

Significant BITS

Newsletter of the
Department of Computer Science



Department welcomes five new faculty

We are pleased to announce that five new tenure-track faculty will join our CS department as Assistant Professors. Yuriy Brun, Evangelos Kalogerakis, Alexandra Meliou, and Daniel Sheldon will join the department in September, and Arjun Guha will arrive in September 2013. The new faculty have research strengths in bioinformatics, computer graphics, data management, programming languages, and software engineering.

“We had a terrific recruiting year,” Department Chair Lori Clarke said. “In each of the areas where we were looking for faculty, we were able to attract our top candidate. All five of our new hires have impressive credentials and should really help expand the research and teaching mission of the department.”

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Real-time, scalable data analytics

Today, data is being generated at an unprecedented rate due to the new ways that we gather information, for example, from sensing devices that monitor our built and natural environment, from software that records system and user activities, and from human-initiated data sources such as blogs and social networks. However, raw data, such as signal data returned from sensing devices and clicks collected from web sites, is of limited use by itself. The value of data is realized only when it is transformed into meaningful and actionable information, such as severe weather events, system anomalies, or user behavior patterns.

“The new science of large-scale data analytics (a.k.a. “Big Data”) carries the promise to enable big leaps forward in science, business, and society at large in the next few decades,” says Associate Professor Yanlei Diao.



Yanlei Diao

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OAA Award recipients celebrated



The 2012 Outstanding Achievement and Advocacy (OAA) Award recipients (shown l. to r.), Elliot Soloway, Justin Borgman, Frederick W. Byron Jr., Claire Cardie, Edmund Durfee, Andrew Merlino, Ken Schmidt, Henning Schulzrinne, and Ted Selker, were celebrated during the fourth annual OAA banquet held on May 4, 2012. See page 12 for details.

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Lori A. Clarke

The department had an incredibly successful recruiting year. With the retirements of Professors Rick Adrion, Wendy Lehnert, and Victor Lesser last year and the very recent retirement of Professor Andy Barto, the department was looking for faculty in several different research areas. Under the leadership of Associate Professor Emery Berger, the recruiting committee decided to invite a small number of candidates in each of our priority areas.

We were pleased that the candidate pool was particularly strong this year, with many of the candidates having completed postdoctoral positions. After considerable discussion, which is the UMass Amherst way, we made offers to five candidates—and had five candidates accept! The article on new hires describes the new faculty and their research interests.

Although we are very sad to see him retire, the department wishes Andy Barto the very best. Andy joined the faculty in 1977, first as a post doctoral researcher working with Professor Michael Arbib, and then as a regular faculty member in 1982. Andy has had an incredible career! On July 6th, the department hosted a workshop to recognize and honor his many accomplishments. The workshop was organized by Professor Sridhar Mahadevan along with Professor Satinder Singh (Ph.D. '94) from the University of Michigan. Many of Andy's colleagues and former students attended, giving presentations about his research accomplishments, his mentoring, and leadership in the field. It was a wonderful and well-deserved tribute.

Andy is traveling to Italy to work with colleagues for the year, but then will return to UMass Amherst to join our other (semi) retired faculty, Rick Adrion, Al Hanson, and

Victor Lesser, who are continuing to pursue their computing research interests. Andy has also been a tremendous help to me as I transitioned into my first year as chair.

The department is seeing a significant increase in the number of undergraduate students. The number of entering freshman is expected to be over one hundred and fifty (greater than a fifty percent increase over last year). This year the average GPA for our incoming class is about 3.75, a slight increase from past years. Despite concerns about the economy, last year our undergraduates were being aggressively pursued by industry, with just about everyone who was seeking employment having job offers at the time of graduation, and others going on to graduate school.

Another area of growth is our graduate program. We have recently introduced a Professional Master's Degree Program. In the past, except for Baystate Scholars, we expected our graduate students to pursue a Ph.D. degree. This year, just over half of our incoming class is in the Professional M.S. program. Professor James Allan will be the M.S. Program Director, working with Professor Sridhar Mahadevan, the Graduate Program Director, and the rest of the graduate program committee.

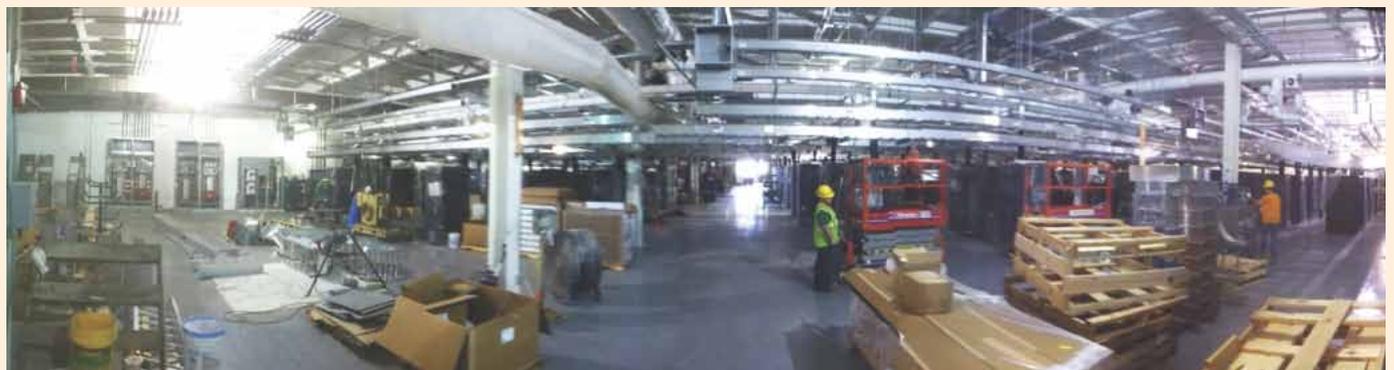
The Massachusetts Green High Performance Computer Center (MGHPCC), www.mghpcc.org, which was described in previous newsletters, is moving forward. This is a multi-university, Massachusetts state government, and industry partnership that will provide state-of-the-art computational infrastructure for data-intensive projects. The building is expected to be completed on time by the end of the year and under-budget (hard to believe).

Finally, plans are also underway for the department to become a School of Computer Science. I thought I would be able to make an announcement in this edition of the newsletter, but, although things are moving forward, it still is not final—look for the official announcement in the next *Significant Bits*.

MGHPCC construction



Construction of the Massachusetts Green High Performance Computing Center (mghpcc.org) in Holyoke, MA is slated for completion at the end of the year. Department faculty involved in the project planning include Distinguished Professor Jim Kurose and Professors Rick Adrion and Prashant Shenoy. Partners in the project include Boston University, Harvard University, MIT, Northeastern University, UMass, Cisco Systems, EMC, and the Commonwealth of Massachusetts.



DATA ANALYTICS - - - - - cont. from page 1

However, “the sheer volume of data, the need to analyze it in real-time, and the complexity of data processing needs, are raising many challenges in designing methods to transform data into meaningful information,” says Diao. To address these challenges, her research explores an overarching theme of *real-time, scalable data analytics* by integrating algorithms, statistical analysis, and systems research.

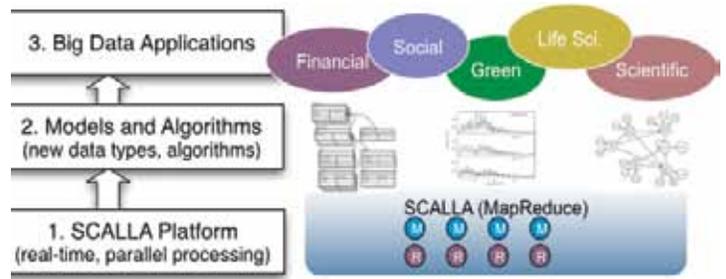
To support real-time, scalable data analytics, “we first need an infrastructure that can perform massive-scale real-time data processing,” says Diao. Recently, big data solutions in industry have developed cluster computing infrastructures, e.g., MapReduce systems that can scale to enormous datasets. However, they are designed for batch processing over a large dataset stored on disk, which can incur hours of delay to return the desired information from the time the relevant data arrives at the system.

Diao and her colleagues are developing a new analytics platform, called Scalla, that builds on MapReduce-style parallel processing and adds the ability to perform incremental, real-time processing as data arrives into the system. The new platform adds “revolutionary” capabilities to existing MapReduce systems because it can return timely results and insights while scaling to enormous datasets. Results of Diao’s work show that for real-world workloads, like web page click analysis, Scalla can return answers much earlier than existing MapReduce systems, while providing remarkable performance benefits, with up to three orders of magnitude reduction of I/O.

Another thrust of Diao’s research is to develop models, algorithms, and techniques on top of the above platform to support a wide range of analytical tasks. “The platform only enables us to analyze data efficiently, while models and algorithms actually perform intelligent data analysis and hence are the smarts,” says Diao.

She has recently examined uncertain data management in depth. Traditional database systems are fundamentally based on a “closed world” assumption: each database is assumed to be complete with data that represents the truth. This assumption no longer holds for the data produced from new data sources such as sensing devices and scientific measurements, because the data is inherently incomplete and noisy. Given high-volume uncertain data, Diao’s research focuses on capturing data uncertainty from the initial input, to intermediate processing, to final output, by devising new models and processing algorithms. Her research further employs optimization to perform processing and analysis at the data arrival rate. A case study in the CASA weather monitoring system showed that for a 15.7 minute trace of a tornadic event, Diao’s work can reduce the number of errors in the system output by two orders of magnitude, while reducing the data processing time from 75 minutes to 10 minutes, which is now shorter than the data collection time of 15.7 minutes. “This means that we have the potential to capture tornadoes in real time in the future while making fewer mistakes in our prediction of a tornado with its location and speed,” says Diao.

As application information needs grow, there is also increased demand to consider data beyond the traditional



Three-tier architecture of a real-time, scalable data analytics system

relational model, in particular, to model data as sequences, strings, or trees for new processing tasks. Addressing such needs requires new research in query languages, processing algorithms, and optimizations for high-performance computing. Diao’s research to date has addressed complex event processing based on a sequence model, deep packet inspection based on a string model, and XML stream processing based on a tree model. Her work has resulted in a number of publications with over 200 citations and software releases with over 1,000 downloads.

All of the above work has enabled Diao to establish external collaborations and develop new data-intensive applications. Besides hazardous weather monitoring and computational astrophysics, she has recently started to work with Harvard Medical School on genetic data analysis. As advancement in DNA sequencing is transforming the field of genomics into a new paradigm of data-intensive computing, the extremely high volumes of genomic data, high error rates in the data, and the complexity of data processing needs are raising many new challenges. With recent seed funding from MGHPCC, Diao’s team is exploring computational methods, including algorithms, error handling techniques, and parallel processing techniques, to assist in diagnosis and treatment of patients and ultimately help realize the vision of “personalized medicine.”

Diao received her Ph.D. in Computer Science from the University of California, Berkeley, in 2005, and her B.S. from Fudan University in 1998. She was a recipient of an NSF Career Award and an IBM Scalable Innovation Faculty Award, and was a finalist of a Microsoft Research New Faculty Fellowship. She spoke at the Distinguished Faculty Lecture Series at the University of Texas at Austin and is an associate editor of *PVLDB 2013*.

We’re on Facebook and LinkedIn

Keep up-to-date on the department’s latest events and announcements. Join us on

Facebook (group name: UMASS CS)
and

LinkedIn (group name:
UMass Amherst Dept. of Computer Science)

NEW FACULTY — — — — — continued from page 1



Yuriy Brun

Yuriy Brun joins the department in September as an Assistant Professor. His research is in software engineering — ensuring complex software systems function properly — with a partial emphasis on reliability and privacy in distributed systems.

“To ease building software systems,” Brun says, “we must understand the processes developers follow and create tools and techniques that help model, design, and implement them.” The long-term goal is to learn how to

manage behavior: from helping developers understand that behavior, to empowering systems to observe and alter their own behavior. Brun adds, “Wouldn’t it be great if we could build self-adaptive systems? Ones that can adapt their own behavior to achieve high-level goals in dynamic, constrained environments?”

Brun comes from the University of Washington, where he was a Computing Innovation postdoctoral fellow, funded by a National Science Foundation (NSF) grant to the Computing Research Association (CRA). He received a Ph.D. in Computer Science from the University of Southern California in 2008, as an Andrew Viterbi fellow, and an M.Eng. in Electrical Engineering and Computer Science from MIT in 2003. His doctoral research was a finalist in the Association for Computing Machinery (ACM) doctoral dissertation competition.

“I am extremely excited to move back to Massachusetts,” says Brun. He immigrated to the Boston area from Moscow, Russia in 1992. “New Englanders are special people. I’m an avid Red Sox fan and have missed them while living in Los Angeles and Seattle. It’s great to be back!”



Evangelos Kalogerakis

In September, **Evangelos Kalogerakis** will join the department as an Assistant Professor. His research deals with the development of the next generation computer graphics techniques that will enhance human creativity and automate complex visual content processing tasks for novice users, scientists, and artists.

“I am very excited to develop algorithms and tools that allow users to quickly and easily create, edit, customize, texture, animate, and artistically render three-dimensional content for virtual worlds,

computer games, films, architecture, computer-aided design, and information visualization” says Kalogerakis.

Kalogerakis is particularly interested in developing machine learning algorithms for computer graphics. “Automating complex geometry processing and 3D modeling tasks requires algorithms that understand shapes, their structure and deformation modes. Machine learning will play a key

role in the development of such algorithms” says Kalogerakis. During his doctoral and post-doctoral studies, he introduced machine learning algorithms for complex geometry processing and artistic rendering tasks, such as shape segmentation and labeling, shape synthesis, assembly-based modeling, and non-photorealistic rendering.

“I am very delighted to join the department of Computer Science at UMass Amherst. The research taking place in the department is very exciting, particularly in the areas of machine learning, vision, and graphics, which interest me the most. I look forward to collaborating with other faculty members and students.”

From 2010 to 2012, Kalogerakis was a Postdoctoral Researcher at the Computer Graphics lab of Stanford University. He earned a M.S. and Ph.D. in Computer Science from the University of Toronto in 2006 and 2010, respectively, and a BEng in Electronics and Computer Engineering from the Technical University of Crete in 2005.

Kalogerakis received the NSERC (Natural Sciences and Engineering Research Council of Canada) Alexander Graham Fellowship in 2009. He also received the international EPFL Dimitris N. Chorafas Award for his Ph.D. work as well as fellowships from the Ontario Ministry of Education, the Bodossaki Foundation, and the Greek State Scholarships Foundation.



Alexandra Meliou

Alexandra Meliou is joining the department in September as an Assistant Professor. Her research is in the area of data and information management, with an emphasis on provenance, causality, and reverse data management.

“We use, generate, and share data at an unprecedented scale. It is often essential to reverse engineer changes that happen to this data, in order to explain observations and behaviors, audit systems for violations, and correct errors at their origins,” says Meliou. One applica-

tion of her research intersects database systems and business intelligence applications. “I want to extend the capabilities of modern database systems to support business decisions and strategy planning queries, which commonly involve optimization problems over large data.”

Prior to joining UMass Amherst, Meliou was a Postdoctoral Researcher at the University of Washington. She received an M.S. and a Ph.D. in Computer Science from the University of California, Berkeley in 2005 and 2009, respectively, and a B.S. in Electrical and Computer Engineering from the National Technical University of Athens in 2003. Meliou received a Siebel Scholarship in 2008, and regularly serves on the program committees of the leading database conferences.

“The department has outstanding faculty culture, which promises stimulating collaborations with brilliant researchers and talented students,” says Meliou. “I am very excited to become part of such a lively academic community.”

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Daniel Sheldon

Daniel Sheldon joins the department in September as an Assistant Professor. His appointment is a Five College Consortium joint faculty position shared by UMass Amherst and Mount Holyoke College. His research interests are in computational ecology and environmental science and machine learning.

“I believe that massive data sets can change the way we understand and make decisions about the environment, but we haven’t built the algorithmic toolkit to realize this opportunity,” says Sheldon. “I want to change that.” He seeks to answer foundational questions (what are the general models and principles that underlie big data problems in ecology?) and also to build applications that transform large-scale data resources into scientific knowledge and policy. Methodologically, Sheldon’s primary interests are machine learning, probabilistic inference, and network modeling.

Sheldon investigates diverse topics that combine computing and the environment. He is currently leading the NSF-funded *BirdCast* project to develop novel machine learning methods for modeling and forecasting bird migration. *BirdCast* is based on his work on *Collective Graphical Models*, a new formalism for inference and learning using aggregate data. He also develops algorithms to optimize land acquisition for endangered species conservation, and machine learning algorithms to extract biological patterns from weather radar data.

“It is a great joy to work in a subject area that is directly relevant to science and society, and, at the same time, possesses difficult technical problems that need the attention of computer science researchers,” says Sheldon.

Most recently, he was a Postdoctoral Fellow in the School of Electrical Engineering and Computer Science at Oregon State University, where he held an NSF Fellowship in Bioinformatics. Sheldon received a Ph.D. in Computer Science at Cornell University in 2009 and an A.B. in Mathematics from Dartmouth College in 1999. Between 1999 and 2004, he worked at Akamai Technologies and DataPower Technology.

“I’m delighted to step into this unique position,” says Sheldon. “The UMass Amherst CS department is an outstanding environment for research and collaboration, and I will enjoy the added pleasure of teaching at Mt. Holyoke, which is an amazing liberal arts college.”

Arjun Guha will join the department in fall 2013. He will receive his Ph.D. in Computer Science at Brown University in 2012 and will be a Postdoctoral Researcher at Cornell University prior to joining UMass Amherst. His research interests lie at the intersection of programming languages and security. More details on Guha’s research will be highlighted in an upcoming issue.



Arjun Guha

Robert Sproull named to adjunct faculty



Robert Sproull was recently appointed as an Adjunct Professor in the department.

Dr. Sproull retired in 2011 as Vice President and Director of Oracle Labs, an applied research group that originated at Sun Microsystems (acquired by Oracle in 2010). Before joining Sun in 1990, he was a principal with Sutherland, Sproull and Associates, an Associate Professor at Carnegie Mellon University, and a member of the Xerox Palo Alto Research Center.

He is currently the Chair of the U.S. National Academies Computer Science and Telecommunications Board, having served in this position since 2009. He is also on the Computing Community Consortium (CCC) Council. In June, Dr. Sproull completed a six-year term on the National Academy of Engineering Council.

He is a Fellow of the American Association for the Advancement of Science and the American Academy of Arts and Sciences. Sproull received his M.S. and Ph.D. in Computer Science from Stanford University and an A.B. in Physics from Harvard College.

Dr. Sproull gave the featured address during the department’s 4th annual Outstanding Achievement and Advocacy Awards Banquet held in May.

Nominate a fellow alum

Nominations are now being accepted for the 2013 Outstanding Achievement and Advocacy Awards. Nominations should be sent by email to Leeanne Leclerc (leclerc@cs.umass.edu). Please include the information below with your nomination:

- The name, title, email, phone number, and organizational affiliation of the nominee,
- The name(s), email(s), and phone number(s) of the nominator(s),
- A brief biography summarizing the nominee’s career (no more than one page),
- A statement of the nominee’s outstanding achievements in the award category,
- A very brief (no more than 25 word) suggested citation to be written on the OAA winner’s award plaque.

Details on the 2012 event can be found at www.cs.umass.edu/oaa2012

Clarke selected for ACM SIGSOFT Outstanding Research Award

Professor Lori Clarke accepted the 2012 Association for Computing Machinery Special Interest Group on Software Engineering (ACM SIGSOFT) Outstanding Research Award in recognition of her “significant and lasting software engineering research in the areas of software testing, software development environments and program analysis.” This lifetime achievement award was announced during the 34th International Conference on Software Engineering (ICSE) held in Zurich, Switzerland in June.

The award, the highest for research contributions in software engineering, is presented annually to “an individual or individuals who have made significant and lasting research contributions to the theory or practice of software engineering.”

Clarke was one of the primary developers of symbolic execution, a technique used to reason about the behavior of software systems and to generate test data. She made contributions in the areas of software architecture and object management.

From her 1975 doctoral work in symbolic execution that led to an explosion of interest in the topic in the early 2000s, to her current work on detecting errors, inefficiencies, and vulnerabilities in medical processes, Clarke has made important and lasting contributions that span many areas of software engineering, says Matthew Dwyer (Ph.D. '95 and former advisee of Clarke's), Henson Professor of Software Engineering at the University of Nebraska.

One such example of the influence of Clarke's research is her work on dependence analysis. She and her student, Andy Podgurski (Ph.D. '89; now a professor at Case West-

ern Reserve University), were the first to formalize program dependences. In particular, they were the first to identify the distinction between weak and strong dependences which has turned out to be crucial in extending dependences to concurrent programs. “Her work on program dependences is highly cited and is considered a classic paper, and required reading, in software engineering,” notes Dwyer.

In a 2008 keynote address, Clarke outlined a broad and innovative program of research aimed at bringing the power of software engineering approaches to bear upon problems in the area of medical safety. “Her ideas are showing that her work on testing and analysis of software systems are equally applicable and effective in their application to complex human-intensive systems, such as medical systems,” says Dwyer.

Clarke is the co-director of the Laboratory for Advanced Software Engineering Research. She is currently the chair of the department and a board member of the Computing Research Association's Committee on the Status of Women in Computing Research (CRA-W). She is a Fellow of the ACM and of the IEEE, as well as a former vice chair of the Computing Research Association (CRA) and co-chair of the CRA-W. She received a 2011 UMass Amherst Chancellor's Award for Outstanding Accomplishments in Research and Creative Activity, a 2009 College Outstanding Faculty Service Award, a 2004 Distinguished Engineering Alumni Award from the University of Colorado, Boulder, the 2002 ACM SIGSOFT Distinguished Service Award, a 1993 University Faculty Fellowship, and a 1991 UMass Amherst Chancellor's Medal.

Eliot Moss on team chosen for SIGPLAN Software Award



Eliot Moss

ACM SIGPLAN (Association for Computing Machinery Special Interest Group on Programming Languages) selected the Jikes RVM (Research Virtual Machine) project for the 2012 Programming Languages Software Award. Professor Eliot Moss is one of the 32 people named in the award nomination as significant contributors to the Jikes RVM project.

Jikes RVM is an open source Java virtual machine project that has supported research on Java, Java run-time compilation and optimization, garbage collection, and Java virtual machine technology. “The high quality and modular design of Jikes has made it easy for researchers to develop, share, and compare advances in programming language implementation,” notes the award citation.

The UMass Amherst team, led at the time by Moss, Steve Blackburn (former department PostDoc; now on the faculty at the Australian National University), and Kathryn McKin-

ley (former Associate Professor in the department; now faculty at the University of Texas at Austin and on the staff of Microsoft Research), was the first to obtain a source license to Jikes RVM outside of IBM and the first to contribute new technology to the project from outside the original development team.

“Our primary contributions have related to garbage collection technology and performance measurement methodology and benchmark suites,” says Moss. “We further led the effort, with the IBM team, to convert Jikes RVM to an open source project, and we continue to use and extend Jikes RVM, including via Google Summer-of-Code projects.”

Moss, along with Timothy Richards (UMass Amherst faculty) and Tony Hosking (UMass Amherst Ph.D. '95, now on faculty at Purdue) recently received a National Science Foundation grant to extend Jikes RVM to be a better platform for emerging parallel languages.

The award was presented at the SIGPLAN Programming Language Design and Implementation (PLDI) Conference held in Beijing in June. According to SIGPLAN, it is given “to an institution or individual(s) to recognize the development of a software system that has had a significant impact on programming language research, implementations, and tools.”

Moss receives Edsger W.Dijkstra Prize in Distributed Computing

Professor Eliot Moss and co-author Maurice Herlihy were selected to receive the prestigious 2012 Edsger W. Dijkstra Prize in Distributed Computing for their 1993 paper “Transactional Memory: Architectural Support for Lock-Free Data Structures.”

The award was presented at the Association for Computing Machinery (ACM) Symposium on Principles of Distributed Computing (PODC) held in Portugal in July. The prize is sponsored jointly by ACM PODC and the European Association for Theoretical Computer Science (EATCS) Symposium on Distributed Computing (DISC).

According to PODC, “the Edsger W. Dijkstra Prize in

Distributed Computing is awarded to outstanding papers on the principles of distributed computing, whose significance and impact on the theory or practice of distributed computing have been evident for at least ten years.” Along with Moss and Herlihy, the prize committee also selected Nir Shavit and Dan Touitou to receive the award for a 1995 paper on transactional memory.

The PODC site noted: “These papers established the abstraction of Transactional Memory, which has fundamentally changed parallel computing both in its theoretical foundations and in its practice. ...In terms of fostering research, transactional memory has become a truly transformative idea.”

McGregor named Lilly Teaching Fellow



The UMass Amherst Center for Teaching & Faculty Development named Assistant Professor Andrew McGregor as a Lilly Teaching Fellow for the 2012-2013 academic year. The Lilly Fellowship is a competitive award program, established in 1986, that enables promising junior faculty to cultivate teaching excellence in a special year-long collaboration. Previous

Lilly Fellows include twelve members of the department’s faculty.

For his Lilly project, McGregor will develop an undergraduate course that will focus on algorithmic ideas that have had a big impact in the real world.

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Don Towsley selected for ACM SIGMETRICS Test-of-Time Award



Distinguished Professor Don Towsley received the 2012 Association for Computing Machinery Special Interest Group on Performance Evaluation (ACM SIGMETRICS) Test-of-Time Award for his 2002 paper “Network tomography on general topologies” written with co-authors Tian Bu (Ph.D. ’02), Nick Duffield, and Francesco LoPresti.

Towsley received the award in June at the joint SIGMETRICS/Performance 2012 Conference held in London, United Kingdom.

According to the ACM SIGMETRICS site, “the ACM SIGMETRICS Test of Time Award recognizes an influential performance evaluation paper whose impact is still felt 10-12 years after its initial publication.”

Gerome Miklau receives Alberto O. Mendelzon Test-of-Time Award

Associate Professor Gerome Miklau received the Alberto O. Mendelzon Test-of-Time Award for the 2002 paper “Containment and Equivalence for an XPath Fragment,” written by Miklau and co-author Dan Suciu.

The award was presented in May at the the Association for Computing Machinery (ACM) Special Interest Group on Management of Data (SIGMOD)/ Principles of Database Systems (PODS) Conference held in Scottsdale, Arizona.

The ACM PODS Alberto O. Mendelzon Test-of-Time Award is awarded each year to a paper or a small number of papers published in the PODS proceedings

ten years prior that had the most impact in terms of research, methodology, or transfer to practice over the intervening decade.

According to PODS, “the paper studied static analysis problems for XPath, a query language at the core of processing XML documents and XML document databases. ... this work initiated a fruitful line of research on the static analysis of XML query languages that brought together researchers from database theory and automata theory.”



UMass Science & Technology grants awarded

Professors Yanlei Diao, Deepak Ganesan, Rod Grupen, and Prashant Shenoy were awarded grants from the President's Science and Technology Initiatives Fund announced June 18 by UMass President Robert L. Caret.

The fund provides seed grants to accelerate research activity across all five campuses and position researchers to attract larger investments from external sources to expand the scope of their projects.

Diao and Shenoy's project, Big Data Informatics Initiative (BDI2), focuses on areas such as detecting financial fraud in large-scale securities data, correlating video-audio surveillance data to spot trends or anomalies in real time; and smart-meter data processing by energy utilities. Collaborators include the Massachusetts Green High Performance Computing Center, Holyoke Gas & Electric, MIT, and commercial partners such as EMC, Nokia, GE Global Research and Yahoo! Research.

Ganesan and Sherry Pagoto of the Medical School were awarded an S&T grant for mHealth-based Behavioral Sensing & Interventions, a center that will research mobile health technologies such as wearable jewelry and smartphones on patients with a variety of health conditions, including an initial study to develop wearable sensor software with real-

time data analysis and patient feedback. Partners include the Massachusetts Department of Public Health, the Massachusetts Green High Performance Computing Center, and mobile health device companies such as Jawbone/Aliphcom, Rock Health, Nexercise, Runkeeper, Microsoft Research, IBM, and Google.

Grupen is collaborating on the New England Robotics Validation and Experimentation (NERVE) Center at UMass Lowell. The center will provide robotics companies and research institutions with a test course for year-round validation of robots and robotic systems designed by the National Institute of Standards and Technology.

"The science and technology fund advances the work of producing the discoveries and technological breakthroughs that will improve lives, create jobs, and preserve our planet," says Caret. "It supports the ideas and inventiveness of our faculty and fosters a culture of collaboration across all five campuses that attracts investments and underscores our role as an innovation engine for the Commonwealth."

Since 2004, the President's Science and Technology Initiatives Fund has provided \$7.5 million to UMass researchers, which, in turn, has generated \$207 million in funding from outside sources for vital research efforts and led to the creation of nearly 20 research centers on the five campuses.

Woolf and Arroyo are designing virtual tutors for Sailors and Marines

Research Professor Beverly Woolf and Research Scientist Ivon Arroyo recently received one of four awards from the Office of Naval Research (ONR) to develop digital tutoring software for teaching mathematics according to individual students' needs. One goal is to reduce training time and instructor costs while improving the technical skills of Sailors and Marines.

Woolf and Arroyo have been working for several years to create intelligent and emotionally perceptive mathematics tutoring software for grade school children called *Wayang Outpost*. It features a friendly tutor and other animated characters who interact one-to-one with students like a personal teacher. The system uses artificial intelligence to evaluate the students' skills and knowledge in real time, then adjusts to offer each user personalized strategies to address individual knowledge gaps and provide advice for tackling challenging problems.

For the Navy research, the UMass Amherst team will partner with faculty from Worcester Polytechnic Institute to integrate its mathematics tutor, *ASSISTments*, with *Wayang*. Students at Thornton Academy in Maine will use the new system and help to evaluate its effectiveness.

In the first part of the two-phase ONR project, teams are developing adult digital tutors to provide instruction

in science and engineering topics. Woolf says the approaches include developing techniques for creating realistic and supportive curriculum, plus techniques for maintaining students' active engagement.

At the end of the first phase, the four teams will be judged on how well the virtual tutors improved students' knowledge retention, reasoning and problem-solving skills. One or two teams will be selected to move on to the second phase to produce a system that can be used to educate Sailors and Marines.

Rear Adm. Matthew L. Klunder, chief of naval research, says, "I look to these teams of researchers and their unique approaches with intelligent tutoring systems to help the Navy, Marine Corps and our Nation in delivering a steady work force of talented scientists and engineers."



Beverly Woolf

Rick Adrion retires

Professor Emeritus W. Richards (Rick) Adrion retired in fall 2011 after twenty-five years of service within the UMass Amherst Department of Computer Science.

While he is officially retired, many in the department have noted that he seems busier than ever. This academic year, he has been a member of the UMass presidential search committee, continued to serve as the Amherst campus faculty trustee on the UMass Board of Trustees, serves on the Faculty Senate Rules Committee, serves as Principal Investigator (PI) of a National Science Foundation (NSF) Research Experiences for Undergraduates site and continues as the PI for the NSF Computer & Information Science & Engineering (CISE) Broadening Participation in Computing (BPC) Commonwealth Alliance for Information Technology Education (CAITE).

Adrion was chair of the UMass Amherst CS Department from 1986-1994—the longest serving chair in our department’s history, and was instrumental in leading the effort that resulted in our current Computer Science building. He founded and, from 1988-2000, served as president and chair of the board of the Applied Computing Systems Institute of Massachusetts — a corporation designed to transfer technology developed at the University of Massachusetts. Adrion has served several times as a senior manager at the NSF, most recently as a division director and senior advisor in CISE from 1999-2003, where he was instrumental in setting strategic directions for computing research. He also was a founding elected member of the Computing Research Association (CRA) board, and continued to serve on that board for the next ten years.

Previously, he held full-time positions with The University of Texas at Austin, Oregon State University, and the National Bureau of Standards, and he held adjunct, visiting, and/or sabbatical positions at American University, Georgetown University, the University of California, Berkeley, the NSF, and Université de Paris-Sud Laboratoire de Recherche en Informatique.

The use of multimedia technology for teaching and learning, both in the classroom and for distance education, is a major focus of Adrion’s research. He has also been active in the fields of testing, analysis, and verification of complex software systems.

Adrion received a B.S. and M.E.(E) from Cornell University in 1966 and 1970, respectively, and a Ph.D. from the University of Texas at Austin in 1971. He is a Fellow of the ACM and of the American Association for the Advancement of Science (AAAS). He has received distinguished service awards from UMass Amherst, ACM-SIGSOFT and the Computing Research Association. Adrion has served on several federal advisory committees and boards, including NSF/CISE, NSF/CDA, NSF/NCRI, NIH/NLM, NIH/NINDS, NASA/CESDIS, NRC/COSEPUP and the National Superconducting Supercollider.

“Rick has played a key role in building, nurturing and shaping today’s computer science community,” says Distinguished Professor Jim Kurose. “Among these contributions are leadership in the development of the Internet; leadership

in setting strategic directions at the National Science Foundation; leadership in developing a stronger political voice for computer science in national politics; leadership in strengthening the software engineering community; leadership in strengthening, modernizing and invigorating computing and information technology programs in Massachusetts public higher education; and overall service to the computer science community.” A few of these accomplishments are highlighted below.

Adrion was a key force in broadening the Internet from a small network of elite institutions into the major force that continues to reshape our world, added Kurose. In the late seventies when the Department of Defense was restricting ARPANET access to just a few universities, Adrion promoted and gained NSF funding for Theorynet, which allowed computer science theorists around the world to communicate freely on the ARPANET. The increased communication and collaborations that resulted led him to be a strong advocate for CSNET, which provided the impetus and funding for all computer science departments to become connected.

He has also provided valuable leadership to the software engineering community. Adrion served for four years as the chair of the ACM Special Interest Group on Software Engineering (SIGSOFT) and for many more years on various executive and advisory boards. He also was the founder and first Editor-in-Chief of *ACM Transactions on Software Engineering and Methodology (TOSEM)*. Under his stewardship, *TOSEM* grew to become widely regarded as the leading journal in the field.

Adrion has also been a leader in computer science education, particular in Massachusetts. He led the conception, development, and implementation of CAITE – an alliance that designs and carries out comprehensive programs that address under-representation in IT education and the workforce. CAITE focuses on women and minorities, groups that are underrepresented in the Massachusetts innovation economy; that is, economically, academically, and socially disadvantaged residents. Earlier he was the co-director of the Commonwealth Information Technology Initiative (CITI), which developed programs to strengthen, modernize and invigorate computing and technology programs in Massachusetts public higher education. The extremely successful UMass cross-campus IT minor, an effort led by Adrion and deans from engineering and management, grew out of the CITI effort.

“Rick’s contributions to the computer science research community, to the software engineering community, to the University, and to our department have been enormous.” says Professor Lori Clarke, department chair. “I have learned and continue to learn so much from him. We are deeply indebted to him for his many contributions, including the growth and success of the department.”



Andrew Barto retires

Professor Andrew Barto retired in July 2012, after spending over three decades in the Department of Computer Science at the University of Massachusetts Amherst. He joined the department in 1977 as a Postdoctoral Research Associate, became an Associate Professor in 1982, and Professor in 1991. He served as Department Chair from 2007 to 2011. Although retired, Barto will continue to pursue his research as an Emeritus Professor.

Throughout his tenure in our department, Barto maintained a highly visible and productive research career, for which he has received many accolades. His primary research contributions are in the field of machine learning, in particular in *reinforcement learning*, a framework inspired from its study in biology and psychology. “Few researchers are gifted enough, indeed lucky enough, to have inspired the study of a new interdisciplinary research area. Through his leadership, the field of reinforcement learning blossomed into a major area of research, not only within computer science, artificial intelligence, and machine learning, but also within numerous other disciplines, from dynamic programming and operations research, and neuroscience, to robotics,” says Professor Sridhar Mahadevan, Co-Director, with Barto, of the Autonomous Learning Laboratory (ALL).

To celebrate his research career, a workshop was held recently in the department that attracted researchers from a wide spectrum of research fields, attesting to the interdisciplinary impact of Barto’s research.

A fundamental contribution of Barto – developed in conjunction with his then graduate student Richard Sutton (Ph.D. ’84; Professor and iCore Chair at the Department of Computing Science at the University of Alberta) – is an algorithmic framework for solving sequential prediction problems called *temporal-difference learning*, or TD-learning as it is widely known. “TD is remarkable not only due to its power at solving incredibly large stochastic sequential decision problems, but also due to emerging evidence linking the TD framework to reward learning in the mammalian brain,” notes Mahadevan. A researcher at IBM Watson Laboratories in 1992 showed that TD was able to learn to solve the difficult game of backgammon to a level comparable with the best human champions. This feat was notable since backgammon has around 10^{20} states, precluding any brute force method for solving it. Backgammon is also a stochastic game, since at each turn, moves are made using dice rolls. Later work demonstrated the utility of TD in a wide variety of real-world applications, from scheduling missions on the space shuttle, and controlling a team of elevators in a high-rise building, to routing calls on a cellphone.

Even more remarkable, growing experimental evidence in neuroscience shows that TD plays a fundamental role in the brain, providing a mechanism for learning from rewards through the neurotransmitter *dopamine*. TD may perhaps be the first

machine-learning algorithm for which we have evidence of its neural implementation in the brain.

“Andy is a highly popular teacher and advisor, and the success of his many Ph.D. graduates is a tribute to his mentoring skills,” adds Mahadevan.

Two of Barto’s former Ph.D. students, Satinder Singh (’94; Professor at the University of Michigan) and Sutton, have received AAAI Fellowships, a premier international recognition of excellence in artificial intelligence research.

Barto continues to co-direct ALL, formerly known as the Adaptive Networks Laboratory. His current research centers on what psychologists call intrinsically motivated behavior, meaning behavior that is done for its own sake rather than as a step toward solving a specific problem.

Barto received the 2004 IEEE Neural Network Society Pioneer Award for his contributions to the field of reinforcement learning. He is a Fellow of the American Association for the Advancement of Science, a Fellow of the IEEE, and a member of the American Association for Artificial Intelligence and the Society for Neuroscience. He received his B.S. with distinction in Mathematics from the University of Michigan in 1970, and his Ph.D. in Computer Science in 1975, also from the University of Michigan.

Barto has over one hundred publications. He is co-author with Richard Sutton of the book *Reinforcement Learning: An Introduction*, MIT Press 1998. “The book is a true classic that has been cited over 13,000 times – perhaps the single most cited research publication ever produced from our department,” says Mahadevan. Barto was also a co-editor with Jennie Si, Warren Powell, and Don Wunch II of the *Handbook of Learning and Approximate Dynamic Programming*, Wiley-IEEE Press, 2004.

“Andy is an exceptional researcher, teacher, and mentor. He provided outstanding leadership to the department during his tenure as chair,” says Professor Lori Clarke, department chair. “I am delighted that he will continue his research endeavors as an Emeritus Professor.”

Professor Andrew Barto with current and former students at the July workshop celebrating his career



Graduate Fellowships awarded

NSF Graduate Research Fellowships

Peter Krafft, Benjamin Mears, and Evan Shelhamer received 2012 National Science Foundation (NSF) Graduate Research Fellowships. Krafft and Mears are graduate students in the department and Shelhamer is a 2012 B.S. alum who will attend graduate school at the University of California, Berkeley.

The competitive fellowship provides three years of support for graduate study leading to research-based masters or doctoral degrees and is intended for students who are in the early stages of their graduate study.

Google Ph.D. Fellowship

Charles Curtsinger has received a 2012 Google Ph.D. Fellowship in Software Performance, one of only 14 Google Ph.D. Student Fellowships awarded in the United States and Canada this year. With the two-year fellowship, Curtsinger will receive funding for tuition, fees, and a yearly stipend. He will also have access to a Google Research Mentor during the fellowship.

Curtsinger is a doctoral student in Associate Professor Emery Berger's PLASMA (Programming Languages and

Systems at Massachusetts) Lab. The focus of his research is on automatic methods for analyzing application performance, making it easy for programmers to find and fix performance problems and thus making software faster.

"Charlie is a star: an exceptional graduate student who is well-deserving of this award," says Berger. "He not only has tremendous depth of knowledge in systems and programming languages, but also has breadth across computer science; his ability to see connections across them, and use those skills to attack problems in systems, is powerful."

Popplestone and Utgoff Scholarships

Tiffany Liu, a first year graduate student, received the 2012 Robin Popplestone Fellowship in Robotics & Artificial Intelligence. Liu graduated from Smith College with a B.S. in Engineering Science and Computer Science in May 2012.

Incoming graduate student Ariel Kobren received the 2012 Paul Utgoff Memorial Graduate Scholarship in Machine Learning. Kobren graduated in 2010 from Tufts University with a B.S. in Computer Science and was recently a Research Scientist at MIT Lincoln Labs. Kobren was also awarded a 2012 NSF Graduate Research Fellowship.

CAITE receives Google RISE Award; organizes NSF and Girls Connect events

The department's Commonwealth Alliance for Information Technology Education (CAITE), directed by Professor Rick Adrion, and the UMass Amherst College of Engineering, are the recipients of a 2012 Google RISE (Roots in Science and Engineering) award. The team is one of 26 organizations receiving this award this year, with over 400 applications. They will expand a recruiting activity for high school girls and will develop outreach activities for middle school students from key high-need districts in western Massachusetts. They will also organize a "Women in Engineering & Computing Career Day."

In March, CAITE and "Georgia Computes!" showcased their work at a poster session in the atrium of

the National Science Foundation (NSF) headquarters in Arlington, VA. The two groups, statewide alliances funded by the NSF's Broadening Participation in Computing program, were part of a reverse site visit during their trip to NSF. During the visit, Dr. Cora Marrett, the NSF Deputy Director and former UMass Amherst Provost, visited the poster session along with the NSF reviewers and other NSF staff. The event was highlighted in NSF's internal newsletter.

In another event organized by CAITE to broaden participation in computing, a "Girls Connect" event was held in the department in April with dozens of middle school girls learning to build and program LEGO Mindstorms NXT robots.

McGREGOR - - - - - continued from page 7

The general goal is to strengthen the undergraduate curriculum in algorithms.

"Given the focus on applied algorithms, there is a lot of potential for mixing theoretical classes with practical labs where students can implement and experiment with the algorithms," says McGregor. "This will not only strengthen the connection between 'theory' and 'non-theory' courses, but will also reveal commonalities between seemingly disparate non-theory topics."

Prior to joining the department as an Assistant Professor in January 2009, McGregor was a postdoctoral researcher

at the University of California, San Diego and at Microsoft Research Silicon Valley. He received a Ph.D. in Computer Science from the University of Pennsylvania in 2007. McGregor is interested in many areas of theoretical computer science and specializes in data stream algorithms, linear sketching, and communication complexity. In 2010, he received a National Science Foundation Career Award.

"I'm very much looking forward to my year as a Lilly Fellow," says McGregor "It is a great opportunity to develop new teaching ideas and learn from the experiences of the other Fellows from across campus."

Fourth Annual Outstanding Achievement and Advocacy Award ceremony held

The department celebrated the accomplishments of this year's Outstanding Achievement and Advocacy (OAA) Award winners along with undergraduate and graduate student award recipients during a banquet held at the UMass Amherst Campus Center on Friday, May 4, 2012.

Department Chair Lori Clarke and Steve Goodwin, Dean of the College of Natural Sciences, welcomed the attendees. Robert Sproull, Chair of the Computer Science and Telecommunications Board of the U.S. National Academies, was the featured address speaker of the evening. Professor Leon J. Osterweil presented the 2012 OAA awards.

The 2012 OAA Award Recipients are:



- Outstanding Achievement by a Young Alum: **Justin Borgman** (B.S. '02) - Chief Executive Officer and Co-Founder of Hadapt



- Outstanding Support for the Department: **Fredrick W. Byron, Jr.** - retired Vice-Chancellor for Research of UMass Amherst; former Dean of the College of Natural Sciences and Mathematics

- Outstanding Achievement in Education: **Claire Cardie** (Ph.D. '94) - Professor in the Departments of Computer Science and Information Science at Cornell University and Co-Founder and Chief Scientist of Appinions



- Outstanding Achievement in Research: **Edmund Durfee** (Ph.D. '87) - Professor in the Department of Electrical Engineering and Computer Science, and in the School of Information, at the University of Michigan



- Outstanding Achievement in Entrepreneurship: **Andrew Merlino** (B.S. '85) - President and Founder of Pixel Forensics



- Outstanding Support for the Department: **Ken Schmidt** - Academic Relations Director for Yahoo!

- Outstanding Achievement in Research: **Henning Schulzrinne** (Ph.D. '92) - Julian Clarence Levi Professor of Computer Science at Columbia University and Chief Technology Officer of the Federal Communications Commission



- Outstanding Achievement in Technology Development: **Ted Selker** (M.S. '81) - Associate Director of Mobility Research and Visiting Professor at Carnegie Mellon University Silicon Valley



- Outstanding Contributions to Society: **Elliot Soloway** (Ph.D. '78) - Arthur F. Thurnau Professor in the College of Engineering, the School of Information and the School of Education at the University of Michigan

More details on the careers of the OAA award recipients, along with photos of the event, are posted at www.cs.umass.edu/oa2012.

During the evening's celebration, current students and recent alums were also recognized. The undergraduate and graduate awards were generously sponsored by Yahoo!. Professor Sridhar Mahadevan, Graduate Program Director, presented the following **Outstanding Graduate Student Awards**:

- Outstanding Dissertation Award: **Aruna Balasubramanian** (Ph.D. '11) - CIFellow, Department of Computer Science, University of Washington
- Outstanding Dissertation Award: **Timothy Wood** (Ph.D. '11) - Assistant Professor, Department of Computer Science, George Washington University
- Outstanding Synthesis Award: **Andres Molina-Markham**
- Outstanding Synthesis Award: **Robert Walls**
- Outstanding Teaching Assistant Award: **Brandon McPhail**
- Outstanding Teaching Assistant Award: **Philip Thomas**



(l. to r.) Andres Molina-Markham, Robert Walls, Philip Thomas, Aruna Balasubramanian, and Tim Wood with Yahoo!'s Ken Schmidt and Profs. Lori Clarke and Sridhar Mahadevan

Professor David Mix Barrington, Department Associate Chair, presented the following **Outstanding Undergraduate Awards** to students in this year's graduating class:

- Overall Achievement in Computer Science: **Evan Shelhamer**
- Achievement in Graphics: **Stephen Giguere**
- Achievement in Interdisciplinary Study: **Vinay Shah**
- Achievement in Interdisciplinary Study: **Derek Wood**
- Achievement in Machine Learning: **Tristan Warneke**
- Achievement in Security: **Jessica Ray**
- Achievement in Systems: **Marek Blat**
- Achievement in Theory: **Matthew Kelly**



(l. to r.): Evan Shelhamer, Matthew Kelly, Marek Blat, Jessica Ray, Derek Wood, and Stephen Giguere

Sawhney and Zhang named IEEE Fellows

Two CS alums, Harpreet Sawhney (Ph.D. '92) and Zhi-Li Zhang (Ph.D. '97), were named 2012 Fellows of the Institute of Electrical and Electronics Engineers (IEEE).

Sawhney, the Technical Director of the Vision and Learning Laboratory within SRI International's Vision Technology Group, was recognized for contributions to video algorithms. While at UMass Amherst, he was advised by Profs. Allen Hanson and Edward Riseman. Sawhney has extended the scope of vision technology at SRI International from basic sensor processing to recognition and reasoning about objects and activities in complex scenes. He led the conceptualization and realization of innovative algorithms in 2D and 3D processing. He introduced the idea of video object fingerprinting to tackle the difficult problem of object tracking across non-overlapping cameras. Sawhney has published more than 90 papers, holds 34 patents, and was named an SRI Fellow in 2011.

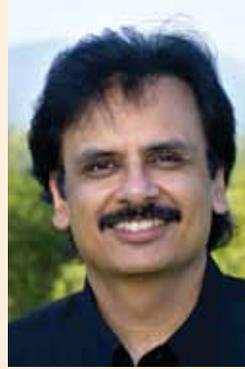
Zhang, Qwest Chair Professor in the Department of Computer Science and Engineering at the University of Minnesota, was recognized for his contributions to Internet quality-of-service theory and applications. Zhang's UMass Amherst advisors were Distinguished Professors Jim Kurose and Don Towsley. His research interests lie broadly in computer communication and networks, Internet technology, multimedia and emerging applications. While his past research was centered on the analysis, design and development of scalable Internet QoS solutions to support performance-demanding multimedia applications, his current research thrusts focus primarily on i) building *highly scalable, resilient and secure* Internet infrastructure and mechanisms to enhance Internet service availability, reliability and security; and on ii) developing *next-generation, service-oriented, manageable* Internet architectures to provide better support for creation, deployment, operations and management of value-added Internet services and underlying networks.

The IEEE Board of Directors confers the IEEE Grade of Fellow upon a person with an outstanding record of accomplishments in any of the IEEE fields of interest. The total number selected in any one year cannot exceed one-tenth of one percent of the total voting membership.

SAVE THE DATE – September 27

CS Alum Social in Cambridge, MA

Computer Science alums: You are cordially invited to a social gathering of CS alums and faculty to be held on Thursday, September 27, 2012 from 6:30 – 9:00 p.m. at Google in Kendall Square, Cambridge, MA. Check out www.cs.umass.edu/alumsocial2012 for more details as they become available. We will post to our LinkedIn and Facebook groups as well.



Victor Bahl (UMass Amherst Ph.D. '97), Director of the Mobile Computing Research Center in Microsoft Research, received a University of Massachusetts 2012 Distinguished Alumni Award at the Massachusetts State House on April 17. The Distinguished Alumni Award is the highest honor bestowed by the UMass Amherst Alumni Association on alumni, faculty, and friends; it honors those who have built

on their UMass Amherst experience to attain notable achievements in business, public or community service realms. On April 18, he gave a presentation in the CS department. He discussed "Putting the Cloud in the Palm of Your Hand."

Alexander L. Wolf (Ph.D. '85) was elected as Vice President of the Association for Computing Machinery (ACM). Wolf is a Professor in the Department of Computing at Imperial College London. He received our department's Outstanding Achievement in Research Award in 2010. More details: www.acm.org/news/featured/new-acm-officers.

Computing for Ordinary Mortals, by **Rob St. Amant** (Ph.D. '96), will be published by Oxford University Press in October, 2012. *Ordinary Mortals* is a popular science book for lay readers about important concepts in computing. St. Amant is an Associate Professor in the Computer Science Department at North Carolina State University.

Aruna Balasubramanian (Ph.D. '11) is the runner-up award winner for the ACM SIGCOMM Doctoral Dissertation award for 2011. Her thesis is entitled *Architecting Protocols to Enable Mobile Applications in Diverse Wireless Networks*. Balasubramanian is currently a Postdoctoral CIFellow Research Associate at the University of Washington.

Joseph Kiniry (M.S. '95), Associate Professor at the IT University of Copenhagen, is one of the PIs on "DemTech: Trustworthy Democratic Technology" (www.demtech.dk), one of the three major strategic grants awarded in Denmark in 2011. The grant will fund research that Kiniry started eight years ago focusing on educating governments and citizenry in the problems of electronic voting and showing how e-voting technology might be used and constructed, treating elections as critical systems. His previous work in e-voting led, in part, to the nationwide ban on the use of computers in elections in the Netherlands and Ireland. In September 2012 Kiniry will begin a new position as a Full Professor and Head of the Software Engineering Section at the Technical University of Denmark.

This spring, **Steve Willis** (B.S./BDIC '78), a consultant to financial, management, and technical startups, discussed his career in startups and technology over lunch with students in the department. Willis' discussion, "The Road from LISP and Ethernet's Promiscuous Mode to the NYSE," was organized by the UMass Amherst ACM student chapter.



Niranjan Balasubramanian; *Query Dependent Selection of Retrieval Alternatives;* (James Allan, Advisor); Sept. 2011; Post-Doctoral Researcher, Dept. of Computer Science & Engineering, University of Washington

This thesis investigates query-dependent selection of retrieval alternatives for information retrieval systems. Information retrieval research focuses on developing query representations and retrieval models for ranking documents. However, no single query representation or retrieval model performs the best for all queries. Selecting the best representation or retrieval model for each query can yield improved performance. This thesis addresses an important question in dynamically combining retrieval alternatives: *How to estimate the relative performance of the different alternatives for each query?* We treat query-dependent selection as a general problem of selecting between the result sets of different alternatives. We develop a relative effectiveness estimation technique that uses retrieval-based features in a learning formulation to directly predict differences between the results sets. We apply this general technique to select between alternative reduced versions for long queries and to combine multiple ranking algorithms. We extend the selection problem to include efficiency constraints and develop easy-to-compute features for efficient combination of retrieval models. Finally, we provide an extensive analysis of selection performance to better understand when query-dependent selection can be useful.



Alan Carlin; *Decision-Theoretic Meta-reasoning in Partially Observable and Decentralized Settings;* (Shlomo Zilberstein, Advisor); Feb. 2012; Research Engineer, Aptima

This thesis examines decentralized meta-reasoning. For a single agent or multiple agents, it may not be enough for agents to compute correct decisions if they do not do so in a timely or resource efficient fashion. By the time a decision is computed, the conditions leading up to it may have changed. The reasoning about one's computation process is referred to as meta-reasoning. Aspects of meta-reasoning considered in this thesis include the reasoning about how to allocate computational resources, including when to stop one type of computation and begin another, and when to stop all computation and report an answer. Given a computational model, this translates into computing how to schedule the basic computations that solve a problem.

This thesis constructs meta-reasoning strategies for the purposes of monitoring and control in multi-agent settings, specifically settings that can be modeled by the Decentralized Markov Decision Process (Dec-POMDP). It uses decision theory to optimize computation for efficiency in time and space in communicative and non-communicative decentralized settings. Whereas base-level reasoning describes the optimization of actual agent behaviors, the meta-reasoning strategies produced by this thesis dynamically optimize the computational resources which lead to the selection of base-level behaviors.



David Cooper; *Computational Affect Detection for Education and Health;* (Hava Siegelmann and Beverly Woolf, Advisors); Sept. 2011; Postdoctoral Researcher, Section of Biomedical Image Analysis, University of Pennsylvania

Emotional intelligence is a clear factor in education, health care, and day-to-day interaction. With the increasing use of computer technology, computers are interacting with more and more individuals. This interaction provides an opportunity to increase knowledge about human emotion for human consumption, well-being, and improved computer adaptation. This thesis explores the efficacy of using up to four different sensors in three domains for computational affect detection. We first consider computer-based education: four sensors are used to detect student emotions relevant to learning, such as frustration, confidence, excitement and interest during a computer tutoring session. The best emotion classifier accuracies range from 78% to 87.5%. We use voice data collected in a clinical setting to differentiate both gender and culture of the speaker. We produce classifier accuracies between 84% and 94% for gender, and between 58% and 70% for American vs. not American culture. Finally, we use video and audio in a health care education scenario to detect students' emotions during a clinical simulation evaluation. The video data provide classifiers with accuracies between 63% and 88% for learning relevant emotions. In total, this work is a step forward in the automatic computational detection of affect in realistic settings.



Gregory Druck; *Generalized Expectation Criteria for Lightly Supervised Learning;* (Andrew McCallum, Advisor); Sept. 2011; Research Scientist, Yummlly

Machine learning has facilitated many recent advances in natural language processing and information extraction. Unfortunately, most machine learning methods rely on costly labeled data, which impedes their application to new problems. Even in the absence of labeled data we often have a wealth of prior knowledge about these problems. For example, we may know which labels particular words are likely to indicate for a sequence labeling task, or we may have linguistic knowledge suggesting probable dependencies for syntactic analysis. This thesis focuses on incorporating such prior knowledge into learning, with the goal of reducing annotation effort for information extraction and natural language processing tasks. We advocate constraints on expectations as a flexible and interpretable language for encoding prior knowledge. We focus on the development of Generalized Expectation (GE), a method for learning with expectation constraints and unlabeled data. We explore the various flexibilities afforded by GE criteria, derive efficient algorithms for GE training, and relate GE to other methods for incorporating prior knowledge into learning. We then use GE to develop lightly supervised approaches to text classification, dependency parsing, sequence labeling, and entity resolution that yield accurate models for these tasks with minimal human effort. We also consider the incorporation of GE into interactive training systems that actively solicit prior knowledge from the user and assist the user in evaluating and analyzing model predictions.



Gary B. Huang; *Weakly Supervised Learning for Unconstrained Face Processing;* (Erik Learned-Miller, Advisor); May 2012; Scientist, Howard Hughes Medical Institute

Machine face recognition has traditionally been studied under the assumption of a carefully controlled image acquisition process. By controlling image acquisition, variation due to factors such as pose, lighting, and background can be largely eliminated. Applications of face recognition have had mixed success when deployed in conditions where the assumption of controlled image acquisition no longer holds. This dissertation focuses on this unconstrained face recognition problem, where face images exhibit the same amount of variability that one would encounter in everyday life.

We formalize unconstrained face recognition as a binary pair matching problem (verification), and present a data set for benchmarking performance. We observe that it is comparatively much easier to obtain many examples of unlabeled face images than face images that have been labeled with identity or other higher level information. We thus focus on improving face verification by leveraging the information present in this source of weakly labeled data. We show how unlabeled face images can be used to perform unsupervised face alignment and unsupervised feature discovery, both leading to improvements in recognition accuracy. We additionally combine the two methods, leading to an unsupervised alignment system with verification accuracy matching supervised alignment.



Pallika Kanani; *Resource-bounded Information Acquisition and Learning;* (Andrew McCallum, Advisor); May 2012; Senior Research Staff Member, Oracle Labs

In many scenarios it is desirable to augment existing data with information acquired from an external source. For example, information from the Web can be used to fill missing values in a database or to correct errors. In many machine learning problems, acquiring additional feature values can lead to improved data quality and accuracy. However, there is often a cost associated with information acquisition, and we typically have resource limitations. In this thesis, I explore Resource-bounded Information Acquisition and Learning. The process of acquiring information from an external source involves multiple steps, such as deciding what subset of information to obtain, locating the documents that contain the required information, acquiring relevant documents, extracting the specific piece of information, and combining it with existing information to make useful decisions. Resource-bounded Information Acquisition (RBIA) involves saving resources at each stage of the information acquisition process. I explore four special cases of the RBIA problem in real-world domains. Finally, I propose a general framework for RBIA, that considers the state of the database at each time point, dynamically adapts to the results of previous acquisition steps and properties of the next ones, and perform them to acquire most information with least resources.



Dov Katz; *Interactive Perception of Articulated Objects for Autonomous Manipulation;* (Oliver Brock, Advisor); Sept. 2011; Postdoctoral Associate, The Robotics Institute, Carnegie Mellon University

This thesis develops robotic skills for manipulating novel articulated objects. Examples of everyday articulated objects include scissors, pliers, door handles, books, and drawers. The degrees of freedom of an articulated object describe the relationship among its rigid bodies, and are often relevant to the object's intended function. Autonomous manipulation of articulated objects is therefore a prerequisite for many robotic applications in our everyday environments. In structured environments robots accomplish manipulation tasks with impressive accuracy and speed. In contrast, when object models are not available, in unstructured environments such as our homes and offices, manipulation remains largely unsolved. We assume that to enable autonomous manipulation of objects in our everyday environments, robots must be able to acquire information about these objects. Acquiring information about the world from sensor data is a challenging problem. There is simply too much information that could be perceived. Solving such a general perception problem is infeasible. Instead, we propose to leverage our understanding of the task, in order to determine what information is relevant for manipulation. The main contribution of this thesis is in introducing Interactive Perception, a new perceptual framework, which exploits the synergies that arise when crossing the boundary between action and perception.



David Mimno; *Topic Regression;* (Andrew McCallum, Advisor); Feb. 2012; Postdoctoral Research Associate, Department of Computer Science, Princeton University

Text documents are generally accompanied by non-textual information, such as authors, dates, publication sources, and, increasingly, automatically recognized named entities. Work in text analysis has often involved predicting these non-text values based on text data for tasks such as document classification and author identification. This thesis considers the opposite problem: predicting the textual content of documents based on non-text data. In this work, I study several regression-based methods for estimating the influence of specific metadata elements in determining the content of text documents. Such topic regression methods allow users of document collections to test hypotheses about the underlying environments that produced those documents.



Hala Mostafa; *Exploiting Structure in Coordinating Multiple Decision Makers;* (Victor Lesser, Advisor); Sept. 2011; Research Scientist, BBN Technologies

This thesis is concerned with sequential decision making by multiple agents, whether they are cooperative or self-interested. The practical intractability of the general problem led to efforts in identifying special cases that admit efficient computation, yet still represent a wide enough range of problems. In our work, we identify the class of problems with structured interactions, where actions of one agent can have non-local effects on the transitions and/or rewards of another agent.

We addressed the following research questions: 1) How can we compactly represent this class of problems?; 2) How can we efficiently calculate agent policies that maximize team reward (for cooperative agents) or achieve equilibrium (self-interested agents)?; and 3) How can we exploit structured interactions to make reasoning about communication offline tractable? We developed a new decision-theoretic model, Event-Driven Interactions with Complex Rewards, that explicitly represents structured interactions. We looked at the issue of communication in both cooperative and self-interested settings. For self-interested agents, we studied an example setting where communication is an integral part of problem solving, but where the self-interested agents have a reason to be reticent (e.g. privacy concerns). We formulate this problem as a game of incomplete information and present a general algorithm for calculating approximate equilibrium profile in this class of games.



Megan Olsen; *Variations on Stigmergic Communication to Improve Artificial Intelligence and Biological Modeling;* (Hava Siegelmann, Advisor); Sept. 2011; Assistant Professor, Dept. of Computer Science, Loyola University Maryland

Stigmergy refers to indirect communication that was originally found in biological systems. It is used for self-organization by ants, bees, and flocks of birds, by allowing individuals to focus on local information. Through local communication among individuals, larger patterns are formed without centralized communication. This self-organization is just one type of system studied within complex systems, and is generally referred to as emergent behavior. My thesis examines emergent behavior in artificial intelligence and biology: the growth of cancer, population dynamics, emotions, multi-agent fault tolerance, and real-time strategic AI for games. I design variations on stigmergy to accomplish my two goals: a) to develop novel computational models of complex biological systems, and b) to tackle key AI research questions by proposing new algorithms and techniques that are inspired by those complex biological systems. My contributions are a new agent-based cancer growth model, a proposed use of localized communication for removing cancer cells, improved multi-agent fault tolerance through localized messaging, a new approach to modeling predator-prey dynamics using computational emotions, and improved strategic game AI through computational emotions.



Jangwon Seo; *Search Using Social Media Structures;* (W. Bruce Croft, Advisor); Sept. 2011; Software Engineer, Google

Social applications on the Web have appeared as communication spaces for sharing knowledge and information. In particular, social applications can be considered valuable information sources. We address methods for finding relevant information in social media applications that use unique properties of these applications. Specifically, we focus on three unique structures in social media: hierarchical structure, conversational structure, and social structure. These structures are designed to organize information and encourage people to participate in discussions in social applications. To exploit these structures in retrieval frameworks, we introduce an effective representation framework for

multiple contexts. We then discuss how to discover or define each structure and how to extract relevant contexts from the structure. Using the representation framework, these relevant contexts are integrated into retrieval algorithms. In addition, we address two other challenges related to social media search--identification of relevant substructures in retrieval objects and analysis of text reuse structures.



Timothy Wood; *Improving Data Center Resource Management, Deployment, and Availability with Virtualization;* (Prashant Shenoy, Advisor); Sept. 2011; Assistant Professor, Dept. of Computer Science, The George Washington University

The increasing demand for storage and computation has driven the growth of large data centers--the massive server farms that run many of today's Internet and business applications. A data center can comprise many thousands of servers and can use as much energy as a small city. The massive amounts of computation power contained in these systems results in many interesting distributed-systems and resource-management problems. This thesis investigates challenges related to data centers, with a particular emphasis on how new virtualization technologies can be used to simplify deployment, improve resource efficiency, and reduce the cost of reliability, all in application-agnostic ways. We focus on three of the key challenges faced when building and running data centers: 1) simplifying the deployment of applications by providing models of virtualization overheads and new placement strategies that allow for greater consolidation; 2) automating performance management techniques that exploit the virtualization abstraction layer to dynamically allocate resources; and 3) providing high reliability services to applications even in the face of site-wide disasters.



Xing Yi; *Discovering and Using Implicit Data for Information Retrieval;* (James Allan, Advisor); Sept. 2011; Scientist, Yahoo! Labs

In real-world information retrieval (IR) tasks, the searched items and/or the users' queries often have implicit information associated with them--information that describes unspecified aspects of the items or queries. This indirectly available information has been shown to improve search effectiveness. However, in many real-world IR challenges this information is incomplete or missing in a large portion of the data. We present a language-modeling based general perspective for discovering implicit information and demonstrate how to use the discovered data for search. We investigate four specific IR challenges: (1) finding relevant records in semi-structured databases where many records contain incomplete or empty fields; (2) searching web pages that have little or no associated anchor text; (3) using click-through records in web query logs to help search pages that have no or very few clicks; and (4) discovering plausible geographic locations for web queries that contain no explicit geographic information. Intuitively, we use contextual similarity among data for discovering implicit information for search. We empirically demonstrate the effectiveness of our approaches using different IR challenges. Our research shows that supporting information discovery tailored to different search tasks can enhance IR systems' search performance.



Chongjie Zhang; *Scaling Multi-Agent Learning in Complex Environments*; (Victor Lesser, Advisor); Sept. 2011; Postdoctoral Research Associate, Dept. of Computer Science, UMass Amherst

Cooperative multi-agent systems (MAS) are finding applications in a wide variety of domains, including sensor networks, robotics, distributed control, collaborative decision support systems, and data mining. A cooperative MAS consists of a group of autonomous agents that interact with one another in order to optimize a global performance measure. A central challenge in cooperative MAS research is to design distributed coordination policies. Existing techniques are inadequate to address this challenge in large-scale complex applications with uncertain

environments. This dissertation develops a new multi-agent reinforcement learning (MARL) paradigm for tackling this challenging coordination problem. To scale up the learning, this learning paradigm exploits interaction locality and non-local information in a coherent way. Using this paradigm, agents concurrently learn their policies based on local observations, and, meanwhile, their learning processes are coordinated by a non-local control mechanism to ensure the global learning performance. This dissertation presents both efficient algorithms for multi-agent learning (MAL) with limited observability and a scalable control framework for coordinating MAL. I have applied and evaluated this learning paradigm in diverse problem domains, including distributed task allocation, network routing, and sensor networks.

CS Undergraduate Dean's List – Spring 2012

Alpert, Warren	Giguere, Stephen J.	Muehlberg, Jacob	Simms, Jeremy R.
Avery, Sean T.	Gonda, Peter S.	Murphy, Brendan Edward	Simon, Timothy
Bach, Michael Curtis	Gordon, Rachel Clare	Nakashian, Louis E.	Sims, Robert J.
Briggs, Priscilla E.	Hamza, Mazen Samer	Naparstek, Nicolas	Singer, Henry Oskar
Bristol, Alexander Lawrence	Hardy, Dustin Power	Neilson, Tyler J.	Stapleton, Brian Fitzpatrick
Bronk, Harold R.	Hayes, James Patrick	Nguyen, Anh Tung	Staruk, Elizabeth A.
Burkatovskiy, Aleksandr Valeriy	Hebert, Mitchell Ryan	Nolin, Brian J.	Stearns, Brett C.
Cadwell-Frost, Amanda Jean	Hingley, Jesse A.	Noran, Sean Stephen	Stewart, Ian Ajameian
Chadowitz, Chaniel	Hoffman, Scott A.	Olejnik, Katarzyna Lucja	Stubbs, Daniel M.
Chan, Andrew	Hong, John	Otsuka, Maxwell Sho	Sullivan, Dylan Patrick
Cheang, Wai	Hughes, Kyle Robert	Ottaviano, Kenneth Robert	Szeto, Ryan Bing-Shue
Chen, Chengyang	Ioannou, Nicolas	Pegus, Patrick	Tang, Roger Z.
Chudy, Joshua Roman	Itkin, David Jonas	Pelletier, Jesse N.	Trask, Joshua H.
Ciollaro, Christopher James	Izotov, Andrey Kirillovich	Peris, Sahil Loy Joe	Truong, Kevin
Conlon, Nicholas	Kaufman, Yael	Perodeau, Timothy Lawrence	Tsang, Ivan
Connell, Ryan J.	Lee, Anna	Perreault, Jason Edward	Turlapati, Hridya
Daole-Wellman, George W.	Lewis, Patrick Joseph	Pezzone, Jeffrey Michael	Vorotnikova, Sofya
Deroche, Michael A.	Li, Lily	Pham, Tung Thanh	Warneke, Tristan Tamas
DeRoy, Michael K.	Ling, Yan	Powers, Kenneth Wendell	Williams, Albert Beckman
Droeske, Trevor Michael	Lowell, David B.	Raitto, Caleb L.	Wong, Ann L.
Duggan, Daniel Joseph	Masi, Daniel Patrick	Rivais, Elaina	Wong, Jay Ming
Edwards, Gen Michael	May, Nathaniel David	Rudovol, Ivan	Wong, Lp Tommy
Eid, Jacob Imad	McAndrew, Jeffrey Douglas	Rutter, James J.	Wongwajarachot, Victor
Filipek, Alexander William	McMahon, Samuel Robert	Rynderman, Mordechai	Young, Cody J.
Fox, John B.	Moh, Heng Li Vahid Anthony	Schuler, Joachim D.	Yuen, Lit Wa

CS undergrads awarded course citations

Course citations recognize outstanding performance of undergraduate students who have significantly exceeded the standards for an A grade in a particular course. The list

of spring 2012 course citation award recipients is below. The course for which the student received the citation is noted after his/her name.

Ayoub, Richard (187)	Gonda, Peter (187)	Muehlberg, Jacob (240)	Stubbs, Daniel (401)
Bjorge, Michael (187)	Higgins, Lauren (121)	Noran, Sean (187 and 250)	Szeto, Ryan (250)
Blat, Marek (445)	Hughes, Kyle (311 and 320)	Otsuka, Maxwell (121)	Tenaglia, Steven (240)
Burkatovskiy, Aleksandr (187)	Izotov, Andrey (445)	Ottaviano, Kenneth (121)	Vorotnikova, Sofya (401)
Chen, Chengyang (187)	Jacek, Nicholas (401)	Pegus, Patrick (240)	Whittemore, Max (187)
Crespi, Tyler (187)	Kelly, Matthew (445)	Powers, Kenneth (305)	Williams, Albert (250)
Deroche, Michael (320)	Lee, Anna (240)	Richardson, Samuel (121)	
Droeske, Trevor (187)	Lewis, Patrick (311)	Sprague, Brandon (187)	
Dunford, Andrew (187)	Lowell, David (240)	Stapleton, Brian (240)	

Faculty News



Distinguished Professor **Bruce Croft** and **Mark Sanderson** (former CIIR PostDoc; now a Professor at RMIT University) contributed to the 100th Anniversary Issue of the *Proceedings of the IEEE* with their paper “The History of Information Retrieval Research.” Croft and

Sanderson also recently received a Google Research Award for their project “Orchestrated Search: Exploiting Differences Between Sub-Collections to Improve Retrieval Accuracy.”



Associate Professor **Gerome Miklau** received a Yahoo! Faculty Research Award for his project “Privacy of Correlated/Linked Data.”

Associate Professor **Hava Siegelmann** was elected to the Board of

Governors of the International Neural Network Society. She was also named a Vice Chair of the NNTC (Neural Network Technical Committee) of the IEEE Computational Intelligence Society (CIS).



Associate Professor **Erik Learned-Miller** will be a Program Chair for the 2015 IEEE Computer Society Conference on Computer Vision and Pattern Recognition.

Professor **Lori Clarke** is an Invited

Technical Speaker at the Grace Hopper Conference to be held in Baltimore, MD in October. She will discuss “Using Process Modeling and Analysis Techniques to Reduce Errors in Health Care.”

Associate Professor **Emery Berger** was interviewed for three segments of the PBS WGBY affiliate program “Connecting Point.” During the interviews, Berger discussed a number of security-based issues that are of concern to the mainstream media.



Associate Professor **Yanlei Diao** and collaborator Li-Jun Ma, Assistant Professor in Plant, Soil and Insect Sciences, received seed funding from the Massachusetts Green High Performance Computing Center to help develop a system for processing massive amounts of genome material. They are working with researchers from MIT/Broad Institute of Harvard, Children’s Hospital/Harvard, and Massachusetts General Hospital on this project.



Assistant Professor **Andrew McGregor** was invited to give a series of four lectures on data stream algorithms at L’Ecole de Printemps d’Informatique Théorique, France in March. McGregor also organized a Workshop on “Algorithms for Distributed and Streaming Data” that was held during the ACM Symposium on Theory of Computing (STOC) in May.



Intel announced that its multicore CPU will incorporate hardware transactional memory, bringing Professor **Eliot Moss’** and Maurice Herlihy’s seminal 1993 paper on “Transactional Memory” to mainstream computing.



Associate Professor **Kevin Fu’s** medical device cybersecurity research is highlighted in an article in *Forbes*, BBC World News, and a number of other media outlets (*Wired*, *iHealthBeat.org*, *IT World*, *WFCR*, *Medical Xpress*, *PC Advisor*, *GovInfoSecurity.com*, among others). Fu is serving a four-year term on the National Institute of Standards and Technology (NIST) Information Security and Privacy Advisory Board (ISPAB). Fu and his wife Teresa welcomed the birth of their son, Walter, on leap day, February 29th.



Associate Professor **Mark Corner**, currently on leave from the department, will run the recently opened Northampton office of Fiksu, a mobile app marketing firm. Former CS Associate Professor **Micah Adler** is the President and CEO of Fiksu.



Jane Fountain, CS Adjunct Professor and Professor of Political Science and Public Policy, was named to the Commonwealth’s Council for Innovation. The council will advise Massachusetts Governor Deval Patrick on opportunities to improve government efficiency and the use of technology to streamline delivery of services to people, businesses and local governments. In June, Fountain led a private session on the future of government during the World Economic Forum Summit on the Middle East, North Africa and Eurasia. The meeting, held in Istanbul, brought together heads of state and government, senior ministers, business leaders and key academic experts.



Yahoo! sponsors CS events and awards

In an award sponsored by Yahoo!, this year’s

Accomplishments in Search & Mining Awards were presented to graduate students **Henry Feild** and **Limin Yao**.

On May 1, 2012, the ACM Student Chapter hosted the department’s 5th Annual CS Foosball Tournament sponsored by Yahoo!. Students, faculty, and staff participated in the event. Graduate students **CJ Carey** and **Jonathan Leahey** (above) won this year’s tournament. Graduate students **Bo Jiang** and **Anand Seetharam** came in second.

Yahoo!, one of the department’s Industrial Affiliates Program members, provides funding and support for the graduate and undergraduate awards (see article on OAA ceremony), CS Women and ACM chapter events, and the fall Hackathon. They also sponsor technical talks in the department through the Machine Learning and Friends lunch series and the Computational Social Sciences Initiative lunch series.

Researcher News

From the Chinese Academy of Sciences Institute of Software, **Jian Zhai** is a Visiting Assistant Professor working with Professors **Leon Osterweil** and **Lori Clarke**.

CS alum **Daniel Figueiredo** (Ph.D. '05) joined the Networks group as a Visiting Professor from the Federal University of Rio de Janeiro.

CS alum **Jerod Weinman** (Ph.D. '08) is a Visiting Professor in the VISIONS lab from Grinnell College where he is an Assistant Professor and the Research Director of the Computer Vision Lab.

CS alum **Eva Hudlicka** (Ph.D. '86) is a Visiting Researcher working with Victor Lesser. She is President and Principal Scientist of Psychometrix Associates.

The Center for Intelligent Information Retrieval is hosting a Visiting Researcher, **Chang Bong Kim**, from NHN Corporation.

Student News

In July, graduate student **Scott Kuindersma** won the award for Best Spotlight Talk and Electric Poster at Robotics: Science and Systems (RSS) held in Sydney, Australia. RSS is a highly selective robotics conference which included 52 spotlight talks/e-posters at this year's program. He presented the paper, "Variational Bayesian Optimization for Runtime Risk-Sensitive Control," written by Kuindersma and co-authors Profs. **Rod Grupen** and **Andrew Barto**.

John Altidor, **Aditya Mishra**, and **Mastooreh (Negin) Salajegheh** were three of 75 graduate students selected nationwide to attend the Google 2012 Graduate Researchers in Academia of Diverse backgrounds (GRAD) CS Forum held in Mountain View, CA and San Francisco, CA in January.

Graduate student **Mastooreh (Negin) Salajegheh** and her team SMASH/TARDIS competed in the UMass Innovation Challenge Finals held on April 17. The Innovation Challenge is a business plan competition that emphasizes innovation and encourages individuals from every discipline and department on campus to work together to use technology to solve society's overarching problems in new ways.

Graduate student **Emma Tosch** (advised by Adjunct Professor Lee Spector) received an ACM-W (ACM Women in Computing) Scholarship to attend the 2012 Genetic and Evolutionary Computation Conference.

Team "Skyward Nord," consisting of CS grad students **CJ Carey** and **Jonathan Leahey**, placed second in the Finals and first in the Semifinal 1 round of the inaugural Windward International Intercollegiate Programming Championship held on January 28, 2012.

The ACM Chapter hosted a CS Jeopardy! night, sponsored by Google, this spring. The winning team was the "Garbage Collectors" consisting of: **Philip Donlon**, **Jon Franklin**, **Ryan McCann**, **Sahil Peris**, and **Reed Silverstein**. Competition categories included actual CS/Math questions, CS and Internet trivia, Guess that CS professor, and an "I'm Feeling Lucky" grab bag.

Elisabeth Baseman, **Anastasia Meek**, and **Ravali Pochampally** are the newly elected CS Women co-Chairs.

Cisco Scholars announced

Cisco Systems, a member of the department's Industrial Affiliates Program, provided scholarships to six of the department's undergraduate students in 2012. **Sofya Vorotnikova** is the recipient of the 2012 Cisco Systems Scholarship for Underrepresented Undergraduate Students at UMass Amherst Computer Science. **Alexander Bristol**, **Gen Edwards**, **Nicolas Ioannou**, **Andrey Izotov**, and **Gal Shenar** are the recipients of the 2012 Cisco Award for Outstanding Achievement as a Junior. The award is given to the top undergraduates in the department who are in their junior year, as determined by a faculty committee who took into account recommendations by faculty members, GPA, coursework, independent studies or honors projects, and course citations.

In addition to the scholarships, Cisco sponsored the Third Annual Five Colleges Programming Competition organized this spring by the UMass Amherst ACM student chapter. The competition's first through fifth place winners are (UMass Amherst unless noted) **Khan Xuan Nguyen**, **Jez Ng** (Amherst College), **Nick Tkachov**, **Michael Bjorge**, and **Nate May**.

The UMass Amherst ACM Student Chapter officers for AY 2012-2013 are: **Brian Nolin**, President; **Ryan McCann**, Vice President; **Nick Tkachov**, Treasurer; and **William Crane**, Secretary.

The CS Women group hosted a Job and Internship Panel Session on April 18th that was supported by a Return Path Student Seed Fund grant from the National Center for Women & Information Technology (NCWIT). The event was open to women from UMass Amherst and the Five Colleges area. **Hala Mostafa** (Ph.D. '11), Research Scientist at BBN Technologies, and **Donna Falcetti**, the CS department's Director of Administration & Finance and former Director of Operations at RXi Pharmaceuticals, spoke to students about their careers and provided tips on internship and job hunting. Current graduate students **Meagan Day**, **Jacqueline Feild**, **Lisa Friedland** and **Kimberly Ferguson** (M.S. '08; Computer Researcher for DoD) also participated as panelists.

Staff News

Donna Falcetti joined the department as the Director of Administration and Finance, replacing **Claire Christopherson**, who accepted a position at the Massachusetts Green High Performance Computing Center.

David Fisher, (B.S. '92), Senior Software Engineer in the department's Center for Intelligent Information Retrieval and a lecturer in Software Engineering, married **Kathie Terry**, former CSCF staffer and current UMass Amherst Buyer in Facilities Planning, on June 21, 2012 on Coast Guard Beach in Truro, MA. The ceremony was officiated by **Kathie's** eldest daughter **Brianna**.

Significant Bits

**Newsletter of the
Department of Computer Science
College of Natural Sciences
at the University of Massachusetts Amherst**

140 Governors Drive
University of Massachusetts Amherst
Amherst, MA 01003-9264

“Significant Bits” is published twice a year by the
Department of Computer Science, University of Massachusetts
Amherst (www.cs.umass.edu).

Your news, suggestions, comments, and contributions are
welcome. Please mail them to the address above or send
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