in Space, 3D Printed Sketch Lamp by Johann Habakuk Israel, Image by Samuel Huron

New Compass Activities for New Researchers

CS alum Liz Marai (PhD 2007) was the creator and organizer of the Compass activities during the conference, which were put in place to support the next generation of visualization researchers by helping connect beginning and advanced researchers from the scientific visualization, information visualization, and visual analytics communities. David acted as a sounding board during the planning stages but made clear that the ideas and their realization were entirely due to Liz's efforts. In Liz's own words:

There was something I had always wanted to do for Vis and kept postponing. 2011 turned out to be the right time.

Vis seemed to me to be more of a publication venue than a place to meet people. It was not so bad once one graduated and had reunions and other projects, but each year I looked at the young graduate students attending the conference, and my heart sank. The young attended the talks, then proceeded without fail to have lunch and dinner with their own academic siblings. Frankly, that decreased the value of the venue.

Now, Vis was not unique in that respect; all CS conferences I know are the same. However, Vis should know better: some of us attend conferences in other fields. Biomed, for example, takes really good care of their youth and community.

As one of the Doctoral Colloquium chairs at VisWeek 2011, and with David Laidlaw's endorsement, I had the power to start changing things.

In addition to running the Doctoral Colloquium, I became the unofficial "Compass" chair of the conference. The "Compass" was an umbrella for four activities I created and organized to help connect beginning and advanced researchers: 1) a "Lunch with the Mentors" event, 2) a "Meet the Candidate" poster session, 3) multiple iterations of a "Blind Date Lunch," and 4) a "Meet the Editors" panel. In brief, the "Lunch with the Mentors" event gave beginning researchers an opportunity to go for lunch with leaders of the visualization community. Through the "Meet the Editors" panel, the Editors-in-Chief of five journal venues (TVCG, CG Forum, J Information Visualization, CG&A, J Computing and Visualization in

Science) quantitatively presented their journal and answered questions from the audience. The "Blind Date Lunch" was a system where beginning researchers signed up to go for lunch with three other researchers they had (preferably) not met before. Finally, the "Meet the Candidate" two-hour poster-style session gave graduating students and post-docs going on the job market an opportunity to present their work, and gave head-hunters an opportunity to informally interview them.

It was touching to see how enthusiastically the community embraced these activities. The biggest hit was, undoubtedly, the "Lunch with the Mentors" event. I asked the field leaders to donate their Wednesday Oct 26th lunch slot to the young in the community: simply go out for lunch on that day (in small groups of four) with random young researchers and talk research, life and career choices (pay for own lunch).

The Visweek committee members generously led by example, and were the first to sign up. I myself donated my lunch and ended up meeting three young women in need of mentoring. As the organizer, I must have had at least four dozen people, both senior and junior, walk up to say “thank you” and rave about the event being the highlight of their conference experience. By the way, the national labs and industry folks were exceedingly happy with the “Meet the Candidate” session, and so were the graduating students.

Organizing the ‘Compassing’ was a bit nuts – I recall a last minute faulty Poster numbering scheme that had me and the student volunteers run around telling people where they were *really* supposed to meet their party. Overall, however, it was well worth it. I am glad to say that starting with VisWeek 2012, the ‘Compass’ is a formal and presumably permanent component of VisWeek. I trust this experiment in goodwill will lead to a richer conference experience for the young, and to a stronger community in the long run.

Brown Presence

In addition, current PhD students Steven Gomez (received honorable mention for his poster, *Modeling Human Performance from Visualization Interaction Histories*) and Çağatay Demiralp (panel organizer and speaker [David also spoke] for Theories of Visualization – Are There Any?) were quite involved in the conference.

New CMS-based Website

Another first for VisWeek 2011 was the introduction of a new Content Management Systems for all the website work based on DRUPAL. CS alum Daniel Acevedo (PhD 2007) signed up to be the new webmaster for the conference and take on this challenge. After many years of service, the previous webmaster retired from this post and Daniel had some pretty big shoes to fill, apart from learning the new system and getting used to how the insides of the website worked.

“It was a very nice experience and I hope to continue as VisWeek webmaster for years to come. David asked me if I would do this right before VisWeek 2010 and I immediately said yes. I am learning a new trade and getting to know all the people in the different committees related to the conference.”

The VisWeek 2011 experience also served as a trial run for IEEE/VGTC websites, which will all go under DRUPAL starting in 2012.

“There were a lot of challenges during the year that pointed to big things to improve later. We did *a lot* of manual data entry that will be automated (not through volunteers) from now on. Unfortunately, when things became a problem during the website’s



Interactive Fluid Flow by Angus Graeme Forbes, Photo by Samuel Huron

four key crunch times (call-for papers, submissions, review notifications, and conference) we had no time to programmatically fix them with the looming deadlines of publicity and publication. Overall it is a very nice system and we have a good team behind it to run it smoothly. I must say the hardest part is just getting the various chairs for the different conference areas to get the information to us on time... not the General Chair, of course... 8^P.”

“I’m happy to say I had good feedback from my first year. Now I just need to get used to General Chairs that are not David.”

Steven Gomez PhD student and honorable mention recipient for his poster, *Modeling Human Performance from Visualization Interaction Histories*

There were several highlights at VisWeek ‘11 for me. The first was seeing some excellent talks, including a keynote from Paul Thagard (Waterloo) about the role of visual thinking in the history of invention. He described a class of visualizations called cognitive-affective maps, which assist in this kind of visual thinking and are helpful for reasoning about social or cognitive theories. A second highlight for me was the lively poster session, which brought together researchers from all tracks of the conference into an open hallway. In fact, I ran into several fellow graduate students I’d met in London at a summer school in 2010, and we were able to catch up and share ideas. Finally, it was nice to meet alums from the lab (and remote collaborators) at the group “reunion” at Trinity Brewhouse!

Faculty Notes

Sorin Istrail

Sorin was honored to be invited to speak to a group of key contacts from the World Economic Forum who visited Brown Sept. 29. The group “was especially interested in meeting people from the sciences and humanities, and within these groups, particularly those whose work might intersect across these fields in interesting ways,” the invitation stated. “President Simmons suggested your work as exemplary in these regards.”

The invitation noted that Sorin was among the list of Brown faculty who “are working on important topics and who are good at speaking to broad audiences about their work, i.e., those working on big topics and who bring pizzazz to their presentations.”

After the presentation, Matthew Gutmann, vice president for international affairs, offered Sorin his thanks for meeting with the visitors who “were interested in learning from your research and how it could be engaged in future WEF gatherings, including Davos.”

The abstract of Sorin’s talk, “The Genome and the Computational Sciences,” follows:

“In 2001, the computational construction of the sequence of the Human Genome marked the phase transition point when biology became a quantitative science. The scientific and strategic importance of genomics for life sciences, medicine, agriculture, and government agencies led to the establishment of bioinformatics centers and institutes for quantitative biology all over the world. In this talk I will present computational biology stories where, as leader of scientific teams, I witnessed the triumph of computer science in the genomic era. I will also present the work of my laboratory at Brown on building CELLARIUM – a Google Earth-like map of the genome, as well as my plans for building a John von Neumann Institute for Advanced Study.”

Sorin also enjoyed the powerful lecture presented by the other computer science professor at the event: the always inspiring Andy van Dam.

Sorin gave three invited talks: one at Eric Davidson’s Lab Retreat at Caltech’s Kerckhoff Marine Laboratory, Corona Del Mar, CA; one at UCLA, in the Bioinformatics Colloquium, and one at University of Rhode Island.

There is much progress to report about Sorin’s students work in the last six months. Ryan Tarpine successfully defended his Ph.D. thesis proposal, “A database of causality-inferred structure-function information for genomic cis-regulatory architecture;” Derek Aguiar made significant advances on research into the genomics of autism in collaboration with the wonderful medical collaborator Eric Morrow (Brown Medical School); Derek is the first author of the paper “DELISHOUS: An Efficient and Exact Algorithm for Genome-wide Detection of Hemizygous Deletion Polymorphism in Autism;” he also made valuable contributions to a number of other projects: building the lab’s RNAseq pipeline, already heavily computing the oyster transcriptome, in collaboration with Martha Gomez (URI), and the *Nematostella* transcriptome, in collaboration with Joel Smith (MBL); he also gave the invited lab talk at the Computational Advances in Next Generation Sequencing Workshop in Las Vegas. Four seniors are working on honor theses with Sorin: Tim Johnston on gene regulatory networks reconstruction from systematic experimental wet lab perturbations; James Weis on biofuels and genomics; and Jake Franco and Jeff Herman doing two theses on inferring population substructure in GWAS. There also is exciting progress to report on protein folding research by Hammurabi Mendez (on voting theory and energy function inference) and by Kshitij Lauria (on the bipole biplane self-assembly conjecture). Sorin also is proud to note that Will Allen, a former member of Sorin’s CYRENE regulatory genomics project and former TA of his AFCB course, just won the prestigious Churchill Fellowship, and next year will study computational biology at Cambridge University.

Sorin also hosted several collaborators’ visits: Liliana Florea (John Hopkins), Ion Mandoiu (UConn), Sorin Dragici and Hamid Chistaz (Wayne State), and Joel Smith (MBL).

In the past few months, Sorin experienced a “Turing phase,” working on three papers to celebrate Alan Turing’s Centennial Year 2012. He collaborated with Solomon Marcus (Romanian Academy) on the essay, “Turing and von Neumann’s Brains and their Computers” and with Brown colleague and Nobel Laureate Leon Cooper on the essay, “Mental Thought and the Turing Test: This Double Face is the Face of Mathematics.” As an homage to Turing’s last published paper, “Solvable and Unsolvable Problems,” Sorin wrote a paper titled “Computer Science Through Urn Games: A Unified Framework for a Hierarchy of Solvable and Unsolvable Problems.” The three papers were accepted for presentation to the “Turing Centenary Conference – CIE How the World Computes,” University of Cambridge, June 18-23, 2012.

In November 2011, Sorin attended the Genome Informatics Conference at the Cold Spring Harbor Laboratory, the famous molecular biology research institute in Long Island, N.Y. The founding home of quantitative biology in the 1970s, and home to eight Noble Laureates, including Barbara McClintock and Max Delbruck, the laboratory is ranked internationally as the number one research lab in molecular biology. The president of the Cold Spring Harbor Laboratory invited Sorin to meet with him and their VP for Research to discuss their plans for the Simons Center for Quantitative Biology.

Sorin became the first member of the Computational Biology Advisory Board of DNAnexus – the cloud-based next generation genome sequencing data analysis start-up company funded by Google Ventures.

As this issue of *Conduit* is the last to be published under Professor Ruth Simmons’ service as Brown’s president, Sorin would like to express his thanks for her inspiring leadership and strong support for him, the computer science department, and CCMB. Her advocacy for Sorin’s projects, the two “The Genome and the Computational Sciences: The Next Paradigms” symposia in 2006 and 2010, and the kickoff workshop “John von Neumann Days” of the Brown University John von Neumann

Distinguished Lecture Series has been herculean. She was key in helping to organize and fund the two Symposia and is been supportive of future activities at Brown inspired by von Neumann.

Shriram Krishnamurthi

For March-May I will be in
London,
that ancient center of
civilization and
banking.
I will revel in the
British Museum, while
casting figurative stones
on behalf of
wronged nations
everywhere.
I will re-visit the
Tudors and Victorians
at the Portrait Gallery.
I will marvel at
Uccello’s linearity in
The Battle of San Romano.
I will thrill to the
Hogarth’s in
John Soane’s house while
squeezing through its
interstices.
I will watch cricket
at Lord’s.
I will watch footy
on the telly
while eating curry.
I will color the city
Monopoly hues, and
distinguish the
Jubilee, Bakerloo, and
Metropolitan lines.
I will refine
old thoughts
and think
new ones.
I will even, after
tea and cakes and ices, if
the mood strikes,
the time permits, and
the spirit is expansive,
engage in some of the
Trades and Things
that I have promised my
Dean.

Department Awards and Honors



Eugene Charniak

Eugene Charniak Named ACL Fellow & Awarded 2011 Hoffman Marlowe Prize

The Association for Computational Linguistics recently named Eugene Charniak among its founding group of Fellows for his significant contributions to natural language parsing. The ACL Fellows program recognizes ACL members whose contributions to the field have been most extraordinary.

He was also awarded the 2011 Calvin & Rose G Hoffman Prize for a Distinguished Publication on Christopher Marlowe. The Marlowe prize was awarded for the essay ‘Statistical Stylo-metrics and the Marlowe-Shakespeare Authorship’ (with coauthors Neal Fox and Omran Ehmoda) which asked the question, “When we don’t know who the author of a document is, but we have a set of candidates, how can we make confident predictions about who its author is?” Eugene and his co-authors theorized that some such statistics which might represent the “fingerprint” of an author may include how often they use certain function words and general part of speech usage frequencies, as well as the likelihoods of transitions between them. The team developed models that use these types of statistics to get an “average fingerprint” for a set of candidate authors, and tested an unlabeled document against these candidates to choose which author’s fingerprint is closest to the text of unknown authorship. These methods were applied to the question in the Shakespearean authorship debate related to Christopher Marlowe’s candidacy as the true author of the works attributed to Shakespeare.

Eugene received an A.B. degree in Physics from University of Chicago and a Ph.D. from M.I.T. in Computer Science. He has published four books: *Computational Semantics*, with Yorick Wilks (1976); *Artificial Intelligence Programming* (now in a second edition) with Chris Riesbeck, Drew McDermott, and James Meehan (1980, 1987); *Introduction to Artificial Intelligence* with Drew McDermott (1985); and

Statistical Language Learning (1993). He is a Fellow of the American Association of Artificial Intelligence and was previously a Councilor of the organization. Eugene was recently honored with a lifetime achievement award from ACL.

Eugene is interested in programming computers to understand language so that they will be able to perform such tasks as answering questions and holding a conversation. This is far beyond our current capabilities, so research proceeds by dividing the problem up into manageable subparts. His research is called “statistical language learning.” He and his students write programs that collect statistical information about language from large amounts of text, then apply the statistics to new examples. For example, much of his recent research has been on statistical models of syntactic parsing—grammatically identifying parts of speech and learning the rules for sentence formation, an exercise akin to the sentence diagramming that most of us did in school. Most researchers believe it is a small but important step toward true language understanding.

James Hays Receives NSF CAREER Award

James Hays is the 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 research funded by James’s CAREER grant aims to understand, represent, and enhance scenes at the Internet-scale. James and his team are investigating “detail synthesis” tasks which alleviate camera shake, motion blur, defocus, or low resolution.

A key insight behind this research is that Internet scale photo collections and scene matching provide an ideal, context-specific statistical model which can be used to insert convincing texture and object detail. To improve scene



James Hays



Nabeel Gillani

Nabeel Gillani First Brown CS Student to Receive Rhodes Scholarship

The department is thrilled to announce that Nabeel N. Gillani '12 has been elected to the American Rhodes Scholar Class of 2012. Nabeel is the first Brown computer science student to receive this honor and was selected from a pool of 830 candidates.

Nabeel, majoring in applied mathematics and computer science, has also served as a research assistant on a biotechnology project with George Karniadakis, as a Microsoft program manager on Microsoft Access, as head TA for Introduction to Object-Oriented Programming, and is working now at Brown's optimization lab on electricity restoration for disaster relief with Pascal van Hentenryck. He founded a Providence-based microfinance organization, The Capital Good Fund, as well as an outreach program in the Providence public schools (The Learning Exchange) to help younger students learn math. After graduating from Brown in May, Nabeel plans to pursue the M.Sc. in computer science and the M.Sc. in education.

He hopes to continue his research by using the tools he developed to answer questions about trust, privacy, and decision-making in the context of human-computer interaction.

Eric Sodomka Selected as Finalist for a Facebook Fellowship

PhD Student Eric Sodomka was recently selected as a finalist for a Facebook Fellowship.

Eric is a fifth-year Ph.D. candidate, performing work on autonomous trading agents with advisor Amy Greenwald. His research interests lie at the intersection of computer science and economics, focusing predominantly on decision making under uncertainty, game theory, and mechanism design. Eric is interested in developing bidding strategies for complex auctions in which analytically solving for equilibria is intractable, and understanding the auction dynamics when different bidding strategies are played. He is also interested in inferring bidders' underlying valuations from their observed behavior, and understanding how the auctioneer's choices affect bidders' resulting strategies, auctioneer profit, and social welfare.



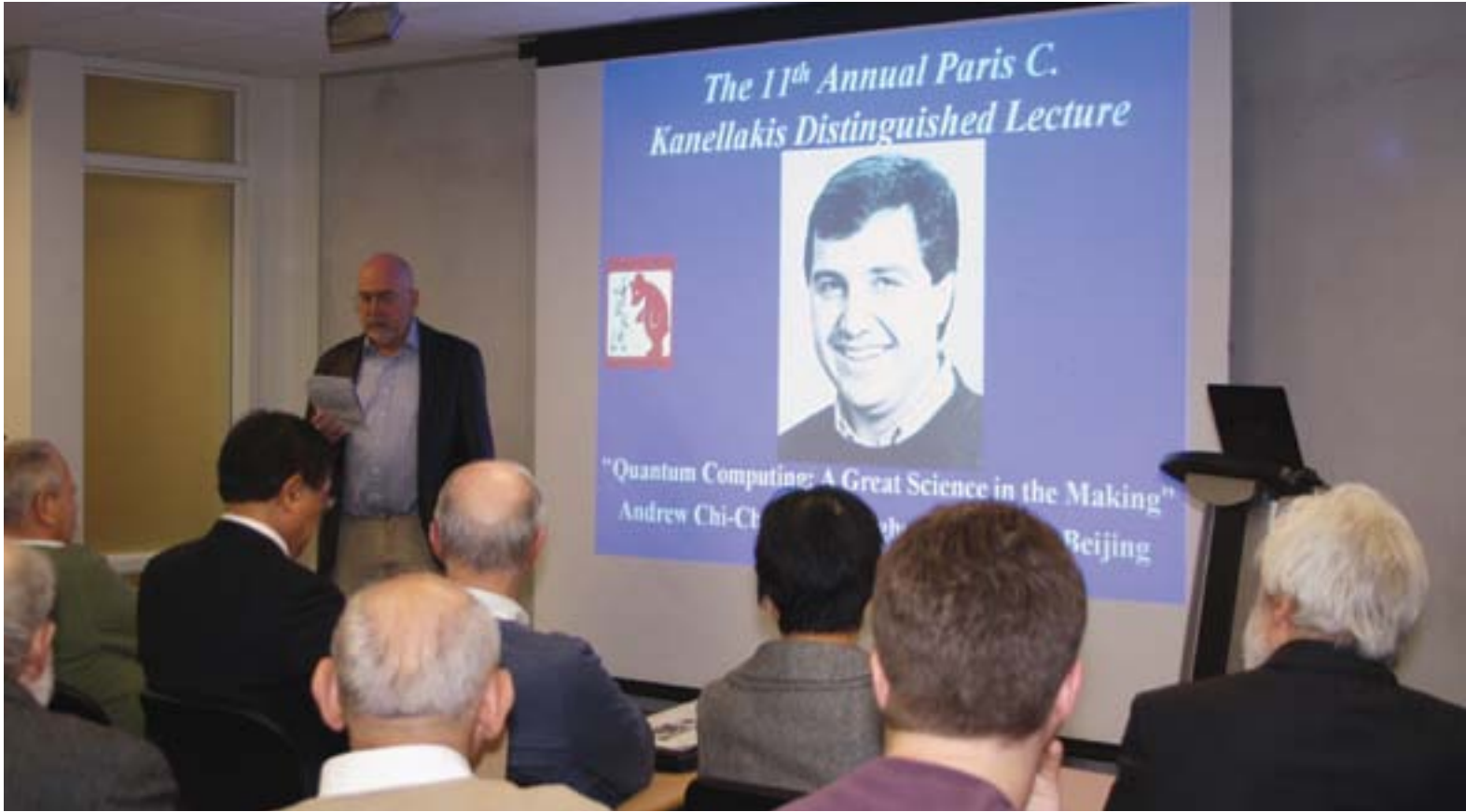
Eric Sodomka

Nathan Malkin Receives Honorable Mention in CRA 2012 Undergraduate Researcher Award Competition

Undergraduate student Nathan Malkin was recently selected for honorable mention in the Computing Research Association's Outstanding Undergraduate Award competition for 2012.

Nathan began research with David Laidlaw his freshman year. As part of the Visualization Research Lab's collaboration with brain scientists, he worked to develop tools for selection, processing, and analysis of streamlines—tracks, derived from MRI data, that visualize the diffusion of water molecules through the brain. More recently, he has pursued his interest in human decision-making by designing a platform for web-based multi-user decision experiments.

The 11th Annual Paris C. Kanellakis Distinguished Lecture



Maurice Herlihy introduces Andrew Yao.

The 2011 Paris C. Kanellakis Distinguished Lecture, titled “Quantum Computing: A Great Science in the Making” was given by Andrew Chi-Chih Yao of Tsinghua University, Beijing on Thursday, December 1, 2011. This year’s lecture was part of the University’s Year of China initiative, which aims to explore China’s past, where it is now and its possible future through an array of programs across disciplines. The CCMB was also a sponsor of this lecture.

Andrew Chi-Chih Yao is a prominent computer scientist and computational theorist. Yao used the minimax theorem to prove what is now known as Yao’s Principle. Yao was born in Shanghai, China. He completed his undergraduate education in physics at the National Taiwan University, before completing a Doctor of Philosophy in physics at Harvard University in 1972, and then a second PhD in computer science from the University of Illinois at Urbana-Champaign in 1975. In 1996 he was awarded the Knuth Prize. He received the Turing Award, the most prestigious award in computer science, in 2000, “in recognition of his fundamental

contributions to the theory of computation, including the complexity-based theory of pseudorandom number generation, cryptography, and communication complexity.” From 1982 to 1986, he was a full professor at Stanford University. From 1986 to 2004, he was the William and Edna Macaleer Professor of Engineering and Applied Science at Princeton University, where he continued to work on algorithms and complexity. In 2004, he became a Professor of the Center for Advanced Study, Tsinghua University (CASTU) and the director of the Institute for Theoretical Computer Science (ITCS), Tsinghua University in Beijing. He now is the Distinguished Professor-at-Large in the Chinese University of Hong Kong.

This lecture series honors Paris Kanellakis, a distinguished computer scientist who was an esteemed and beloved member of the Brown Department of Computer Science. Paris joined the Department in 1981 and became a full professor in 1990. His research area was theoretical computer science, with emphasis on the principles of database systems, logic in computer science, the

Spring Symposium: Security & Privacy in the Cloud



L to R: Arjun Guha, Ben Livshits, Joe Gibbs Politz, Michael Coates, Tao Stein, Denis Pilipchuk, Anna Lysyanskaya. Missing from the photo, Kevin DeLange and Feng-Hao Liu.

On February 23, the Industrial Partners Program hosted the 44th symposium titled, “Security & Privacy in the Cloud.” Anna Lysyanskaya, the faculty host of the event, along with Shriram Krishnamurthi and Ugur Cetintemel, put together a diverse and interesting roster of speakers, including three of our own PhD students. The technical talks were followed by a lively panel discussion. Below is the list of the symposium speakers, along with their talk abstracts and bio information.

Michael Coates, Mozilla

Title: Protecting Browsers in a Changing Threat Landscape

Abstract: The technologies available on the web are quickly advancing. Along with the new power of these technologies come new attack vectors that are leveraged to exploit users and websites. To combat these new threats, browsers have been enhanced with many new security capabilities that automatically protect the user or can be enabled by a web application to create a more secure browsing experience. During this discussion we will explore the changing threat landscape and discuss new security controls within browsers that help protect users against today’s most prevalent attack techniques.

Bio: Michael Coates is the Director of Security Assurance at Mozilla. He is responsible for Mozilla’s software and infrastructure security which includes Firefox, web applications, and supporting infrastructure. In this role he sets the security assurance strategy to integrate security into the development life cycle of all applications and ensures that the organization’s infrastructure is designed to minimize risk and protect critical data. Throughout Michael’s career he has performed hundreds of technical security assessments for financial, enterprise, and cellular customers worldwide.

Michael is also the Chairman of the OWASP board, an international non-profit organization focused on advancing and evangelizing the field of application security. In addition, he is the creator of OWASP AppSensor, a project dedicated to creating attack aware applications that leverage real time detection and response capabilities. Michael also maintains a popular security blog at michael-coates.blogspot.com

Michael holds a Master of Science degree in Computer, Information and Network Security from DePaul University and a Bachelor of Science degree in Computer Science from the University of Illinois at Urbana-Champaign.

Kevin DeLange, GTECH

Title: GTECH and Cloud Security

Abstract: GTECH and other corporations are often faced with opportunities in the cloud to enhance their business strategies. Attractive at the business level for the obvious cost advantages and reduction in time to market, there are very real and tangible dangers associated with such a strategy in the lottery world. In this presentation we’ll take a look at the traditional lottery security paradigm and explore the potential pitfalls that must be addressed and mitigated in this environment.

Bio: Kevin DeLange, Senior Director Information Security with GTECH Corporation

Tao Stein, Facebook

Title: Protecting Facebook

Abstract: Social networks are under attack all the time from phishers, fraudsters, and spammers. They aim to steal user information and expose users to spam.

The attackers have vast resources at their disposal. They are well-funded, with full-time skilled labor, control over compromised and infected accounts, and access to global botnets. Protecting our users is a challenging adversarial problem with extreme scale and load requirements.

Over the past few years we have built and deployed a system to protect our users and the social graph. The system performs real-time checks and classifications on every read and write action. The system also generates signals for use as feedback in classifiers and other components. This talk will describe specific threats to the graph, present the systems we have built, and outline current and future challenges.

Bio: Tao is an Engineer at Facebook. For the past 4 years he has been building systems to protect Facebook users. Prior to Facebook, Tao was a Researcher at Microsoft Research Asia in Beijing for several years where he built experimental operating systems. Tao received a PhD from Harvard in computer systems.

Arjun Guha, Brown University

Title: Confining the Ghost in the Machine: Using Types to Secure JavaScript Sandboxing

Abstract: The commercial Web depends on combining content, especially advertisements, from sites that do not trust one another. Because this content can contain malicious code, several corporations and researchers have designed JavaScript sandboxing techniques (e.g., ADsafe, Caja, and Facebook JavaScript). These sandboxes depend on static restrictions, transformations, and libraries that perform dynamic checks. But, do they actually work?

We tackle the problem of proving the security of these sandboxes. Our technique is to employ a JavaScript type-checker to encode and verify the properties of sandboxes. The type-checker is lightweight, efficient, and operates on actual source. I will discuss our verification of ADsafe, which revealed several bugs and other weaknesses. (Joint work with Spiridon Eliopoulos, Shriram Krishnamurthi, and Joe Gibbs Politz)

Bio: Arjun Guha is a graduate student of Computer Science at Brown University. His work focuses on securing existing Web programs and designing new programming languages for the Web. He co-developed Flapjax (a reactive programming language), LambdaJS (a semantics for JavaScript), and Google Belay (a cloud authorization protocol). More recently, he has been working on the safe management of software-defined networks.

Recent PhDs



Arjun Guha



Serdar Kadioglu

Responses to Tom Doeppner's Fall 2011 Conduit Article, 'Maintaining the UTA Program'

I just read—with horror—your note in Conduit. Thank you for everything you've done to try to preserve the undergraduate TA program: as you know, I view this to be an invaluable part of the Brown CS experience (I only felt that I really mastered the content for CS169 after TA'ing it), and I did not realize how threatened its existence had become. I realize I'm very late in asking this, but is there anything we can do to help? Can we computer science graduates earmark donations to the University to the UTA program? Note that I'm cc'ing my father (Stephen Cantrill '66)—he and Bob Munck were among Andy's first TAs for Applied Math 101?), and I am proud to have been a second generation Brown UTA!

Anyway, Tom: thanks again for fighting so hard for UTAs. TA'ing is the most important thing I did as an undergraduate—and I know that many of my colleagues (spanning a decade and a half!) feel the same way!

Bryan Cantrill '96

I read your update on the UTA Program developments with great interest. After all, I had the opportunity to "TA" for 4 semesters while an undergrad. I always viewed this experience as part of the CS Program rather than a campus job. Activities such as this fostered a community between undergraduates that as far as I know was unique to the CS department. This sense of community is one of the reasons that I was attracted to concentrate in this area and eventually build an information technology career. It is sad to read how lawyers are forcing the department to change a win-win-win situation (experience for the 'ta'ing student—cheap assistants for the department—improved support for the students taking the course) by introducing time-sheets or offering course credit.

Your personal and the department's efforts to maintain the program demonstrate that you appreciate the value of these activities.

Spyros Bartsocas '89, ScM '91

The Undergraduate TA program in the Brown CS department is absolutely critical to the quality of the undergraduate experience. The Brown CS experience depends on understanding theory taught by the professors and putting those theories into practice shown by the UTAs. Professors teach the theory of how systems work, the methodology for examining complex systems, and the frameworks for asking the right questions. UTAs teach the practice of reducing those theories into concrete, real-world implementations. Having gone through the experience of implementing the coursework assignments themselves a year or two prior, UTAs are in a unique position to articulate the concepts in ways that no graduate TA or professor ever could, and benefit themselves from a second exposure to the coursework, giving them an even-deeper understanding of the material. Of course, without the professors the educational experience would consist of only implementation skills and would turn the experience into nothing more than a vocational one. The lectures are the critical part of the education. But without the UTAs, the experience would be equally unbalanced: students would have a difficult time learning how to implement the ideas from lecture and would be at a huge disadvantage in industry after graduating.

A good friend of mine once pointed out something which I strongly believe: the Brown CS department is the single best department in the country at teaching good, sound software architecture skills. To me, it's clear that the reason for this is the unusual combination of the UTA program with excellent educators. As a cartoon on one door in the CS department said (at least when I was there): "In theory, there's no difference between theory and practice. In practice, there is." In theory, all the educational benefits are from the professors, but in practice, it's the UTAs that complete it.

Jeff Potter '00 (and a former UTA of CS-31)

Around the Department



Goodbye to the old Sunlab chairs.



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