Rochester Launches
Need new head Science
At the October 2013 Big Data Forum, University of Rochester President Joel Seligman formally launched the Rochester Institute for Data Science (IDS). The institute is at the heart of the University’s five-year strategic plan, which commits $50 million towards new faculty, programs, and facilities for data science. The institute will serve as an umbrella organization that unifies and strengthens research and education across all divisions of the University, including Arts, Sciences & Engineering; the Simon Business School; and the School of Medicine and Dentistry.

On April 1, 2014, the Wegman Family Charitable Foundation announced a $10 million gift to the University for construction of a building that will house the IDS, the Department of Computer Science, and the Department of Earth and Environmental Sciences. New York State has named the University as a Center of Excellence for Data Science, allocating $872,000 in annual support.

**Computer Science at the Core**

The Department of Computer Science will play a large role in the IDS. While the IDS will not hire its own faculty, many of the faculty whom are hired through the resources of the institute will have primary or secondary appointments in computer science. The IDS will be home to new degree programs in data science at the BS and MS levels, and these programs will include many courses offered by the computer science department.

The founding director of the IDS is Professor Henry Kautz, who has served as chair of computer science for the past seven years. Together with other faculty and University leaders, Kautz helped shape the strategic plan that lead to the formation of the IDS. Scott Steele, Rochester’s director of research alliances, serves as executive deputy director of IDS and leads the associated NYS Center of Excellence.

**Faculty Growth**

The Year One priority for the IDS was to grow collaborative research in data science. To this end, the University authorized an interdisciplinary faculty search in data science. The search committee included representatives from a dozen different departments and sought candidates whose research was exciting and cutting edge and bridged multiple disciplines. As Professor Kautz noted, the field of data science is inherently interdisciplinary, growing out of the intersection of statistics, computer science, and computationally oriented life, physical, and social sciences.

This IDS search resulted in hiring Tom Howard, whose research is in probabilistic robotics and computational linguistics, and Gourab Ghoshal, whose work is in theory and applications of network science. Howard holds appointments in computer science, electrical and computer engineering, linguistics, and biomedical engineering, while Ghoshal holds appointments in physics, mathematics, and computer science.

Beyond these IDS-led hires, however, a number of other searches across the University resulted in new data science-oriented faculty. These included machine learning researchers (Ji Liu in computer science and Gonzales Mateo in electrical and computer engineering), three computational neuroscience researchers in brain and cognitive sciences, and four bioinformatics hires in the Medical School.

**Into the Future**

The IDS has designed BS, BA, and MS programs in data science, which are currently undergoing review for New York State accreditation. The new programs will start in 2015. Meanwhile, interested students can begin an independent major with a concentration in data science offered through the University’s Center for Interdepartmental Programs.

The activities and goals of the IDS will expand in the coming years; possible future activities will include summer schools and research experiences for undergraduates, sponsoring visiting professors, and developing grants and gifts. An interdisciplinary faculty steering committee, including both junior and senior faculty along with a distinguished group of advisors from industry and academia will help plot the institute’s course. Up-to-date information about IDS events and activities can be found at [www.rochester.edu/data-science](http://www.rochester.edu/data-science).
Robot Learning and Decision Making in Complex Unstructured Environments

Thomas Howard will join the faculty in computer science and electrical and computer engineering as an assistant professor in spring 2015. He will also be a member of the Institute for Data Science and hold a secondary appointment in the Department of Biomedical Engineering. Currently he is a research scientist at the MIT Computer Science and Artificial Intelligence Laboratory in the Robust Robotics Group. Previously he was a research technologist at the Jet Propulsion Laboratory (JPL) and a lecturer in mechanical engineering at Caltech. Thomas received his PhD in robotics from the Robotics Institute at Carnegie Mellon University (CMU) in 2009 and BS degrees in electrical and computer engineering and mechanical engineering from the University of Rochester in 2004. He has authored or coauthored six journal articles, 22 conference papers, and a book chapter on motion planning and safety issues in the Handbook of Intelligent Vehicles and has received two NASA Group Achievement Awards. He also currently serves as a mentor of the MIT Program for Research in Mathematics, Engineering, and Science for High School Students (PRIMES) program.

At CMU, Howard developed a model-predictive trajectory-planning algorithm for high-performance mobile robot navigation in complex environments. He applied this algorithm for in-lane navigation on Boss, the self-driving automobile that won the 2007 DARPA Urban Challenge, and for autonomous navigation in unstructured environments on Crusher, a six-ton, skid-steered field robot. For his PhD thesis he developed the Adaptive State Lattice, a search space for robot motion planning that locally optimizes a uniformly distributed sampling of paths to more efficiently plan maneuvers for vehicles with mobility constraints through cluttered obstacle fields.

At JPL, Howard expanded his research in manipulation planning, robot modeling and simulation, and position estimation. Howard led three research programs as principal investigator on adaptive mobile robot search space design, perception and pose estimation in poorly illuminated environments, and adaptive simulation for mobile robot navigation. He applied his trajectory planner for dexterous manipulation on a robot torso as the motion planning lead for the JPL/Caltech team during Phase I of the DARPA Autonomous Robotic Manipulation (ARM) program. Additionally, he worked on autonomous navigation as a member of the flight software team for Curiosity, the planetary rover of the Mars Science Laboratory that has been exploring the surface of Mars since August 2012.

At MIT, Howard is investigating algorithms on how to form and solve difficult planning problems from natural language expressions in the context of the perceived environment. He developed the Distributed Correspondence Graph model, a probabilistic graphical model that is formed from the grammatical structure of the utterance and groundings from the physical environment. These models learn the correspondence between phrases and relationships in the physical world using machine learning algorithms that are trained from a set of examples. He recently applied this model to construct maps of the environment and integrated this framework on a robotic wheelchair for assistive mobility tasks. He also is serving as a mentor to a pair of high school students through the MIT PRIMES program on research to improve the efficiency and scalability of natural language interfaces on unmanned aerial vehicles.

Howards’ interdisciplinary laboratory at the University of Rochester will focus on improving the efficiency, fidelity, and optimality of robot learning and decision-making algorithms in complex unstructured environments. He will expand upon his experience with autonomous automobiles, planetary rovers, robotic torsos, unmanned aerial vehicles, robotic wheelchairs, and mobile manipulators to address critical problems in manufacturing, health care, and exploration. His vision for the future of robotics is one in which robots learn from knowledge bases, physical experiences, and interactions with people to efficiently perform novel tasks at speeds that exceed human performance.

Howard is looking forward to returning to the University of Rochester, where he and his wife, Vicki, earned their undergraduate degrees. He plans to develop undergraduate and graduate courses in mobile robots, robot learning, human-robot interaction, and robot control and is excited about the opportunity to supervise undergraduate and graduate research in his laboratory.
Optimization: Modeling, Algorithm, and Theory

Ji Liu has joined the faculty in computer science at the University of Rochester as assistant professor. He received his PhD degree in computer sciences from the University of Wisconsin–Madison in 2014, his MS degree in computer science from Arizona State University in 2010, and his BE degree in automation from the University of Science and Technology of China in 2005. His research interests include machine learning and optimization and their applications in big data analytics, data mining, computer vision, medical data analysis, etc. He won the KDD best research paper award honorable mention in 2010.

His research experience can be summarized in three aspects of optimization: modeling, algorithm, and theory.

**Modeling**
The main purpose of modeling in optimization is to find a neat mathematical model to precisely describe the practical problem and further formulate it into a minimization or maximization problem. Liu’s projects in modeling span multiple domains and topics, including abnormal event detection, feature selection, dictionary learning, multitask learning, online scene classification, and reinforcement learning. Among these projects, one widely cited work is to define the tensor null norm for capturing the low rank structure of tensors. This work received their applications in big data analytics, data mining, computer engineering, brain and cognitive sciences, and psychology. He is interested in many research projects conducted at Rochester and is looking forward to contributing his expertise in optimization and machine learning.

**Theory**
Liu’s research also covers theoretical topics, including sparse learning and compressed sensing. The key motivation of sparse learning and compressed sensing is to pursue a model as simple as possible (with sparse coefficients in most cases) to fit the training data. Some fundamental contributions in this area were made by him: refining (or extending) several classic and popular methods like LASSO, Dantzig Selector, and Forward-Backward greedy algorithms; and proving stronger theoretical guarantees.

In the Department of Computer Science, Liu is excited about the potential collaboration with other departments and institutes of the University, such as the School of Medicine and Dentistry, electrical and computer engineering, brain and cognitive sciences, and psychology. He is interested in many research projects conducted at Rochester and is looking forward to contributing his expertise in optimization and machine learning.

**Algorithm**
While a practical problem has been properly formulated, the remaining issue is to find a solution to the target problem. Liu has contributed several algorithms that are both computationally and spatially efficient to solve in both general large-scale optimization problems and specific areas such as (multi)linear systems and stream data analysis.

The scientific, social, and economic implications of big data will take years to fathom, and many fields will be involved—it may not live up to the hype, but the potential is clearly present for major impacts across many fields. Important big data application problems are found in speech, signal, and text processing (e.g., denoising/deblurring and medical imaging); biology and bioinformatics (e.g., identifying genomic and environmental risk factors for diseases); feature selection in geographical and astronomical images; and many other areas. Even U.S. government agencies have been busy solving big data problems of their own, for example, analyzing surveillance data from telephone and email communications.

Although the nature of the analysis differs across these applications, as does the usage of the extracted knowledge, they share many key technologies. For example, almost all of them can be formulated as an optimization problem. While optimization has a rich and mature history, it has developed rapidly in the recent decade, especially for applications in machine learning and data mining, because of the need to process enormous datasets and derive meaningful inference from them. Partly due to these reasons, the preferred optimization method of choice in scientific applications has quickly moved to stochastic and incremental type of methods instead of classical Newton type and gradient-based methods, because the former requires much less computation and data movement per iteration.

However, the effort on the algorithmic level alone is far from enough for optimization schemes to gracefully scale to big data problems. Parallelization provides a solution to speed up optimization algorithms beyond the algorithmic level. Traditional parallel optimization schemes usually adopt the synchronous mechanism by splitting the workload per iteration onto multiple computation units, thus paying a heavy synchronization cost (all units have to wait for the slowest one to finish per iteration), especially when the number of involved units is large. To minimize the overhead due to synchronization, Liu’s recent projects adopt an asynchronous parallel scheme costing minimal overhead to parallelize several sophisticated optimization algorithms. This pioneer work theoretically and empirically justifies the advantages of asynchronous methods over traditional synchronous methods and builds up the theoretical foundations for the asynchronous parallelism. Successes applying this scheme have been demonstrated in solving the sparse linear equations LASSO, box constrained quadratic programming, and vertex cover.

Recent success in applying asynchronous algorithms to big data problems is only the beginning, and it opens up a new direction for future research. While the idea of assembling computation units or utilizing existing computation networks for parallel processing sounds simple, things get sophisticated when combining parallelism with optimization and machine learning techniques. A number of interesting questions arise naturally. For instance, how to make existing algorithms compatible with various constraints in practice (such as data distribution, privacy preservation, computer networking topology, etc.)? All these questions are worth further exploration and call for more research efforts.

In the Department of Computer Science, Liu is excited about the potential collaboration with other departments and institutes of the University, such as the School of Medicine and Dentistry, electrical and computer engineering, brain and cognitive sciences, and psychology. He is interested in many research projects conducted at Rochester and is looking forward to contributing his expertise in optimization and machine learning.
Improving Security of Computer Systems

John Criswell is a new assistant professor in the Department of Computer Science at the University of Rochester. He earned both his BS in computer science (2003) and PhD in computer science (2014) at the University of Illinois at Urbana-Champaign. Criswell’s industry experience includes computer security work at Argus Systems Group, Inc. and a summer internship at FireEye, Inc.

Criswell’s research work primarily focuses on improving the security of computing systems. Long gone are the days in which computer security attacks were merely a nuisance. Computing systems are now high-value targets; they store valuable information such as bank balances, tax and health records, and product designs, and they operate critical systems such as communications, voting machines, cars, and planes. The players also have changed: defenders no longer face off against curious programmers but against nation states and organized crime.

Criswell’s research goal is to create computing systems that provide high-security assurances while minimizing adoption cost. High-security countermeasures are those that require significant adoption cost. High-security countermeasures thwart an entire class of attacks and can be verified correct (i.e., such as memory accesses, pointer arithmetic, or control-flow transfers are being used to perform illegal operations; when such operations are detected, SVA-M can either halt the system or alert the system operator. More recently, Criswell designed and built the KCoFI (pronounced "coffie") system. KCoFI enforces a security policy that is lighter weight than SVA-M. By focusing on more common attacks that divert control-flow maliciously, KCoFI provides strong protection with less performance overhead than SVA-M. Criswell has also formally verified parts of KCoFI’s design using small-step semantics and the Coq proof assistant; this verification provides greater assurance that the design of the KCoFI system is correct.

A limitation of the SVA-M and KCoFI systems is that they only protect the kernel against certain classes of attacks; other attacks can still render the operating system compromised and allow the theft or modification of application data. To take a more holistic approach, Criswell designed and built Virtual Ghost. Unlike SVA-M and KCoFI, Virtual Ghost protects applications from a compromised operating system kernel. Using SVAs compiler facilities, Virtual Ghost provides memory to applications that the operating system kernel cannot read or write (Figure 2).

Additionally, it controls how the operating system modifies application control flow to prevent the operating system from maliciously modifying the application’s behavior. Combined with a novel system for delivering encryption keys to applications without operating system interference, Virtual Ghost permits applications to operate on an operating system kernel without trusting that kernel. In this way, even if the operating system kernel is taken over by an attacker, the attacker cannot subvert the security of applications.

At the University of Rochester, Criswell looks forward to leading graduate students in research in compilers and operating systems and their application to computer security. One topic that interests Criswell is security for mobile systems. Mobile systems have the same security needs as servers and desktop systems but have much tighter power and performance constraints. Numerous security policies for mobile devices require compiler instrumentation, but such techniques require sophisticated compiler analysis and optimizations not currently available today.

Criswell is also interested in developing formal metrics for computer security. Numerous countermeasures exist for several classes of attacks, each providing different protection and performance tradeoffs. However, there does not currently exist methods for measuring how much protection is afforded by more secure, but more costly, countermeasures. Having the ability to measure the amount of security provided by countermeasures would be invaluable in helping system developers determine which countermeasures to deploy in different environments that have differing risks and assets.

In addition to research, Criswell is excited to be teaching the Operating Systems course this fall. Understanding operating system internals is key to developing code that makes efficient use of operating system services and is valuable to students who want to work in systems, security, and/or computer architecture. In addition to covering basic operating system topics such as memory management and synchronization, the course will have students working on and becoming familiar with the internals of a real-world operating system kernel.

In his free time, Criswell enjoys music (especially Baroque) and, on occasion, plays recorder. Criswell is also interested in obscure abstract strategy games and is especially fond of connection games such as Hex, Unlur, and Antipod.
Fifteen students from computer science, mechanical engineering, and electrical and computer engineering spent the semester designing and building “Fencebot,” “Spiderbot,” and “Blimbot.” They drilled, milled, and sawed in the student machine shop; glued, screwed, and soldered in the computer science undergraduate makerspace; and printed in 3-D in the new Ronald Rettner Hall for Media Arts and Innovation to craft raw materials and basic components into bodies, brains, and sensors for their 21st-century beasts. And then they had to program them.

Fencebot, constructed by Matthew Baker, Lucian Copeland, Yukun Liu, Morgan Sinko, and Ben Vespone, features two (small) robot sword fighters lunging, thrusting, and parrying to score points by hitting each other with their sabers. Several of the constructors are members of the University of Rochester fencing club, so they knew the rules.

Spiderbot, constructed by Chandler Haugh, Raaga Kanakam, Alex Matthews, Greg Polis, and Taylan Sen, is a magnetic-footed bug designed to crawl around on steel building frameworks like that exposed in the interior of Rettner Hall. “Spidey” is not quite as sure-footed as we would like, and the web self-arrest system not quite perfected, so it is not crawling above unsuspecting heads just yet (an impressive mass of motors, processors, and wiring, nonetheless).

Blimbot (or Hindenbot) constructed by Jorden Brooks, Luke Kortepeter, Ryan Lee, Casey Waldren, and Julian Weiss, is a robot blimp designed to navigate in large indoor spaces like theaters, big-box stores, or (again) Rettner Hall. “Blimpy” wanders through 3-D space investigating locations and objects of interest, returning to a feeding station when it needs a recharge. Helium, rather than hydrogen is used as a lifting gas, so, hopefully, this bot will have a less fiery fate than its namesake.
An Interview with Daniel Russell

Daniel Russell ’84 (PhD)
Daniel Russell is the Uber Tech Lead for Search Quality and User Happiness in Mountain View. He earned his PhD in computer science, specializing in artificial intelligence until he realized that magnifying and understanding human intelligence was his real passion. Twenty years ago he foresaw AI in favor of HI and enjoys teaching, learning, running, and music, preferably all in one day. He worked at Xerox PARC before it was PARC.com and was in the Advanced Technology Group at Apple, where he wrote the first 100 web pages for www.Apple.com using SimpleText and a stone knife. He also worked at IBM running an HCI lab and briefly at a start-up that developed tablet computers before the iPad was a thing. His MOOCs (Massive Open Online Courses) have helped students become much more effective online searchers. His online course, PowerSearchingWithGoogle.com, has had ~500K students go through the content, meaning that somewhere on earth, an image of him has been on teaching search skills for more than 200 years.

From all accounts, the faculty and students at the Redigting University of Rochester Department of Computer Science (CS) in the ’70s were pioneers with great vision and energy. No rules, just research. What was that atmosphere like for you and how did a particular person or experience influence what you have done in your career?

At the time, we were just kids with dreams. Remember, this was just when the ARPAnet was getting a start—the Internet as we know it didn’t even exist except in science fiction, which I’m sure all of us thought was WAAH off in the future.

We’d grown up on Star Trek and similar fare. I started in AI because I was deeply interested in figuring out how intelligence really worked—little did we know how much longer that particular road was going to be. But it was all part of our dream. So we worked until late at night, working away on our research projects, trying hard to implement our visions of AI or distributed systems (and yes, playing more than a few games of Trivial Pursuit Gene Bell for bringing that first truly networked game to the Ethereums in the CS lab). But to answer your question, the atmosphere was just wonderful—lots of freedom, lots of classic grad school conversations with your peers, lots of hanging out with the faculty members. Of the folks I talked with the most, many impressed me, but Jerry Feldman (my advisor and department chair at the time) had a great intellectual curiosity and a very laissez faire approach to grad student management. That’s probably for the good, as I changed my thesis topic a few times.

I was also profoundly influenced by folks in the neuropsychology department, especially Harry Whitaker (with whom I wrote my very first paper—a computational model of apraxia . . . of all things) and the other grad students over there who opened my eyes to what cognition (especially from a neuro perspective) was really all about. When I think back on it now from the perspective of a few decades, the CS department gave me a structure to work in (the AI model), and the neuropsychologists gave me data and a deep appreciation for how cognition actually operates. Both have served me well over the years.

Did the field of User Interface Design exist when you did your graduate work at Rochester? How did each company you worked at (Xerox, Apple, IBM, and Google) strengthen your commitment to move in that direction?

Here’s the true story, never before written down.

As I said, my thesis work was in AI planning. There’s been a long and illustrious line of work on planning ever since then (remember I graduated in 1984). I took my background in planning and went to work at PARC with Richard Fikes, one of the founders of the full planning area. And we had a “great” time working on a planner that would generate (provably correct!) plans to help humans run a complex Xerox copier. It really was complex, and the planner we worked on (called Bluebonnet) would help people through even the knottiest of jobs. Do you want to make 500 copies of a 50-page document with perfect binding, 2-sided copies for the first 100 pages, then copy onto blue pages for the next 30 pages, then insert cardboard sections? Easy. Bluebonnet would walk you through the steps.

It was great. I wrote Lisp code to make the planner work, I wrote the serial driver to pull state from the copier (at the wire level), I wrote 3-D shaded animated graphics (for the animated help system), etc., etc. It really was a grad student’s dream.

Then Lucy Suchman, an anthropologist at PARC, suggested that we watch what would happen when real people used Bluebonnet to do real tasks.

Great idea! Let’s do that! So we set up the cameras and brought in people to use Bluebonnet to solve their large, complex, copying tasks.

And it was a huge disaster. The system worked perfectly. The plans were created, the system state was correct . . . and the UI was terrible. We hadn’t paid much attention to it, so it looked very “industrial,” and had no obvious flow. People literally didn’t know where to look.

As we ran the tests, Lucy kept saying “This is really interesting . . . And I kept thinking, “How did we find such terrible users?”

That is until the day Herb Simon and Alan Newell came to PARC on a visit. We managed to get them as test subjects for our user trial. And . . . THEY couldn’t complete the task.

It was an epiphany for me. It really didn’t matter how great, smart, or perfect the back-end planner was—if the UI didn’t communicate what the human needed to know, it was so much computational junk. And THAT’s the moment when I converted almost completely over to HCI. I still did AI as a day job for the next 10 years, but little by little I started doing work on HCI with Tom Moran, Peter Fincoli, Stuart Card, and Mark Steffy. That was really at the dawn of the discipline of HCI, when we were still very concerned with building predictive models of people, and the interest in the “design” of the UI was just emerging.

The Xerox Star was being developed as all this was going on, and it became abundantly clear that design REALLY matters—getting the iconography right, the appearance model, the information architecture, even the text of the error messages— it all matters. So after 10 years, I went to Apple to work in the area of AI + HCI. I ended up running half of Apple’s HCI research lab, so it was a deeply broadening experience for me to work with truly great visual and interaction designers, as well as our own anthropologists, IR people, speech reco, and TTS team.

After an amusing time returning to PARC for two years with the best people from Apple HCI labs, we found that Xerox was (still) not ready to get into hardware, and I ended up at IBM running a fairly large HCI research lab for them. Although it was organizationally complicated, I learned a good deal of managerial skills, which has proven useful at Google.

In your position as research scientist in Search Quality and User Happiness at Google, you analyze the way different people use the Google search engine. Because of that, you have been called a search anthropologist for social media—part psychologist, part anthropologist, and part computer scientist. Which part is the most enjoyable for you or do you see them blending seamlessly?

Blending seamlessly in the manner of a fruit smoothie is about the right model. There’s a little of this, a little of that—my work draws on all of these skills, using tools and analysis methods from whatever field will help answer the questions. It’s question-driven research, not methods- or field-driven research.

My job is to understand how and why people search the way they do. To understand this at Google scale requires blending the skills of a big data scientist (to analyze millions of log records), a field anthropologist (to conduct field studies about how people are thinking about their search process), and a usability lab experimenter (when we bring participants into our labs to do traditional studies or eye-tracking analyses of their behaviors).

Although I was initially skeptical of the anthropological method, my early work with Lucy Suchman and later...
work with Victoria Bellotti (at Apple and PARC) convinced me that this is a deeply important part of understanding how people consider the artifacts that we (as engineers) construct. It’s really something to visit someone in their home and have them RANT at the computer because of the insane way it’s operating (and you, as the designer of that particular system, realize that you didn’t consider this kind of person in your design).

What are some of the surprising results of your field studies of users’ search techniques, and how has that impacted the way the Google search engine is evolving? What methods do you use to track the search behavior of subjects? Are there certain groups who show particular strengths and weaknesses?

Probably the biggest surprise is how much of a gap there can be between logged behavior and actual behavior. In many ways, the rise of large amounts of log data has given researchers deep insights into what kinds of information people are really looking for, and how they respond to that. But there are interesting nuances that just clickstream data doesn’t provide; the attitudinal response to our UX and product designs, as well as the mental model people have of our systems. We can impute some of that, but at the end of the day, you still have to go and look at people using the tools we’ve built.

The biggest surprise is the surprise that always happens—and that’s the discrepancy between what people say they do, and then what they actually do. We see this repeatedly. People are not good describers of their own behavior, nor can they project forward very well to describe the tools they’d like to have. As Henry Ford reputedly said, “If I had asked people what they wanted, they would have said faster horses!” We are in much the same boat. When we ask people what they want from search, they say “better results,” but their response to “better results” is complex. What seems to be happening is that it’s very hard to describe accurately what “better” really means. This is why we keep experimenting.

There are definitely different sets of search skills out there. Typically someone will be very skilled in a given domain and not so great in another. MDs, for instance, are typically great at searching out medical information, but I’ve seen MDs fail at finding how-to information for a plumbing repair task. On the other hand, I’ve watched unemployed teens solve the plumbing search problem, but have zero idea how to find medical information. An interesting effect is that people “socially norm” their search skill estimates. That is, if you ask people “who’s the best Google searcher you know?” it will typically be someone in their social group (usually defined by their working situation). A bus driver will point to another bus driver as the best searcher they know. That makes sense. But when you do studies across groups, you see each has domain depth, but in cross-domains, very few people have broad search skills. (Information specialists, like reference librarians, almost always do—but that’s their profession, and it’s relatively rare.)

You have emerged as a leader in MOOCs (Massive Open Online Courses) such as a Google a Day and other Search Education tools. These reach millions of people each week. Will MOOCs reshape the educational systems of the future? What are the benefits and disadvantages to this type of learning?

Learning in the Internet age is changing rapidly. A motivated student with a search engine is a powerful force and has access to a vastly larger set of resources than ever before. MOOCs offer one way to reach a large number of students in a relatively short amount of time. My MOOCs (PowerSearchingWithGoogle.com) have reached over 500,000 students in the past two years. I could have never done that in my lifetime. Even if I taught 500 students/year, that’s a kilo-year of teaching. So in one way, MOOCs are incredibly efficient. And in studies I’ve done, I have been able to show that if you complete the MOOC, your search effectiveness basically doubles—and that improvement is persistent. Thus, the MOOCs can also be effective.

Will they revolutionize teaching? Yes, but I don’t believe it will be the sudden collapse of academe that some predict. Instead, MOOCs will become just another tool in the educators’ box of tricks. The bigger shift is from knowledge-buried-in books to discoverable knowledge online and the ease with which students can search out, access, organize, and use that knowledge. I see this in the classes I teach. Teaching programming or system building is now nothing like what it was when I was a graduate student at Rochester. There are vast oceans of data, code, systems, and knowledge out there to be discovered and used.

At the same time, large MOOCs also provide a wealth of socialization for learning that I hadn’t expected. When you have 100K students all taking the class together, it’s a radically different experience than if there are 300 students. The chance that another student will be online AND be able to answer your question is very high. The chance that this student had exactly the same misunderstanding as you did is also quite high. A student who has just come to understand something in the class can give a much better explanation of the concept than I can.

How do we prevent the knowledge divide between the computer literate with access to unlimited information and those in the world who are all the grid without access?

The answer is obvious: provide access. The means of doing that are not obvious. There are many programs that are attempting to bring connectivity to the rest of the world. The one I know a bit about is Google’s Loon project (to fly high-atmosphere balloons with regional wireless networking that are six miles above commercial aviation traffic), but this is a huge problem for which there probably isn’t a single panacea.

Many of us have been victims of poor software design that we use in our daily work. Why aren’t there more “User Happiness Designers” like you throughout the software industry? Will user interface and need finding become a more important part of the end product in the future? Is the pipeline of software currently producing enough HCI/UI graduates to meet the demand of this growing field?

“User happiness” has been a (unstated) goal for UX designers for quite a while. The biggest change over the past few years is the shift towards quantification and careful data analysis about how people are actually using our designs. As I discovered years ago when working in the AI end of things, it doesn’t matter how good the service is—if people can’t understand it and use it, the product fails. The job of the designer is to create something that works with the mental models of the user AND has the correct affective response. My particular job as a User Experience Researcher is to bridge the gap between design and implementation. It’s really a perfect job for someone like me who has a background in classical computer science, a specialization in AI, a couple decades of practice in HCI work, all arranged over a set of broad ranging interests. HCI in general is a skill-set that’s much in demand (that covers the needs from UI prototypers, designers, researchers, and data scientists), and my sense is that there’s a fair bit of competition for these people—which suggests that we need to grow the pipeline from university to industry.

Is there too much personal information on the web? How can we protect ourselves from becoming vulnerable to criminals and scam artists as search abilities become more sophisticated? Is there a way to limit access to personal information and still allow public access to knowledge?

This isn’t my area of expertise, but my sense is that PII (personally identifiable information) is kind of a difficult battleground. There are too many repositories of information owned by too many different interests with too many levels of security and privacy. The biggest challenge I see is now to develop an awareness of what you’re giving up when you sign up for this or that. People need to understand the basics of privacy, and I don’t know where they’re supposed to learn this—in school? That’s not happening. Technologies change, scams change, best practices change—and yet people are, for the most part, immune to education about this. It worries me, which is part of the reason I’ve been spending so much time trying to figure out the best way to teach millions of people about how technology works, and how they can use it to change their lives (incidentally, their personal information privacy practices).

Looking back on your career to this date, what contribution in your body of work has certainly affected more people in the world who are off the grid without access? The answer is obvious: provide access. The means of doing that are not obvious. There are many programs that are attempting to bring connectivity to the rest of the world. The one I know a bit about is Google’s Loon project (to fly high-atmosphere balloons with regional wireless networking that are six miles above commercial aviation traffic), but this is a huge problem for which there probably isn’t a single panacea.

Is there too much personal information on the web? How can we protect ourselves from becoming vulnerable to criminals and scam artists as search abilities become more sophisticated? Is there a way to limit access to personal information and still allow public access to knowledge?

This isn’t my area of expertise, but my sense is that PII (personally identifiable information) is kind of a difficult battleground. There are too many repositories of information owned by too many different interests with too many levels of security and privacy. The biggest challenge I see is now to develop an awareness of what you’re giving up when you sign up for this or that. People need to understand the basics of privacy, and I don’t know where they’re supposed to learn this—in school? That’s not happening. Technologies change, scams change, best practices change—and yet people are, for the most part, immune to education about this. It worries me, which is part of the reason I’ve been spending so much time trying to figure out the best way to teach millions of people about how technology works, and how they can use it to change their lives (incidentally, their personal information privacy practices).

Looking back on your career to this date, what contribution in your body of work gives you the most satisfaction?

That’s a hard question: Which of your children do you love best? Probably the most influential from an academic perspective has been my work on sensemaking—that is, the processes people go through when they’re searching for, finding, organizing, and understanding a complex body of information. I started that work at Xerox PARC back in the early ‘90s, and it’s been a constant force in my research ever since.

But in terms of teaching people, my more recent educational work (with the PowerSearchingWithGoogle.com MOOCs and various other teaching programs) has certainly affected more people in the world. I often get messages from people telling me that what they learned in one of my classes completely changed the way they work, or they were able to solve a problem of longstanding. That’s very rewarding.

Knowing what you know now, what advice would you give to current computer science students at Rochester?

When choosing a thesis topic, focus your heart, but be ready to listen to good advice. I changed my focus several times and found a topic I really, really enjoyed. But when my advisor said “Stop already, just drop Chapter 13 from your thesis, you’re done . . . ,” he was completely right. I was passionate about Chapter 13, but it was time to go pursue that chapter (which ultimately turned into the sensemaking work) elsewhere.

When you aren’t working at making everyone else happy, what do you do for rest and relaxation?

Family, running, bicycling, or scuba diving in exotic locations. And, truthfully, writing. (You’d have thought that all that writing for the thesis and all of those academic papers would have pounded it out of me, but you’d be wrong.)
Graduate Alumni news

Bai, Tongxin (PhD ’11)—My current affiliation is with Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, which is located in Shenzhen, China.

Beigelzimer, Alina (PhD ’03)—I’ve moved to Yahoo in NYC. Sitting next to Joel Tetralu and Amanda Stent!

Bukys, Ludvig (MS ’96)—My current position is Director, Advanced Application Development at Allworx (subsidiary of Windstream).

Campana, Ellen (PhD ’07)—A couple years ago I left my tenure-track professorship at ASU and headed to Silicon Valley. After some time at the big data start-up Apixio, I moved to Intel and am now working as a Software Architect in the New Devices Group. I am about to celebrate my first anniversary there and I love it so far! Greg Aist and I will celebrate our first anniversary there and I am expecting our third child this September.

Coombs, David (PhD ’92)—I recently ended my term appointment as a PM at IARPA and joined Raytheon. My role is Technical Director, Customer R&D. Raytheon Intelligence, Information, and Services. My charter is to grow more contracted R&D with DARPA and similar sponsors. I will be glad to forge alliances with university partners.

Cottrell, Gary (PhD ’85)—I saw Peter Selfridge and other alums at the memorial service for Andy Haas outside of Albany. There was a display of his t-shirts! He was one of a kind.

Dallessandro, Luke (PhD ’14)—I’ve been busy playing with the 3-D printer I built last year. It’s located at Shenzhen, China.

Denber, Michele (MS ’80)—I’ve been busy playing with the 3-D printer I built last year. I also recently restored a 1969-cottage Aikai quarter-inch open reel tape recorder to operating condition. I’m still living in Brighton and Bradenton with my partner of 13 years and two big German Shepherds, enjoying being retired. Best regards to everyone in the department.

Dominguez, Melissa (PhD ’03)—I was promoted last year and am now tech lead/manager of the Gmail team for iOS, mobile web, and offline. In addition to my official work duties, I also lead outreach efforts at the Google Waterloo, Canada office to encourage young girls and other underrepresented groups to consider computer science/STEM as a possible educational and career path. My older daughter Trella will be starting first grade next year, and my younger daughter, Beatriz, will be starting junior kindergarten.

Faliszewski, Piotr (PhD ’04)—I won the 2013 Research Prize of ‘Polityka’ magazine (in the field of technological sciences”). Since 2001, every year,”Polityka” selects a group of 15 finalists (in five fields: humanities, life sciences, social sciences, exact sciences, and technical sciences) and then picks one representative from each of the fields.”Polityka” is a weekly magazine in Poland.

Friedberg, Stuart (PhD ’89)—I’ve been with ARRIS Group, a supplier to the cable TV industry, for about 4.5 years. Related anecdote: My first post-academic job was with Sequent Computers, eventually bought out by IBM and shortly thereafter discarded. I moved on to Polyserve, eventually bought out by Hewlett-Packard and discarded about two years later ARRIS bought out Motorola Home from Google, which is a case of the fish swallowing the whale. I’m hoping the consequence is equally different.

Gallo, Carlos Gimez (PhD ’11)—I am a Research Assistant Professor at the department of Psychiatry and Behavioral Sciences, Northwestern University.

He, Shan (PhD ’07)—I am now a staff engineer in Google. We have two boys. The older one, Kirk Aferka, is 2 and the younger one, Derek Aferka, just turned 3 months old. They love each other, and we hope it stays that way.

Light, Marc (PhD ’96)—My current title is ‘Manager of the Applied Math Group’ at Windlincs.

Meira, Wagner (PhD ’97)—I have published a book with Mohammed Zaki that can be found at http://data miningbook.info/.

Mellor-Crummey, John (PhD ’89)—Professor of computer science, and electrical and computer engineering at Rice University, has been named a Fellow of the Association for Computing Machinery (ACM) for his contributions to parallel and high-performance computing.

Pearson, Jonathan (BS ’05, MS ’07)—I am now working at Google in NYC.

Sabbah, Danny (PhD ’82)—I am still working for IBM even though I had planned to be ‘retired’ by now. They asked me to stay on till the end of 2015 and asked me to become the CTO and GM of IBM's next generation initiatives especially around cloud related technologies. I just launched a R&D initiative a few months ago called Bluemix. It has grown to over 20K users in 3.5 months, so not so shabby. I am now working on other things including an IoT platform. Still having fun! My kids are off on their own and have been for quite a while. We are looking forward to ‘retirement’ whatever that means.

Salgian, Garbis (PhD ’98)—I’m still at RPI (formerly Sarom Corporation). I was promoted to Principal Scientist in April 2014. The kids are growing fast, they will turn 10 and 3 respectively in the Fall.

Selinger, Salgian, Andrea (PhD ’01)—I am still an Associate Professor in the Computer Science Department at the College of New Jersey.

Stent, Amanda (PhD ’01)—I am now a Principal Research Scientist at Yahoo Labs in New York, NY where we are building an NLP group. And I have a new collection coming out from Cambridge University Press titled Natural Language Generation in Interactive Systems, edited by Bangalore and Stent.

Stewart, Christopher (PhD ’08)—I was awarded the NSF CAREER award for my research on powering Internet services, like Facebook, with clean, sustainable energy. Here’s a blurb about the award from the NSF website: “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 the early-career-development activities of those teacher-scholars who most effectively integrate research and education within the context of the mission of their organization. Such activities should build a firm foundation for a lifetime of integrated contributions to research and education.”

Tang, Chunqiang (PhD ’04)—I left IBM Research and joined Facebook on July 1, 2013. My family also relocated from New York to San Jose, CA.

Tetralu, Joel (PhD ’05)—I just joined Yahoo Labs in NYC in January as a Senior Research Scientist. Amanda Stent is here too and we’re working together!

VanDurme, Ben (BS ’11, PhD ’09) — In September 2013 I married Sara Eleoff (BA/BE/Take’01, Residency ’08, Fellowship ’11, MPH ’12) (picture attached from a recent trip hiking in Ireland). Also in September I was made head of text research at the Johns Hopkins Human Language Technology Center of Excellence (HLTCC). Later in the year I was given a cross-appointment as an Associate Research Professor in the Department of Cognitive Science, in addition to my existing appointment in Computer Science. (photo: vandurme.jpg)

Zaki, Mohammed (PhD ’98)—We are pleased to announce the publication and availability of our textbook on data mining and data science.

Data Mining and Analysis: Fundamental Concepts and Algorithms

Mohammed J. Zaki and Wagner Meira, Jr. Cambridge University Press, May 2014

Zhang, Xiao (PhD ’10)—Our second boy, Derek, was born in Jan. 2014. Now my hands are full with Sean and Derek. :)

VanDurme, Ben (BS ’11, PhD ’09)

Recent PhDs

Marzieh Bazrafshan

Semantic Features for Statistical Machine Translation

MS, San Francisco, CA

Chu

Intelligent Prompting Systems for People with Cognitive Disabilities

Nokia Communications

Luke Dallessandro

Preserving the Appeal of Transactional Programming

Indiana University

Elif Eyigoz

 Morphology Modeling for Statistical Machine Translation

IBM, Watson Labs, Austin Texas

Lichang Feng

 Learning Effective Grammar Rules for Machine Translation

Google

Jonathan Gordon

Inferential commonsense knowledge from text

USC Information Sciences Institute

Mehdi Hafeszi Manshadi

Dealing with Quantifier Scope Ambiguity in Natural Language Understanding

Google

Tzvadir Papali

Exploiting Constraints, Sequential Structure and Knowledge in Markov Logic Networks

Google

James Park

 Managing and Exploiting Flash-based Storage for Data-intensive Systems

Nvidia

Xiaoye Xiang

A Higher Order Theory of Locality and Its Application in Multicore Cache Management

Twitter

Hongzhou Zhao

 Application-directed Cache Coherence Design

Xilinx
I'm Brandeis Hill Marshall, a science, technology, engineering, and mathematics woman of color faculty—a Black woman in computing. Now, in shorthand (aka, acronyms), I'm a STEM WOC faculty; e.g., a BWiC. The (academic) life of a BWiC faculty is, well, full of LOL, OMG, and WTH moments that are shared here. The csdoctorsister moniker was selected to not only represent me as an individual but also as the growing faction of PhD CS Black females. A close friend (yes, another BWiC) and I use the term of endearment "doctor-sister" or "doctor-sis" frequently. Since blk-cs-doctor-sister is too clunky, I chose csdoctorsister to succinctly capture all these dimensions.

I graduated, but no one could name another), and I am the first Black woman to earn a PhD @ RPI (I asked when I verify?), first Black woman to earn her BS in CS @ UofR (Marty can you confirm?), first Black woman to earn promotion and tenure in Purdue's CoT. In short, I'm Brandeis Hill Marshall, a science, technology, engineering, and mathematics woman of color faculty—a Black woman in computing.

I'm also graduate and undergraduate students.

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Since obtaining promotion and tenure, I am more outspoken. I have a sense of clarity about my role as an instructor, scholar, and steward of computing. The significance of this accomplishment I wrote about in a blog post: http://csdoctorsister.blogspot.com/2014/04/tenured-bwic.html. In short, I made history again. #ThisIsEpic #TenuredBWIC (I believe I was the first Black woman to earn her BS in CS @ UofR (Marty can you verify?), first Black woman to earn a PhD @ RPI (I asked when I graduated, but no one could name another), and I am the first Black woman to earn promotion and tenure in Purdue's CoT.

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Abraham, Sunil ‘00—My current employer is Stifel Financial. I am a technology investment banker in Baltimore. My second child, a daughter, was born on May 15, 2014.


Balconi, Charles ‘03—I’ve been working for Siemens PLM Software for nearly 10 years, though the company name has changed a few times during that time. I basically support and customize CAD software and CAD data management software for some of our medium to large enterprise customers. The biggest change would certainly be that my wife and I had our first child, Nathan, in August last year.

Bhasker, Prakash ‘13—I am currently working at Intel in the research department.

Bhople Plaisier, Seema ‘04—I have had a second daughter! Sonia Belle Plaisier, now 8 months old, sister to Aashna Lynn Plaisier, now 4 years old. I am taking care of them full time now, though I am still consulting with Dr. Delphine Lee at John Wayne Cancer Institute in Santa Monica, CA. Until Sonia was born, I was working with her lab part time doing bioinformatics and gene expression analysis. Since then I have shifted my scientific efforts to a new audience— I have started an informal preschool science class from my home. We have done fun and interactive chemistry experiments such as making acid-base volcanoes and faux lava lamps using oil and colored water. We have also explored the five senses (biology) and built sculptures out of toothpicks (engineering). It has been so rewarding for everyone involved.

Bodek, Haim ‘95—I’m currently working with the technical staff in R & D, Salesforce.com.

Boku, Andy ‘02—I am currently the CTO at Hone, Inc. http://gohone.com. Hone is a small startup in the advertising and data space that I founded with my wife Natalie and I got married on June 9, 2012.

Bodek, Haim ’95—I don’t even know where to begin. Maybe the place to start is this documentary about my campaign to reform the US stock market: https://www.youtube.com/watch?v=GEAGdwHXfLQ. Here’s to start is this documentary about my campaign to reform the US stock market: https://www.youtube.com/watch?v=GEAGdwHXfLQ. Here’s my scientific efforts to a new audience— I have started an informal preschool science class from my home. We have done fun and interactive chemistry experiments such as making acid-base volcanoes and faux lava lamps using oil and colored water. We have also explored the five senses (biology) and built sculptures out of toothpicks (engineering). It has been so rewarding for everyone involved.

Burks, Andy ’03—I am currently working at Intel in the research department.


Christophers, Ian ‘10—I am still working at the startup I cofounded, analyzics. We raised a seed round in early 2014 and have moved in to a new space in Mountain View and have also hired two employees. Doing our best to help healthcare.

Clubb, David ‘06—My current employer is Chartboost, in San Francisco.

Douglass, Scott ‘97—A little over two years ago Symantec bought Odyssey Software (and me with it). Last fall, they shut down the office here but offered to relocate me, which I declined, then offered a remote job, so now I’m working out of my house.

Eisenstat, David ‘06—I graduated with my PhD from Brown University in May 2014. My thesis title was “Toward Practical Planar Graph Algorithms.”

Feil-Seifer, David ‘03—I am an Assistant Professor of Computer Science and Engineering at University of Nevada, Reno.

Feng, Jessica ‘12—I graduated from Fordham University and have started my new job at Citrix.

Ferraro, Frank ‘11—I married Erin Sherman on December 28th, 2013, in Schenectady, NY. I just finished my third year as a PhD student at Johns Hopkins University working on computational and event semantics.

Fong, Warren ‘04—I work at Memorial Sloan Kettering Cancer Center. About a year after graduation I switched to radiation physics due to an internship I got at Mskcc. They soon hired me after and I have been a radiation dosimetrist for the past 10 years and soon to be radiation physicist. I am finishing my part time masters of science in Medical Physics at Columbia University this year.

Frankel-Goldwater, Lee ‘06—I’m currently working with the Sustainability Laboratory, and heading to Costa Rica to co-lead the Global Sustainability Fellows Program. Recently, I taught myself some web development skills and have been creating sites for NGO’s on the side. I’m also doing some research for a UN paper in Brazil this summer towards “Bridging the Digital Divide in Developing Regions.”

Freidman, Jason ‘07—I left Google a few months ago to join the fine folks of Periscope, (’07 grads Tom O’Neill & Harry Glaser’s company). Things have been pretty great on that front, having a good time and signing up more customers, and building awesome software!

Frisken, Steven ‘13—I am transferring from GWU to Cornell for my PhD. I’ve just submitted a paper for review with my advisor and another co-author a few weeks ago, but no news yet on whether it will be accepted to the conference or not.

Fu, Tao ‘13—I just finished two thirds of the program at Cornell. This summer, I did an internship with an asset management firm on the Wall Street. I will resume my study in September and finish around December this year.

Goldstein, Greg ‘01—I recently finished my first year in the Computational Science and Engineering program at Harvard. I’m still working at iXel LLC in Cambridge.

Gorenstein, Aaron ‘11—I decided to graduate from UW-Madison with almost no MSc in CS rather than continue for a PhD. I’m now a SDE at Microsoft, working on the back-end compiler optimization team in Visual Studio.

Hanson, Edith ‘12—Iosh Pawlicki ‘12 and I were married on July 5, 2014. I’m starting a graduate program at Northwestern University for a Masters in Teaching.

Hardesty, Neal ‘96—I am a principal member of the technical staff in R & D, Salesforce.com.

Heavey, Brendan ‘02—I am getting married in October to a girl I met during grad studies at UBuffalo. I’m buxom and I’m doing my best to teach her how to juggle.

Hoa, Brian ‘12—I am working as a programmer/ software developer at Worldwide Environmental Products.

Hughes, Eric ‘07—I currently work for Novetta Solutions developing in C#, previously in Java and Ruby. I was married on June 29, 2014. In my spare time, I’ve been doing some community theatre, notable past shows include “Les Miserables” and “Next to Normal”.

Isman, Michael ‘04—Since last year I got married and bought a house, still living in MA and still at Uberense.

Jackson, Jonathan ‘03—I am working for Fitbit, Inc.

Kim, Brian ‘04—I am currently working at Catalog Spree, Los Altos, CA.

Kimball Schools, Erin ‘04—After having moved to the Netherlands four years ago for my job, I have since bought a house and married the most wonderful man, Sander. While the past years have been focused on learning to speak Dutch, experiencing different cultures, and
traveling all around Europe, the next adventure has just started with the birth of our first child, Brady, on June 28th! He is a beautiful healthy boy that we could not be happier with! We'll just have to wait to see how long it takes before he picks up my old programming books.

Koller, Thomas '04—This year I joined Apple as a Research Scientist, working on Siri.

Landier, Sean '08—finished my MS in CS at University of Missouri last month and I am about to start my PhD in Bioinformatics at the University of Missouri this coming Fall I got married in Sept. 2012.

Liu, David '07—I successfully defended my PhD in Computer Science from Washington University in St. Louis. The topic was “Contextualized Robot Navigation” I’ll be teaching classes in the Wash U CS department for the next year.

Luis, Cristina '01—I am working at the Norwegian Meteorological Institute (Norway) as a research scientist in the Ocean and Sea Ice section. I mostly occupy myself with remote sensing of the Arctic to determine sea and ice surface temperatures, data that is then used by climate researchers and modellers. The job involves a lot of programming, making it a good fit for the Earth/computer scientist.

Mierz, Evan '04—finished my doctorate in music from UC Santa Cruz in December 2013. My daughter, Lucy, was born on Dec. 2, and I defended my dissertation on July 26!

Miller Haddix, Cynthia '99—I am now working as a Software Engineer at KIX (International Gaming Technology) in Reno, NV.

Mueller, Daniel '06—recently started as a Software Engineer at Twitter in Boston.

Norina, Christopher '09—I'm in California in the Navy! I fly in F/A-18 Super Hornets, and I'm a little more than halfway through my "sea tour" here. I've been doing training (most recently spent time with the Marines learning to become a JTAC—Joint Terminal Air Controller). I've spent a few months now on the USS Ronald Reagan (an aircraft carrier) and actually am leaning to go back out there for two months on a "Rim of the Pacific" exercise. We are slated to head to Hawaii twice, and that is actually am leaving to go back out there for two months on a "Rim of the Pacific" exercise. We are slated to head to Hawaii twice, and that is

Oisiek, Eric '07—I have earned a MS in Philosophy in Computer Science. I work full time at Factual Research Systems in Norwalk, CT. I'm still working part time towards a PhD. and I'm engaged to Kristen Moore (UR '08).

Oussayef, Karim '04—I have switched jobs and I'm now working at a patent litigation boutique called Deimaris LLP.

Panzarella, Dan '10—I got married on August 10, 2013 to Hannah Attard. I'm working as a software engineer at Blue State Digital.

Pawlicki, Joshua '12—I was married to Edith Hanson '12 on July 19th and is currently working at Google in Kirkland WA.

Pearson, Jonathan BS '05/MS '07—I'm now working at Google in NYC.

Pritthviraj, Preethum '05—I'm currently working at LifeCare Ambulance (Remote IT Support) and Blue Eskimo (my own Company). Last year, my son was born 16 weeks premature, but he's now turning 1 and doing great! I've become a stay-at-home dad and working from home in my spare time on Android Apps and the like. I'm also doing some volunteer work as a Paramedic.

Rau, Alex '99—I am Managing Director / Solution Architecture at AXA US.

Richer, Isaac '11—I am now an ECE PhD student at UR in Engin Ipek's lab.

Rotondo, Mike '07—I graduated in 2012 with a Masters of Arts in Music, Science and Technology (MAAMST) from the Center for Computer Research in Music and Acoustics (CCRMA) at Stanford. After that I did an artist residency at the Children's Creativity Museum, and am currently making creative software for kids at Launchpad Toys. I will be married on July 28!

Schmid, Jonathan '03—Since April of this year, I have left the Department of Defense and now work at LewisX (a Business Software Engineer using Oracle ADF and RESTful web services in Raleigh, NC. I took this job in order to gain more experience with both front and back-ends of today's service driven web platforms. I also hope to launch a Facebook app soon for a visualization engine called Amble. (www.amble3d.com)

Silverman, Michael '08—I'm still working on my company, Silverware Games, Inc. So that's where I'm employed. I had a game featured in the Apple app store, "Don't Shoot Yourself" and I'm working to bring it to other platforms. Also I'm right about to do my first release of a racing game for PC called "Speedway Heroes."
Thank you to all donors who have contributed to the University of Rochester in the last year. If you are interested in donating to the department or the University, please go to the alumni website and look for “Online Giving.”

www.rochester.edu/college/giving/