University of Massachusetts Amherst Spring 2016

Significant BITS

Newsletter of the College of Information and Computer Sciences

Tackling Digital Health in the Mobile Domain

Digital health is a rapidly emerging area with the broad goal of improving healthcare delivery, efficiency, and quality by leveraging a diverse array of health data sources including electronic health records, medical claims data, medical imaging data, genomics data, and data streams collected from smart phones and wearable health and activity sensing devices like Fitbits and smart watches.

Within CICS, Professors Deepak Ganesan and Benjamin Marlin, and their collaborators and students, have been working on integrating advanced mobile and wearable sensing devices with state-of-the-art machine learning models and algorithms to support digital health in the mobile domain.

continued on page 4

NSF CAREER Grants Awarded for Data Analytics Research and Combatting Internet Censorship

Alexandra Meliou

Amir Houmansadr

CICS Assistant Professors Alexandra Meliou and Amir Houmansadr each recently received five-year National Science Foundation (NSF) Faculty Early Career Development awards.

"Alexandra's research on data analytics is extremely valuable in this new era of Big Data, and Amir's work on circumventing censorship is an important part of the on-going debate about communication privacy," said Professor James Allan, chair of the faculty. "These are both well-deserved awards."

Meliou's grant is to design and develop new technologies that will assist scientists, data analysts, and casual users in obtaining deeper insights about their data.

"Today, data is critical in almost every aspect of society, including healthcare, education, economy, and science," said Meliou. "However, because data is easily shared and reused, it has become less curated and less reliable. Data is often misused because its validity and origin are unclear, and mistakes easily propagate as data is often used to derive other data."

Meliou's work develops a new data analysis model that reasons about data derivations and reverse-engineers them to provide better explanations for unexpected observations, more accurate and efficient diagnoses of problems, and better tools for making data-driven decisions and planning.

Houmansadr's CAREER project is to combat Internet censorship by analyzing current censor-circumvention systems and designing a model that will lead to new anti-blocking tools.

"Censorship resistance tools exist already to help people circumvent those who block free access to the Internet," Houmansadr said. "But they have different levels of success against different types of censors, depending on the user's location and how aggressive the censoring government is. My goal is to make it much, much easier to bypass censorship no matter where you are in the world."

One approach that Houmansadr plans to use is to take advantage of emerging communication devices and techniques such as content caching, content delivery networks, mobility, and cloud computing to design new censorship circumvention tools. "These things are changing the way people use the Internet," he pointed out. "Another part of this research will look at these new paradigms of Internet communication and use them to devise new, sustainable ways to get around censorship."

The CAREER award is one of NSF's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education, and the integration of education and research. In receiving the CAREER awards, Meliou and Houmansadr joined 21 other current and former CICS faculty who have received CAREER awards in years past.

Letter from the Dean

Bruce Croft

Happy first birthday to the College of Information and Computer Sciences! We have just completed our first year as UMass Amherst's newest college. The year has brought a lot of changes as we navigate what it means to be a new college, create the Center for Data Science and Cybersecurity Institute, grow our faculty, and welcome new staff to our community.

In this issue, Distinguished Professor Jim Kurose, who is on leave from CICS to head up NSF's CISE Directorate, talks about computer science's increasingly vital role in society as an expanded footprint for the discipline. On our first birthday, what strikes me most about being a college is that our opportunities to make connections outside the Computer Science Building—to expand our footprint—have grown exponentially.

Great examples of new and strengthened connections in multi-disciplinary research can be found in our cover article, "Tackling Digital Health in the Mobile Domain." Deepak Ganesan and Benjamin Marlin's research on wireless sensing has the potential to lead to increased understanding of human behaviors, especially as they relate to addiction. Their work is increasingly being done in collaboration with clinicians and with faculty members in the life sciences. In fact, our faculty's association with UMass Amherst's Institute for Applied Life Sciences (IALS) has led to a new, shared faculty position we hope to fill in the coming weeks. More examples of work that crosses boundaries are in our round-up of cross-disciplinary research, "CICS Faculty Expand CS Footprint with Collaborative, Cross-Disciplinary Research" (there's that footprint again); they show how CICS faculty are working to solve problems in a wide array of fields, including neuroscience, education, health, and environmental science.

Opportunities for industry connections via the Center for Data Science (CDS) and CICS Industry Affiliates Programs (IAP) are also on rise. CDS hosted member companies at its career mixer in October and has since held a series of industry events, culminating in its first annual Data Science Research Review held here in the CS Building on April 22. This year, the college's IAP hosted 15 industry events, including our wildly popular career fair—in all, 720 students have taken advantage of these opportunities to learn about technology companies as well as companies in the financial services and healthcare sectors.

With our new director of development, Julie Stubbs, now on board, we are in a good position to build philanthropy and alumni relations programs that will strengthen the college's connections with our donors and alumni community. Julie talks about the potential for increased alumni engagement in her profile, "When alumni whether undergraduate or graduate are involved members of the CICS community, amazing things happen…" I couldn't agree more.

During Commencement Weekend (May 6-7), CICS will host its first Senior Celebration and graduate our largest-ever class of undergraduate computer scientists. We look forward to welcoming them to our alumni community and hope that we have prepared them to tackle problems beyond the traditional bounds of the discipline. As we have learned in our first year, there is tremendous potential for having an impact in this expanded footprint for CS.

Bruce Croft, Distinguished Professor and Dean

Software That Beat World's Best Human 'Go' Player Has Roots in CICS

Andrew Barto

The ancient board game Go, played with black and white stones on a grid, is so complex that experts in artificial intelligence (AI) once believed it would be decades, if ever, before a computer could beat the best human player. In March, AlphaGo, an AI program developed by Google DeepMind, defeated the human world champion Lee Sedol, winning four of five matches in a tournament in Seoul.

Sridhar Mahadevan, co-director of the Autonomous Learning Laboratory at CICS, with Professor Emeritus Andrew Barto, said, "This is a huge breakthrough for AI and machine learning. AlphaGo was not programmed explicitly to play Go, but learned to play using an approach called reinforcement learning, or RL, pioneered here at UMass Amherst several decades ago by Andrew Barto, considered the father of RL, and his students, principally Rich Sutton. Many of the top researchers in the field today are his students. So this achievement was made possible by research done at UMass Amherst computer science, and it's a source of special pride for us all."

Barto and Sutton's book, *Reinforcement Learning*, considered the bible in the field, is cited in DeepMind's January paper in *Nature* outlining AlphaGo's strategy.

Barto said, "Many people didn't think this was possible, but here we are. It's a truly remarkable development. These results with AlphaGo are really historic, and the DeepMind team deserves an enormous amount of credit for their accomplishment."

Barto added, "I'm certainly not the real father because the basic idea goes back at least to the 19th century in psychology. The first computer science mention of RL I have found was by Alan Turing in 1948, but he never implemented it. The AI pioneer Marvin Minsky at MIT contributed some of the basic computational ideas. It sporadically arose in engineering and AI but had been considered too slow, requiring too much data. But now we have the computing power plus deep learning neural networks that when put together can tackle huge problems. I'm delighted to see that UMass Amherst played a role in this accomplishment."

For more: **cics.umass.edu/news/go_barto**.

Sitaraman Awarded Jewel of India


Ramesh Sitaraman

Professor Ramesh Sitaraman has received India's prestigious Hind Rattan Award in recognition of contributions to the field of computer science. This award is given annually to approximately 25 individuals of Indian origin, selected from a pool of over 25 million people who are of Indian descent but live abroad.

The "Hind Rattan" (a Hindi phrase, which translates to English as "Jewel of India") is granted by the Government of India and the Non-Resident Indian (NRI) Welfare Society. Sitaraman received the award in New Delhi on January 25, 2016, the eve of the 67th Republic Day of India, at a ceremony attended by senior members of India's government and Supreme Court, cabinet ministers, international ambassadors, scholars, and other dignitaries.

Professor Sitaraman's award recognizes his role in pioneering content delivery networks (CDNs). Such networks are now key to the functioning of the modern Internet. As a principal architect, he helped create the Akamai network, one of the world's largest CDNs, that currently delivers 15-30% of all web traffic. CDNs, which are pervasive today, enable web sites to download faster and online videos to play more smoothly.

Chancellor Kumble R. Subbaswamy said, "It is gratifying to see Professor Sitaraman recognized for his innovative research, which has had a far-reaching impact on how billions of people around the world access the Internet. Almost every Internet user in the world directly benefits from his research when they go online to read the news, watch videos, buy products, play games, or use a social network."

Sitaraman's current research focuses on all aspects of Internet-scale distributed networks, including algorithms, architectures, performance, energy efficiency, and economics.

Siegelmann Wins Hebb Award for Research


Hava Siegelmann

CICS Professor Hava Siegelmann, director of the BINDS laboratory, was selected as the 2016 recipient of the International Neural Network Society (INNS) Hebb Award in recognition of her "outstanding contributions to biological learning." The award will be presented at the 2016 World Conference on Computational Intelligence in Vancouver.

The award is named for Donald Hebb who pioneered the concept of brain self-organization and information processing. The Hebb award is presented annually to senior, "highly accomplished researchers for outstanding contributions made in the field of Neural Networks, and in particular, in the area of computational learning."

Siegelmann's primary contributions are in the field of biologically inspired computational systems. She is known for her seminal work on Super-Turing computation, an alternative form of computation that models dynamic biological systems more closely. Siegelmann is a core faculty member of the campus' Neuroscience & Behavior graduate program.

Moss Receives SIGOPS Hall of Fame Award


Eliot Moss

During the 2015 Association for Computing Machinery Symposium on Operating System Principles (SOSP), Professor Eliot Moss was honored with the prestigious Special Interest Group on Operating Systems (SIGOPS) Hall of Fame Award for his landmark paper on transactional memory, co-written with Professor Maurice Herlihy of Brown University.

The SIGOPS Hall of Fame Award was established in 2005 in order to acknowledge the most significant and pivotal operating systems research papers in the past decade. Moss and Herlihy's paper, "Transactional memory: architectural support for lock-free data structures," focuses on the architecture of transactional memory, which increased the ease and efficiency of lock-free synchronization.

The citation reads: *This paper introduced transactional memory, an architectural concept intended to make lock-free synchronization as efficient and easy to use as conventional techniques based on mutual exclusion. This concept has found its way into commercial multicore processors, and has generated a large amount of follow-on work in software transactional memory.*

Also at SOSP 2015, Professor Emery Berger and Ph.D. Candidate Charlie Curtsinger (now an assistant professor at Grinnell College) won a Best Paper award (see details in Student News on pg. 15).

DIGITAL HEALTH – – – – – – – – – – – *cont. from page 1*

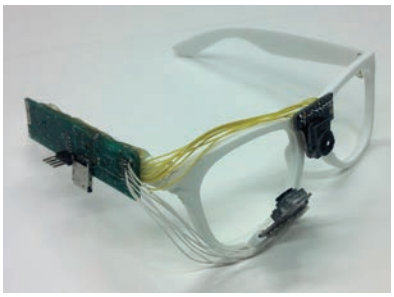
Their work has resulted in new approaches for assessing a wide range of health and behavior-related metrics and markers from eye movements to detecting smoking, eating, and drug usage.

Marlin and Ganesan have been collaborating since 2012 when they launched an NSF-funded project to design a next-generation ultra low power wearable real-time eye gaze tracking device. Eye gaze tracking is the problem of inferring where a user is looking in a scene based on an image of their eye and an image of the scene. Ganesan and Marlin's research focuses on enabling eye gaze tracking in real time at low power on an eye glass form factor device.

The current generation of their device is based on a low-power microcontroller, a unique camera that supports random access to individual pixels, and customized neural network based algorithms that learn to optimally trade off prediction accuracy against energy use. In addition to gaze tracking, the device supports continuous computation of other eye parameters including pupil dilation, eye closures, and eye movements that are useful in health applications like continuous fatigue monitoring.

Since 2013, with funding from the National Institute on Drug Abuse, Ganesan, Marlin, and their collaborators at the Yale School of Medicine have been working on the problem of detecting drug usage events based on wireless electrocardiogram (ECG) sensors since 2013. This system aims to detect changes in the morphological structure of heartbeats caused by the presence of drugs such as cocaine. This project has led to several additional lines of research including the use of probabilistic models to more accurately infer the morphological structure of noisy ECG waveforms, as well as research into machine learning methods for mitigating the problems of between person variability and lab-to-field generalizability when models and algorithms are deployed to new populations outside of lab settings

Eye gaze tracking device



Deepak Ganesan (left) and Ben Marlin

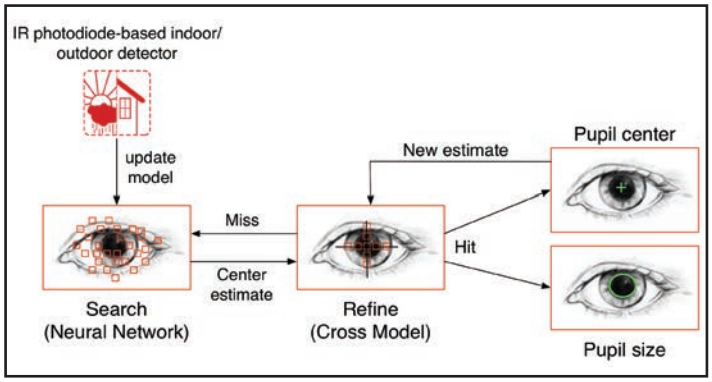


Figure 1: Real-time eye movement tracking and pupil dilation estimation

With CICS Professor Evangelos Kalogerakis, Ganesan has also studied the use of wrist-worn smartwatches and fitness bands with inertial sensors for advanced mobile health applications. While commercial devices like Fitbits and smart watches use these sensors to infer simple metrics like steps, Ganesan has investigated their use to differentiate between different types of hand gestures linked to health-related activities including smoking and eating. This work has led to an SBIR-funded startup, Lumme Inc, which uses gesture recognition for smoking cessation.

In 2014, Ganesan, Marlin, and collaborators from eleven other sites were awarded a five-year grant from the National Institutes of Health to establish the Center of Excellence for Mobile Sensor Data to Knowledge (MD2K). Marlin leads machine learning research for MD2K, while Ganesan leads the core program on sensor device development and sensor data analytics. The center leverages, extends, and integrates mobile health (mHealth) devices, data sets, and data analysis models and algorithms developed at all of the member sites in the pursuit of two driving health problems: smoking cessation and congestive heart failure.

Since the formation of the Center, Ganesan has worked to refine the computational eye glass platform and is integrating it into the MD2K sensor suite. Marlin has worked with MD2K director Santosh Kumar's research group on machine learning models to integrate their prior work on respiration-based smoking detection with Ganesan's prior work on actigraphy-based smoking detection, resulting in a new multi-modal smoking detection system.

Currently, Ganesan, Marlin, and CICS Professor Prashant Shenoy are collaborating on the development of new research infrastructure to support mHealth technology research and development on the UMass Amherst campus. This facility, called *mHealthLab*, is supported by capital funds from the Massachusetts Life Science Center and is being developed as a core facility of the newly established Institute for Applied Life Sciences (see **umass.edu/ials/**). The goal of mHealthLab is to provide a state-of-the-art testbed for performing mobile health user studies and data collection involving hundreds of simultaneous users. This facility will complement ongoing research being conducted through the MD2K center and will provide a platform for interdisciplinary collaborations across campus, and with industry and government partners.

Q & A with Jim Kurose


Jim Kurose

Jim Kurose is leading the Directorate of Computer & Information Science & Engineering (CISE) as an Assistant Director of the National Science Foundation (NSF). He is on leave from his UMass Amherst position as Distinguished Professor of Computer Science within the College of Information and Computer Sciences. He came to UMass Amherst straight out of graduate school in 1984 and has been a member of our faculty ever since. We asked him about his NSF position.

Tell us about your role at NSF.

I lead the CISE directorate with a staff of more than 140 people. NSF/CISE provides more than 80% of the federal funding ($933M for Fiscal Year 2015) for academic basic computer science research in the nation. CISE works closely with its community to identify opportunities that will continue to transform all areas of science and engineering. Beyond NSF, I work with leaders from industry, international organizations, and other federal agencies such as the White House's Office of Science and Technology Policy (OSTP) and with the U.S. Congress. I think the breadth of these collaborations reflects the reach, importance, and impact of CISE.

What are your goals during your term at NSF?

I hope to assist the CISE community to continue achieving research advances within core disciplines and collaborative research across disciplines. Our community is recognized for its leading roles in national, cross-government initiatives such as the Smart Cities Initiative, the National Strategic Computing Initiative, the National Robotics Initiative, the BRAIN Initiative, and the National Big Data Research and Development Initiative. I'd also like to foster expanded federal, university, and industrial partnerships, and to increase CISE's collaboration with other agencies and with international partners. Other top priorities include advanced cyberinfrastructure and nurturing the growing student interest in computer science in our nation's colleges and universities.

President Obama recently launched Computer Science for All (CS for All). What is the CISE Directorate's involvement with this initiative?

NSF is committed to improving the availability of comprehensive computer science education throughout the nation. The CS for All Initiative, launched by President Obama during a weekly address (the importance of CS education was also mentioned twice during his State of the Union address), builds on NSF investments over the last decade in broadening participation in computer science and computer science education efforts. Both of those NSF efforts were developed and led by Jan Cuny, who was a UMass Amherst CS professor during the 1980's and 1990's. Jan and I started together at UMass on the same day, and now it's great to be working with her again at NSF!

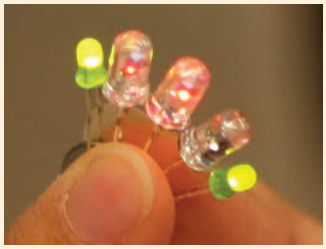
NSF is committing $120 million over five years to the CS for All initiative to prototype instructional materials, assessments, teacher resources, and scalable professional development. This investment could enable as many as 9,000 additional high-school teachers to be well prepared to teach computer science over the next five years.

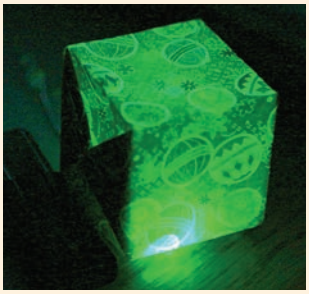
What is the most exciting/interesting aspect of the job?

I love working with all of the people at NSF, not just in the CISE Directorate, but also across all areas of science and engineering. Folks who work at NSF are incredibly dedicated and passionate about their work. I've also enjoyed working with folks from different government agencies who have a deep interest in computer science research. There are a number of academic computer scientists like me who are on leave from their university to contribute—Randy Bryant from CMU at OTSP, Scott Jordan from UCI at the FCC, and Margaret Martonosi from Princeton at the State Department come to mind. And, of course, there are many academic computer scientists working in CISE at NSF. I think we all feel it's a real privilege to be able to spend some time in government to help "move the needle" for the community and for the country. I also really enjoy meeting with CS faculty across the country. I've visited more than a dozen universities in my first year at NSF. I've also travelled internationally to represent NSF, including a memorable trip to Antarctica, where NSF maintains facilities at McMurdo Station and the South Pole.

Students Develop Creative Technologies

This fall, approximately 50 CICS students participated in the popular wearable electronics workshop led by Associate Professor Rui Wang. During the workshop, Wang helped students design and create a wide variety of animated light patterns using microcontroller programming. The resulting creations included accessories, decorations, and works of art such as the illuminated origami shown at right.





CICS Faculty Expand CS Footprint with Collaborative and Cross-Disciplinary Research

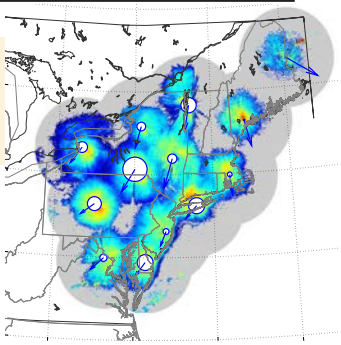
Computer Science within UMass Amherst has changed from a school to the College of Information and Computer Sciences (CICS). One of its strongest characteristics remains the same–the connectivity among its faculty and our commitment to productive research and teaching through collaborative and interdisciplinary work. This is evident in the latest research grants and research highlighted below.

For patients with HIV and other chronic conditions, taking medicines daily and exactly as prescribed is crucial for quality of life and long-term health. To support this, CICS Associate Professor **Deepak Ganesan** is teaming with **Jenna Marquard**, associate professor of mechanical and industrial engineering and CICS adjunct faculty, on a $1.71 million grant from the National Institutes of Health to develop a cost-effective, easy-to-use device for maintaining a medication regimen for HIV and other chronic conditions. They will work with the Swedish Medical Center in Seattle and the University of Washington to design and evaluate a wrist-worn device that detects when a person is interacting with the container and swallowing a pill.

"The challenge is to design a solution that is cost-effective, unobtrusive, and accurate so that it can be scaled easily," said Ganesan. "While there are many mobile phone and sensor-based solutions for medication adherence, they fall short of one or more of these goals. Some of them require expensive instruments on the pill bottles, others require manual input of information by a user, and most do not sense whether the pill was ingested or not." Marquard and Ganesan said that this project closely aligns with the goals of the UMass Institute of Applied Life Sciences (IALS) on the Amherst campus, which focuses on translating life science research into products that improve human health. As IALS Director Peter Reinhart, pointed out, "This is an exciting endeavor both because it addresses an important healthcare problem and because it is the type of interdisciplinary collaboration leading to real-world solutions that constitute the mission of the IALS Center for Personalized Health Monitoring."

In another multi-disciplinary initiative, CICS Assistant Professor **Dan Sheldon** is leading the CICS effort on a multi-institutional grant funded through the National Science Foundation's Expeditions in Computing Program. Cornell University is the lead on this $10 million Expeditions initiative. The CompSustNet project involves twelve partner institutions to explore computational sustainability. Along with UMass Amherst and Cornell, the partners include Bowdoin College, California Institute of Technology, Carnegie Mellon University, Georgia Institute of Technology, Howard University, Oregon State University, Princeton University, Stanford University, University of Southern California, and Vanderbilt University.

CompSustNet will act as a large national and international multi-institutional research and education network, collaborating with key governmental and non-governmental organizations in the areas of conservation, poverty mitigation, and renewable energy. "Our NSF Expedition brings together computer scientists and engineers, environmental and social scientists, physicists, and materials scientists charged with growing and expanding the horizons of the nascent field of computational sustainability," said Cornell PI Carla Gomes. "Advances in computational sustainability will lead, for example, to novel strategies to help herders and farmers in Africa improve their way of life, save endangered species, and scale renewables up to meet 21st century energy demand."



This Cornell Lab of Ornithology's BirdCast Traffic is an example of Asst. Prof. Dan Sheldon's work to measure bird migration using radar. He will continue to work with Cornell on this and other projects related to computational sustainability as part of the NSF Expeditions Grant.

In another interdisciplinary project, CICS Professor **Hava Siegelmann**, along with Patrick Taylor, Nick Hobbs, and Javier Burroni, conducted research that links brain architecture to consciousness and abstract thought. Using 20 years of functional magnetic resonance imaging (fMRI) data from tens of thousands of brain imaging experiments, the team has created a geometry-based method for massive data analysis to reach a new understanding of how thought arises from brain structure. Their work appeared in the December issue of *Nature Scientific Reports*. The authors said their work paves the way for advances in the identification and treatment of brain disease as well as in deep learning artificial intelligence (AI) systems.

Siegelmann believes this work, supported by the Office of Naval Research, will have far-reaching effects. "Currently, many brain disorders lack a clear biological identifier, and are diagnosed by symptoms, such as confusion, memory loss, and depression. Our research suggests an entirely new method for analyzing brain abnormalities and is a source of new hope for developing biomarkers for more accurate and earlier diagnoses of psychiatric and neurological diseases."

Finally, CICS Professors **Andrew McCallum** and **Beverly Woolf** are participating in the NSF Big Data Hubs program, a nationwide network for data innovation. McCallum and Woolf co-organized the first Northeast Big Data Hub Workshop held at Columbia University, which drew over 100 leaders from a wide range of industries, government, and universities. Participants discussed issues ranging from national security to corporate data analytics. Woolf is co-leader of the Northeast "Big Data in Education Spoke," a focus area within the Hub. McCallum is a member of the Northeast Hub's executive committee and a member of the "Discovery Science Spoke." CICS Professor David Jensen is a member of the "Finance Spoke," and CICS Professor Prashant Shenoy is a member of the "Energy Spoke." Though only in its first year, the Northeast Hub is already comprised of scholars from over 40 universities, governments, and non-profits in order to bring experts in the public and private sector together to collaborate on data-driven solutions in four theme areas: education, data sharing, ethics and policy, and privacy and security.

UMass Amherst Receives $4.2 Million to Train Next National Cybersecurity Workforce


Brian Levine

A team of UMass Amherst cybersecurity researchers led by CICS Professor Brian Levine has a received a $4.2 million grant from the National Science Foundation (NSF) to bring a CyberCorps Scholarship for Service (SFS) program to the campus, making UMass Amherst the first public university in New England to receive such an award. NSF's CyberCorps program, in partnership with the Department of Homeland Security, supports the educational and professional development of domestic students who will help the nation address threats to national security including critical infrastructure such as utilities, water treatment, military defense systems, and refineries.

The program, which will support a total of 28 students over the next five years, will admit its first students in the fall 2016 semester, according to Levine. U.S. citizen or permanent resident students can receive up to two years of support from the CyberCorps SFS. For each year they accept aid, they will serve for one year in a federal, state, or local government position related to cybersecurity.

"The program offers very generous support," Levine noted, "and we will be actively recruiting women and people from underrepresented minority groups interested in security." Graduate students receive full tuition and fees per year, plus an annual stipend of $34,000 and $9,000 in additional benefits; undergraduates receive the same except the stipend is $22,500 per year. In addition to financial benefits, Levine said students in the CyberCorps SFS program will receive support in extra mentoring groups, assistance in finding summer internships and permanent positions at federal and state agencies, and other professional development opportunities.

Upon graduation and completing the training, students will join government agencies at full pay and benefits working in cybersecurity, such as the FBI, National Institutes of Health, Centers for Disease Control, and analogous agencies at a state or local level. Any government service involving cybersecurity fulfills the service requirement, ranging from protecting the nation's infrastructure from state-based hackers to joining a state university as a researcher or educator in cybersecurity.

Katherine S. Newman, senior vice chancellor and provost, said, "This program answers a critical national shortage of highly trained experts in cybersecurity and will prepare students for successful careers in this field through a combination of strong curricula, ample professional development, extensive advising, interdisciplinary enrichment, and access to recruiting opportunities."

In addition to Levine, Wayne Burleson, engineering, Marc Liberatore, CICS, Mila Sherman, management, and Eric Sommers, mathematics, are also co-PIs of the program. Faculty members contributing to the grant include Emery Berger, Yuriy Brun, Lori Clarke, Krista Gile, Arjun Guha, Dan Holcomb, Amir Houmansadr, Gerome Miklau, Anna Nagurney, and Ryan Wright.

Net Zero Data Center Testing Sustainability

Prashant Shenoy

Some computer data centers see electricity bills in the millions of dollars each month, and costs continue to rise, said CICS Professor Prashant Shenoy, which is why the official opening in February of New England's first experimental solar-powered data center located at the Massachusetts Green High Performance Computing Center (MGHPCC) in Holyoke was recently hailed as a promising first step in leading the nation toward net-zero, green data and computing centers.

The 200-square-foot Mass Net Zero Data Center (MassNZ) is a shed-sized micro data center on the MGHPCC grounds. Using MassNZ for testing, Shenoy will lead a team of investigators in researching how to power data centers sustainably with renewable energy.

Solar panels next to the facility provide power to run about three racks of a total of 40 servers, with cooling systems, batteries, and micro-flywheels for energy storage, Shenoy noted. MassNZ will also house a variety of different server, storage, sensor, and network systems.

His colleague, David Irwin, electrical and computer engineering professor, said, "We are the first in New England and one of the first in the nation to be doing this research, and ours is certainly the only one of these facilities that is next-door to a real data center, so we can benefit from comparing our experimental scenarios with what it is doing in real time. The combination is unique."

Among scenarios the researchers plan to simulate are cooling with air conditioning vs. outside air, converting from solar DC to grid AC power, and using power from several different storage battery types. They are collaborating with HG&E to deploy these. One of the first tasks for the team will be to create software for managing experiments remotely from campus. Once fully operational, MassNZ will be available to UMass and other MGHPCC university researchers for conducting experiments. It is supported in part by grants from the National Science Foundation, the American Public Power Association, and the Massachusetts Clean Energy Center.

Industrial Affiliates Program News

Hundreds of undergraduate and graduate students attended the 3rd annual Computer Science Career and Internship Fair held in our computer science building on October 22, 2015. The room was packed with students connecting with recruiters and company representatives, many of whom are CICS alumni, to get advice on careers in computing and to apply for internships and career positions. CICS industrial affiliate companies in attendance included: **Akamai**, **AlphaSights**, **Amazon**, **Associated Environmental Systems**, **Cisco**, **EMC**, **Google**, **HP Enterprise**, **Liberty Mutual**, **MassMutual**, **Philips**, **Raytheon BBN Technologies**, **TripAdvisor**, **ViaSat**, and **Yahoo!**. During the morning of the career fair, IAP representatives gathered to hear from CICS faculty about the research being undertaken within the college.

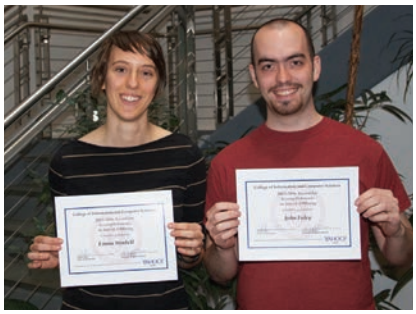
In addition to the Career Fair, many IAP companies met with students through a variety of events. **TripAdvisor**, **Google**, and **Facebook** gave talks on how to prepare for technical interviews. **Google** also held a resume review session and also brought some of their technical staff for a presentation on the "Impostor Syndrome." **EMC**'s Ramasundar Ramani, a senior director of architecture, spoke to students during a technical seminar on "EMC: Demystifying 3rd Platform." **Yahoo!**'s Edo Liberty, a research director and leader of the Yahoo! Labs Scalable Machine Learning group, gave a technical talk as part of the Machine Learning and Friends Lunch series that is sponsored by Yahoo!. Hewlett Packard Enterprise (**HPE**) also hosted a tech. talk on HPE storage and developing storage analytics. **MassMutual** held a session to discuss cybersecurity and the internships available at their organization. The college's newest IAP member, **Optum** (a subsidiary of UnitedHealth Group) hosted an information session in February. **AlphaSights** also held an information session in the fall. **Liberty Mutual** and **ViaSat** set up meet and greet opportunities for students to chat with technical staff and recruiters alike.

In addition to hosting events, some of our IAP companies have provided scholarships, award funding, and equipment.

In 2015, **EMC** Corporation established an undergraduate scholarship, with awards given to top sophomore undergraduates in the UMass Amherst College of Information and Computer Sciences. The 2015-2016 recipients of the EMC Award for Outstanding Achievement as a Sophomore are **Rachana Lingutla** and **Terry Breen**. Both Rachana and Terry are CS majors and are in the Commonwealth Honors College.

Since 2008, **Cisco Systems** has provided undergraduate scholarships to students within CICS. The recipients of the 2015-2016 Cisco Systems Awards for Outstanding Achievement as a Junior Undergraduate are **Dominic Defuria**, **Amanda Doucette**, **Thai Nguyen**, **Karl Schmeckpeper**, and **Raymond Tang**. This award is given to the top junior undergraduates in the college as determined by a faculty committee who took into account recommendations by faculty members, GPA, coursework, independent studies or honor projects, and course citations. In another scholarship funded by Cisco, **Elitza Neytcheva** was awarded the 2015-2016 Cisco Systems Scholarship for Underrepresented Undergraduate Students at UMass Amherst College of Information and Computer Sciences.

Doctoral students **John Foley** and **Emma Strubell** are the 2016 recipients of the college's Accomplishments in Search & Mining Awards. **Yahoo!** has sponsored these awards since they were established in 2009. Foley is a student in the Center for Intelligent Information Retrieval and Strubell is in the Information Extraction and Synthesis Lab. **Yahoo!** also provided CICS with 160 servers this fall through the Yahoo! university equipment donation program. As an example of how CICS is utilizing the servers, over 40 have been installed in one of the Center for Data Science's clusters for student educational use and as a testbed for new software applications that can be implemented on other CICS clusters once testing is complete.



Emma Strubell and John Foley

Leaders in Twelve States Focus on CS Education and Equity

President Obama's announcement of the "Computer Science for All" initiative in January echoed the mission of CICS-based projects that have worked to broaden participation in computing in Massachusetts and the U.S. over the last nine years. The day after the President's address, twenty-five state leaders and educators convened for the Expanding Computing Education Pathways (ECEP) Alliance Annual Meeting to strategize on how to ensure that all students have the opportunity to learn computer science in school.

Based at CICS, ECEP began in 2012, building on the work of the Commonwealth Alliance for Information Technology Education (CAITE), led by CICS Professor Emeritus Rick Adrion and GeorgiaComputes! at Georgia Tech. The National Science Foundation-funded alliance has grown to include twelve states and territories: Alabama, California, Connecticut, Georgia, Indiana, Maryland, Massachusetts, New Hampshire, Puerto Rico, South Carolina, Texas, and Utah.

"Education in the U.S. is mostly controlled at the state level. NSF is supporting us to share what we have learned and done in Massachusetts, and now with more states involved, we are all learning what it takes to expand CS education in different state contexts," said Adrion.

ECEP supports member states by providing resources to support state-level CS education reform, access, and equity. ECEP offers data for CS education advocacy, access to an experts' bureau, and mini-grants to fund small projects that help advance CS education throughout each state. In Massachusetts, Adrion works with the Massachusetts Computing Attainment Network (MassCAN) and the Department of Elementary and Secondary Education on the creation of K-12 digital literacy and computer science standards. ECEP/CAITE continues to provide professional development for teachers and contributes to efforts to expand CS education in the state, including developing credentials for teachers and making CS "count" for higher education admissions and high school graduation. For more information, see **ECEPalliance.org**.

First Place at HackUMass

CICS doctoral students Srinivasan Iyengar and Stephen Lee took home first place in the third annual HackUMass, a 36-hour, student-run hackathon that drew almost 400 participants to UMass Amherst on October 23-25, 2015.

Iyengar and Lee captured the prize with a web-based tool that allows homeowners to determine whether their house is a good candidate for rooftop solar panels. Using a combination of existing geographic programs such as Google Maps and cool image processing, Iyengar's and Lee's program, dubbed "Solartopia," determines roof sizes, tilt, and solar radiation at any U.S. location. First place prizes included $1024 for the winners to share and two Sphero BB-8 droids.

HackUMass participants hailed from 49 universities and 8 high schools, with 220 students coming from UMass Amherst. Of the UMass participants, over sixty percent were from CICS. CICS, the College of Engineering, and Isenberg School of Management were partners for the event. In addition to providing monetary support, CICS faculty served as judges and advised students on event logistics and fundraising.

CICS Sponsors Grace Hopper Celebration

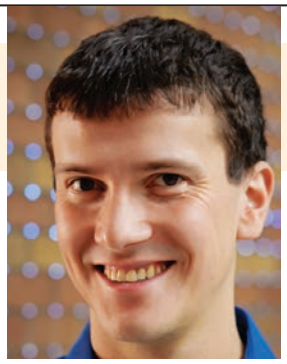
CICS and UMass Amherst had a strong presence at the 2015 Grace Hopper Celebration of Women in Computing in Houston, Texas (Oct 14-16) with 11 CICS students and one professor in attendance at the world's largest gathering of women technologists. The college also sponsored the event for the first time this year. Yahoo!, one of the CICS IAP members, provided funding for some of the students to attend, and additional funding was provided by CICS as part of an ongoing effort to support women in computer science. Some of the GHC attendees (l. to r.) gather at the CICS booth: Assistant Professor Alexandra Meliou, Tian Guo, Emma Strubell, Pinar Ozisik, Shiri Dori-Hacohen, Rose Tharail John, Amee Trivedi, and Anushree Ghosh. Missing from photo: Rebecca Bryan, Nabanita De, Kristina Fedorenko, and Yamin Tun.

Faculty Win Google and Yahoo! Awards for Cutting-Edge Research


Barna Saha

Assistant Professor Barna Saha was awarded a 2015 Yahoo! Academic Career Enhancement (ACE) Award and a Google Faculty Research Award. Assistant Professor Yuriy Brun and Professor Prashant Shenoy also received Google Faculty Research Awards.

Saha's Yahoo! ACE award is for her work in algorithm design and analysis, data analytics, and randomization in computation. This prestigious award is designed to aid promising first- and second-year professors at research universities who are conducting academic research that is relevant to Yahoo! Labs. She was one of three recipients selected out of talented professors considered for the award worldwide, each of whom must be nominated by Yahoo! Labs scientists and campus relationship managers.


Yuriy Brun


Prashant Shenoy

The Fall 2015 Google Faculty Research Awards were announced in February 2016. Saha received a Google award in the area of machine learning and Shenoy for systems research. In the Fall 2015 round, Google funded 151 projects from 950 proposals, covering 55 countries and over 350 universities. Brun was a recipient of the Summer 2015 Google awards that funded 113 projects from 805 proposals. He received his award in the area of software engineering and programming languages. According to Google, the "Faculty Research Awards program plays a critical role in building and maintaining strong collaborations with top research faculty globally."

Graduate Fellowships and Scholarships

A number of CICS endowed scholarships were awarded to incoming graduate students.

The 2015 recipient of the Jim Gray Scholarship in Computer Science is **Mehrnaz Najafi**, a first year doctoral student who received an M.S. in computer science from the University of Toronto in 2013. She also received a B.S. and M.S. in computer engineering from Shahid Beheshti University. Her research interests are in data management and software engineering.

Doctoral student **Sandhya Saisubramanian** is the 2015 recipient of the Robin Popplestone Fellowship in Robotics & Artificial Intelligence. She received an M.S. in computer science from the National University of Singapore and a B.S. in computer science from Pondicherry University. She is a research assistant in Professor Shlomo Zilberstein's Resource-Bounded Reasoning Lab.

Rian Shambaugh is the first recipient of the David W. Stemple Scholarship in Computing. She received a B.S. in computer science from George Washington University in 2015 where she was advised by CS Ph.D. alum Tim Wood ('09). Shambaugh, a doctoral student working with Assistant Professor Arjun Guha in the PLASMA Lab, has research interests in programming languages and formal verification.

Su Lin Blodgett, a first-year doctoral student, was named the 2015 recipient of the Paul Utgoff Memorial Graduate Scholarship. She received a B.A. in math from Wellesley College in 2015. Blodgett spent a semester abroad as part of the Budapest Semesters in Mathematics program. She is advised by Assistant Professor Brendan O'Connor. Her research interests are in using statistical text analysis to answer social science questions.

The UMass Amherst International Programs Office provides tuition waivers to a select number of CICS graduate students each year. The 2015-2016 tuition award recipients are: **Nabanita De, Shamya Karumbaiah, Vinitra Ramasubramaniam, Aishwarya Ramaswamy Govindaraj, Sandhya Sankaranarayanan, Manjeshwar Shenoy,** and **Jun Wang.**

Visit our new website for the latest news
cics.umass.edu

Towsley Elected to Brazilian Academy of Sciences

The Brazilian Academy of Sciences (Academia Brasileira de Ciências) recently elected Distinguished University Professor Donald Towsley as a Corresponding Member. He will be inducted in May 2016.

The Brazilian Academy of Sciences is the Brazilian equivalent of United States' National Academy of Sciences, honoring those who are pioneers in the scientific field. Corresponding Members are foreign researchers with recognized scientific merit who have provided relevant collaboration to the development of science in Brazil.

Data Science Research and Career Opportunities Mixer

Representatives from the inaugural members of the Center for Data Science's (CDS) Industry Affiliates Program (IAP) came to campus last fall for the first annual Data Science Career Mixer–a combined poster-session and career-fair event. More than 70 students, mostly M.S. and Ph.D. candidates, filled the halls of the Computer Science building while data scientists from the Center's IAP member companies visited their posters to discuss their research. Students also visited the company stations during the evening. A much larger CDS career mixer is planned for Fall 2016. Companies interested in learning more about the CDS IAP should contact **ir@ds.cs.umass.edu**.

MassMutual and Microsoft Support Data Science Community with Soirées and Training

Faculty from all of the Five Colleges–Amherst, Hampshire, Mt. Holyoke, Smith, and UMass Amherst–attended two data science soirées organized by the Center for Data Science (CDS) and sponsored by MassMutual to coalesce the data science community. In addition to computer scientists and statisticians, the events attracted linguists, chemists, social scientists, biologists, astronomers, and economists exemplifying the broad reach of data science. MassMutual's data scientists also participated.

"The regional data science community is rich and we want it to grow," said Sears Merritt, chief data scientist at MassMutual, from the new Data Science Laboratory in Amherst. "Data science is a vital component of MassMutual's long term strategy and hosting these events is a way for us to support and engage with the community." Professors David Jensen and Andrew McCallum have worked closely with MassMutual to develop their new data science programs. CICS Ph.D. alumni Marc Maier '14 and Matt Rattigan '12 currently work at this new lab.

Microsoft has also helped grow the data science community and, with the CDS, convened a daylong training session on Microsoft Azure, AzureML, and other tools in their cloud toolkit which attracted 60 faculty, students, and staff. Disciplines were similarly diverse and broad.

"We were so pleased with the turnout," said Kristin Tolle, director of Microsoft Research's Data Science Initiative. "We see this as a great launchpad for deepening the relationship we have with data scientists at UMass."

The CDS will continue to organize soirées and other events to build the regional data science community, including its first annual Research Symposium on April 22.

IESL Team Takes Top Prize in International Competition

A team of CICS Information Extraction and Synthesis Laboratory (IESL) researchers took the top prize in an international competition sponsored by the U.S. Patent and Trademark Office (USPTO) and U.S. Department of Commerce. They designed an algorithm that rapidly removes inventor ambiguity from patent records, providing users with more efficient and effective searches of the country's millions of inventors and patents. Their winning approach will be incorporated into the USPTO's new online platform, PatentsView.

The team, advised by Professor Andrew McCallum, IESL director and director of the UMass Amherst Center for Data Science, produced the winning algorithm in the competition, which attracted entries from China, Germany, Australia, Belgium, and the United States. IESL team members included graduate students Ari Kobren and Nicholas Monath; Michael Wick (Ph.D. '15), now at Oracle Labs; Sameer Singh (Ph.D. '14), now at the University of Washington; and Jack Sullivan (M.S. '15), now at Cambridge Semantics. The team had the fastest system in the competition as well as the system with the highest accuracy score.

As part of its win, the lab will receive a $25,000 stipend for technical guidance on applying the algorithm to millions of patent records in the PatentsView platform.

Why I Give


Andrew Merlino ('85)

No matter how large or how small, every single gift to CICS is greatly appreciated and put to good use. Here is why Andrew Merlino (B.S. '85) chose to give…

"In the early 80s, I was a computer science student who studied math and science and found computers useful. CICS computer science professors like Michael Arbib, Andrew Barto, Nico Spinelli, Lori Clarke, and Robert Moll helped to make me aware of all the possible avenues within computer science. Because of their teachings, I've been able to work in areas of electrical design, computer vision, database management systems, speech and language processing, and multimedia processing systems. Today, I am fortunate to be co-founder and president of Pixel Forensics, a software company. I'm happy that I can still work with and cross paths with current CICS Professors Erik Learned-Miller and James Allan as well as graduate students through project collaborations, student sponsorships, and hiring.

Why do I give? Because I'll never be able to pay back what UMass Amherst has given to me."

Alumni Networking Night

CICS alumni gathered at Amazon's Cambridge, MA facility on November 5, 2015 for the annual CICS New England Networking Evening. Attendees learned about the new college, reconnected with CICS faculty and friends, and expanded their professional network. Special thanks to Wayne Duso ('85), general manager for Amazon Web Services, for providing the venue.

Lifetime Alumni Email

Email forwarding addresses are now available for any of our UMass Amherst computer science alumni. Although you might change employers or Internet providers, your alumni email address will always stay the same and will forward your email to whatever address you choose. The email address will generally be firstname.lastname@alum.cs.umass.edu. To sign up for your email forwarding address, go to **cics.umass.edu/lifetime-email-forwarding**.

Alumni Connections

Shaun Kane (B.S. '03, M.S. '05) and **David Mimno** (M.S. '09, Ph.D. '12) are 2016 recipients of the prestigious Alfred P. Sloan Foundation Research Fellowships. The fellowships honor early-career scientists and scholars whose achievements and potential identify them as the next generation of scientific leaders. Dr. Kane, assistant professor of computer science at the University of Colorado Boulder, directs the Superhuman Computing Lab. Mimno is an assistant professor in the Department of Information Science at Cornell University.

Panos K. Chrysanthis (Ph.D. '91), a University of Pittsburgh professor of computer science, received the 2015 Provost's Award for Excellence in Mentoring. The award recognizes faculty "who have nurtured their doctoral students' professional and personal development, providing a strong foundation for the students' careers." He is the founder and director of the Advanced Data Management Technologies Laboratory, and he holds a secondary appointment in the Department of Electrical and Computer Engineering.

Dr. **Michael Franklin** (B.S. '83) has been appointed chair of the Department of Computer Science at the University of Chicago. Franklin will also serve as senior advisor to the provost on computation and data science. In 2009, he was recognized by CICS with an Outstanding Achievement and Advocacy (OAA) Award for Research.

Alexander Wolf (M.S. '82, Ph.D. '85) has been named dean of the University of California Santa Cruz's Baskin School of Engineering. Wolf currently serves as the president of the Association for Computing Machinery (ACM). In 2010, Wolf received a CICS OAA Award for Research.

Rukmini Vijaykumar (Ph.D. '89) joined CICS as a Visiting Lecturer. She is currently teaching a machine learning graduate level course at UMass' new Boston academic center located on Beacon Street. She is an independent consultant in the Greater Boston area and previously served as senior member of technical staff at Verizon Communications developing automated systems for network fault diagnosis.

In Memoriam: **Arthur I. Karshmer** (1940-2015). We are saddened to announce that CICS alum Arthur I. Karshmer (M.S. '74, Ph.D. '78) passed away on November 11, 2015 at the age of 75. Karshmer, professor emeritus in the School of Management's Department of Analytics and Technology at the University of San Francisco, received a CICS OAA Award for Contributions to Society in 2013.

In Memoriam: **Steven Levitan** (1950-2016): It is with sadness that we also announce the passing of Steven Levitan (M.S. '79, Ph.D. '84) on March 8, 2016. He was the John A. Jurenko Professor of Computer Engineering in the Department of Electrical and Computer Engineering at the University of Pittsburgh.

Recent Computer Science Ph.D. Graduates (September 2015)

Abhigyan Sharma; *Content Placement as a Key to Infrastructure Service Design for a Content-Dominated, Highly Mobile Internet;* Arun Venkataramani and Ramesh Sitaraman, Advisors; Sept. 15; Researcher, AT&T Labs Research

Hannah Blau; *Automated Style Feedback for Advanced Beginner Java Programmers*; W. Richards Adrion and Robert Moll, Advisors; Sept. 15

John Bowers; *Skeleton Structures and Origami Design*; Ileana Streinu, Advisor; Sept. 15; Assistant Professor, Department of Computer Science, James Madison University

See details on the graduates' research at: **cics.umass.edu/phdgrads_sept15**

Ethem Can; *Exploiting Concepts in Videos for Video Event Detection;* R. Manmatha, James Allan, Advisors; Sept. 15; Senior Software Developer, SAS

Thomas Helmuth; *General Program Synthesis from Examples using Genetic Programming with Parent Selection Based on Random Lexicographic Orderings of Test Cases;* Lee Spector, Advisor; Sept. 15; Assistant Professor of Computer Science, Washington and Lee University

Bo Jiang; *Network Characteristics and Dynamics: Reciprocity, Competition and Information Dissemination;* Donald Towsley, Advisor; Sept. 15; Postdoctoral Research Associate, UMass Amherst

Yoonheui Kim; *Application of Techniques for Map Estimation to Distributed Constraint Optimization Problem;* Victor Lesser, Advisor; Sept. 15

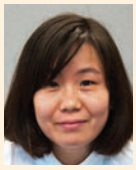
Chia-Jung Lee; *Exploiting Social Media Sources for Search, Fusion and Evaluation;* W. Bruce Croft, Advisor; Sept. 15; Applied Scientist, Microsoft

Vimal Mathew; *Energy-efficient Content Delivery Networks;* Prashant Shenoy and Ramesh Sitaraman, Advisors; Sept. 15; Self-employed

Aditya Mishra; *Energy Optimizations for Smart Buildings and Smart Grids;* Prasahant Shenoy, Advisor; Sept. 15; Assistant Professor, Seattle University

Brian Taylor; *Informed Search for Learning Causal Structure;* David Jensen, Advisor; Sept. 15; Machine Learning Engineer, Amazon

Philip Thomas; *Safe Reinforcement Learning;* Andrew Barto, Advisor; Sept. 15; Postdoctoral Fellow, School of Computer Science, Carnegie Mellon University



Sookhyun Yang; *Forensic and Management Challenges in Wireless and Mobile Network Environments;* James Kurose, Advisor; Sept. 15; Senior Performance Engineer, Akamai Technology

College Welcomes New Director of Development

Julie Stubbs

UMass Amherst fundraiser Julie Stubbs has joined CICS as director of development. Stubbs brings 12 years of experience in heading the philanthropic efforts at nonprofits and UMass Amherst. Her initial position on campus was in the College of Natural Sciences, where she supported the then-named Department of Computer Science in creating scholarship funds. Stubbs transitioned to director of development for the College of Education (CoE) in 2012.

Over three and a half years in the CoE, Stubbs partnered with leaders and donors to bring philanthropic support to critical areas such as faculty research, student scholarships, and buildings and infrastructure. Her work resulted in the college surpassing its campaign goal of $8.5 million one year prior to the conclusion of the UMass Rising campaign.

"We are very pleased to welcome Julie to CICS," said Bruce Croft, distinguished professor and dean. "She will be leading the college's efforts in fundraising and donor relations, strengthening our financial foundations, and building new, lasting relationships with those who support our mission. Julie is an exceptionally capable leader for our efforts in these areas."

Stubbs added, "When alumni, whether undergraduate or graduate, are involved members of the CICS community, amazing things happen—networks develop between students and alumni, alumni from different years connect with one another, industry-sponsored research bolsters faculty research and student support, and volunteers step forward to help guide the college and bring new opportunities to the forefront. This is the environment in which philanthropy lives."

Stubbs welcomes contact with all members of the CICS community and can be reached at 413-545-1220 or **stubbs@cics.umass.edu**.

Faculty News

Assistant Professor **René Just** was awarded an ACM SIGSOFT Distinguished Paper Award for his work published at the 30th IEEE/ACM International Conference on Automated Software Engineering (ASE 2015).

Distinguished Professor **Don Towsley**, CICS alum Boulat Bash (Ph.D. '15), Engineering Professor Dennis Goeckel, and four Raytheon BBN researchers collaborated on covert optics research that was published in the October issue of *Nature Communications*. The team developed the theory of covert (private) communications and demonstrated it experimentally in optical communications.

Distinguished Professor **Jim Kurose**, currently assistant director of NSF for CISE, was chosen to present during the Distinguished Colloquium Speaker series at Missouri University of Science and Technology's computer science department during their yearlong Golden Jubilee.

Distinguished Professor **Bruce Croft**, CICS dean, gave a keynote speech, "Finding Answers in Passages," at the WebQA Workshop held at the 2015 SIGIR Conference.

Professor **Erik-Learned Miller** was co-program chair of the Computer Vision and Pattern Recognition 2015 conference, which took place in June 2015 in Boston, MA.

Assistant Professor **Amir Houmansadr** and co-authors recently published a book, *Information Hiding in Communication Networks: Fundamentals, Mechanisms, Applications, and Countermeasures*, part of the IEEE Press Series on Information and Communication Networks Security, published by Wiley-IEEE. In other news, Houmansadr and his wife Saloumeh proudly announced the birth of their daughter Elsa, born on December 20th.

Assistant Professor **Yuriy Brun**'s and his co-author's paper, "The ManyBugs and IntroClass Benchmarks for Automated Repair of C Programs," that appeared in *IEEE Transactions in Software Engineering*, was recognized as the December 2015 spotlight paper. Brun and Assistant Professor **Alexandra Meliou** welcomed the birth of their son, Orion, on March 8th.

Professor **Emery Berger** received funding from Microsoft to support his lab's work on debugging spreadsheets. He was a visiting researcher at Microsoft Research in August 2015. Berger is also currently collaborating with CICS alum Tim Wood (Ph.D. '11), assistant professor at George Washington University, on a NSF-funded project "EVADE: Evidence-Assisted Detection and Elimination of Security Vulnerabilities."

Professor **Neil Immerman** was quoted in a *Science News* article on the "Computer Science 'advance of decade'" about László Babai's algorithm solving the graphing problem.

Gordon Anderson (Ph.D. '15), CICS lecturer, and his collaborators published a paper on the effectiveness of the "flipped" classroom, in the December issue of *CBE-Life Sciences Education*. Their study was noted in an Op-Ed piece in the *New York Times*. Anderson is also working with Professor Craig Martin, Department of Chemistry, on a class project for the

McGregor Receives College's First Outstanding Teacher Award

Associate Professor Andrew McGregor was selected as the recipient of the 2016 CICS Outstanding Teacher Award. "The CICS Awards Committee selected Andrew based on a number of factors including his excellent teaching evaluations, letters from students supporting his nomination, and his contribution to the college's teaching mission," said Associate Professor Arun Venkataramani, awards committee chair.

McGregor regularly teaches the undergraduate course on uncertainty and the graduate course on advanced algorithms among others. In nominating McGregor, students noted a number of McGregor's teaching strengths, including his energy and contagious enthusiasm; his mastery of subject material with interactive, clear, and well-presented lectures; his responsiveness to student feedback; and, his helpfulness during office hours. Students wrote: "he enjoys seeing students' ah-ha moment when they finally understood;" "I came into this class expecting it to be a dry subject, but it turned out to be one my most favorite classes thanks to Professor McGregor's teaching style and dedication;" and "this class is one of my favorite classes even though it was the hardest."

Andrew McGregor

In its inaugural year, the CICS award carries a $1000 prize and a commemorative plaque. McGregor will be formally recognized at the undergraduate commencement as well as during the Faculty Honors Dinner in April. The College Outstanding Teacher Award (COTA) program was instituted as a complement to the Distinguished Teaching Award and is administered by the Provost's Office and the individual colleges.

software engineering course he is teaching. The students are designing and implementing a significant extension to the "Molecular Playground," a system that displays large-scale interactive molecules in prominent public spaces. People may move and rotate the molecule by moving their bodies in front of the projected image. There are currently nine installations around the world, including on campus in the Integrated Sciences Building.

Researcher News

Patrick Taylor, **Alejandro Chinea Manrique de Lara**, and **Victor Hernandez-Urbina** joined the BINDS Lab as postdoctoral research associates.

Working with Assistant Professor Subhransu Maji, **Thomas Irmer** is a visiting scholar from Ruhr University in Germany.

Teresa Martin, a doctoral student from the University of Darmstadt, is a visiting scholar with IESL. Also joining IESL, **Ajay Nagesh** is a postdoctoral research associate.

A doctoral student at Princeton University, **Shilpa Nadimpalli Kobren** joined the Center for Data Science as a visiting scholar.

Howard Schultz, a senior research fellow within the Computer Vision Lab, retired from CICS in November after a 26 year career at UMass Amherst.

Student News

Senior undergraduate **Austin Suszek** is a 2016 UMass Amherst Senior Leadership Award recipient. The award recognizes graduating seniors who have demonstrated outstanding leadership and service to the UMass Amherst community.

Undergraduate **Robert Ambrose** is a recipient of the 2016 William F. Field Alumni Scholar Awards which were established in 1976 to recognize and honor third-year students for their academic achievements at UMass Amherst.

Professor Emery Berger and Ph.D. Candidate **Charlie Curtsinger** (now an assistant professor at Grinnell College) won a Best Paper Award at 25th ACM Symposium on Operating Systems Principles (SOSP 2015), the most prestigious venue for systems research. Their paper, "Coz: Finding Code that Counts with Casual Profiling," introduces "causal profiling," a technique that pinpoints exactly which code programmers should work on in order to make applications faster or more responsive. Using their system, known as Coz, they were able to speed up a number of applications by up to 70%.

CICS Undergraduate Dean's List – Fall 2015

See the full Fall 2015 Dean's List and the list of student citations (students recognized for their outstanding performance in the classroom) at **cics.umass.edu/people/fall-2015-deans-list-and-citations**.

Mitrano Joins CICS

Tracy Mitrano

Tracy Mitrano has joined the College of Information and Computer Sciences as the Academic Dean of a new cybersecurity program to be called the Trust, Assurance and Cybersecurity, or TAC. A component of the college's Cybersecurity Institute, TAC is a certificate program comprised of three new courses and one existing course: Internet Law and Policy, Information Risk Management, Cybersecurity, and a TAC Capstone. The certificate program will be taught in the UMass Center at Springfield in the Tower Square district of Springfield, MA.

Mitrano is the former director of Information Technology Policy at Cornell University. Prior to that role, she was a lecturer in social policy in the College of Human Ecology at Cornell. She has a doctorate in American History from Binghamton University and a law degree from Cornell University Law School.

CICS undergraduate **Samantha Kolovson**, a member of the UMass Amherst Varsity Women's Rowing team, earned a silver medal by placing second at the Head of the Charles in the club singles race in the fall.

MIT Technology Review highlighted CICS graduate student **Valentin Kassarnig's** political speech generator in the article "How an AI Algorithm Learned to Write Political Speeches." Kassarning's research used machine learning techniques to train his system on a database of political speeches to create speeches on its own.

The college's student-run **CS Women**'s group received a 2015 NCWIT Student Seed Fund grant to organize, host, and promote a series of technical workshops taught by students (male and female) for students on everyday technical skills. In participation with Graduate Women in STEM (GWiS) and the Indian Students Association (ISA), the CS Women group was also awarded a Welcoming the World to Amherst grant by the Student Engagement and International Programs Office.

Staff News

In January, **Jessica Fill** joined the college as personnel officer.

The Center for Data Science welcomed **Jim Demary**, associate director of strategic communications, **Pamela Mandler**, assistant operations director, and **Lauren O'Brien**, administrative assistant.

Melisa Bok joined IESL as a software engineer.

Sarah Dunton is the new Expanding Computing Education Pathways (ECEP) alliance manager working with national partners who are reforming computer science education.

Significant Bits

Newsletter of the
College of Information and Computer Sciences at the University of Massachusetts Amherst

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Your news, suggestions, comments, and contributions are welcome. Please mail them to the address above or send them electronically to **bits@cs.umass.edu**.

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