

Significant BITS

Newsletter of the
School of Computer Science



NSF selects Kurose to lead CISE Directorate

The National Science Foundation (NSF) has selected Distinguished Professor Jim Kurose to serve as assistant director for its Directorate for Computer & Information Science & Engineering (CISE). The three-year appointment began in January 2015.

Kurose has served in a number of administrative roles including chair of the CS department, interim dean and executive associate dean of the College of Natural Sciences and senior faculty advisor to

continued on page 4

News

| | |
|---------------------------------|------|
| Data Science Center Established | 5 |
| Osterweil, Moll retire | 9,11 |
| ImmermanFest | 13 |
| Moll Scholarship | 11 |

Alums

| | |
|-----------------------|----|
| Cambridge Alum Social | 12 |
| Recent Ph.D. Grads | 13 |

Training computers to generate 3D shapes

Digital three-dimensional (3D) content is becoming ubiquitous. 3D printers, augmented reality applications, collaborative virtual environments, physics simulation techniques, and computer-aided design rely on the availability of digital content in the form of 3D shapes and scenes. Unfortunately, creating digital representations of shapes and scenes is largely out of reach for users without extensive experience and training on modeling tools, such as 3DS Max, Maya, ZBrush, Blender, and so on. Even for professional modelers and digital artists, creating a compelling and highly-detailed shape can take several hours or days. The reason is that existing modeling tools require users to interactively specify a series of low-level laborious selection and editing commands; e.g., create and manipulate individual 3D curves, points, or patches.



Figure 1: User interface for creating and exploring virtual creatures by specifying semantic attributes reflecting high-level design intent.

Assistant Professor Vangelis Kalogerakis' research deals with the development of computer algorithms that generate 3D shapes given high-level design goals and specifications provided by the users. Instead of painstaking low-level commands, the user

continued on page 3

Brun receives NSF CAREER award to improve software quality

Assistant Professor Yuriy Brun received a five-year National Science Foundation (NSF) Faculty Early Career Development (CAREER) award for the project "Improving Software Quality using Dynamically Inferred Models."

"Software has become an integral part of our society and it is hard to imagine many aspects of our lives, including the economy, healthcare, and communication, functioning without software," said Brun. "However, software is rarely perfect and software defects can have serious consequences, such as security breaches and the compromise of private information."

While these high costs of defects are well known, the software industry has been unable to remedy the problem because the inherent complexity of software is so high that even the best, most careful developers still make mistakes. As a result, defects are not only common, but new defects are typically reported faster than developers can fix them. This makes the problem of improving software quality one of the

continued on page 6



Lori A. Clarke

This has been an incredibly busy time for Computer Science, with a number of very exciting new endeavors. First and foremost, plans are moving ahead to become an independent college. It was only a few years ago that we announced that we were a *School* of Computer Science within the College of Natural Sciences. That step increased our independence, but we viewed it as only a steppingstone to become a truly independent college. As we repeatedly demonstrated our ability to function as an independent unit and as the importance and centrality of computing has become ever more apparent, the university administration has joined us in advocating for a **College of Information and Computer Sciences** (CICS, pronounced “kicks” as in “kicks butt”). As we have presented our case before a number of faculty senate committees and councils, I have been pleasantly surprised by the overwhelming support we have received. It is clear that faculty across campus realize the potential impact computing can have on their disciplines and look forward to developing even more interactions with us. We still have a few more hurdles before the decision is final, but it appears that September 1, 2015 will be the inaugural date for the new college. There are many people to thank for pushing this forward. Our Strategic Planning Committee has been working on this for over a decade. Although many people have been involved, Professors Rick Adrion, Bruce Croft, Jim Kurose, and Lee Osterweil have devoted considerable energy to make this happen. Dean Steve Goodwin, the dean of the College of Natural Sciences, has also been a strong advocate, recognizing that although CNS will become smaller, the University will benefit overall. Also, the support of Chancellor Kumble Subbaswamy and Provost Katherine Newman has been vitally important. I’m writing this column before the Board of Trustees will actually vote on our collegehood proposal, but if you are reading it, the vote was positive!

Another new initiative is the Center for Data Science, which is being led by Professor Andrew McCallum and will have a kickoff workshop on April 9th. This center will be a catalyst for research and industrial interactions, emphasizing the investigation and development of new approaches for decision-making based on the analysis of large data sets. The opportunities for applying data analytics are exploding as companies and researchers uncover a treasure-trove of computer processible data that, with new and emerging techniques, can now be analyzed to provide new insights and improved decision making. In addition to synergizing research activities, the Data Science Center will be the impetus for a number of new educational programs. In addition to our Data Science Track and the Information Retrieval and Search Track in our undergraduate B.S. program, we expect to offer an M.S. degree with an emphasis on Data Science. Although we have over two-dozen faculty with research interests related to this area, we will be adding

new faculty in this important, emerging area to address the broad range of concerns and student interests.

As you read this newsletter, you’ll see that many of our faculty received important recognitions over the last half year. A special congratulations to Professor Jim Kurose, however, who has been selected to serve as assistant director for the Directorate for Computer and Information Science and Engineering (CISE) of the National Science Foundation (NSF). Although the title is “assistant” director, this is a very high-level position that influences the research direction of the NSF. As reported on pg. 4, Jim has already testified before Congress. I can’t think of a more energetic, articulate, and knowledgeable person to advocate for and represent computing at the NSF. We wish Jim the very best (but look forward to his return in three years).

Although we are all very happy for Professor Robert Moll and wish him the very best, it is with some sadness that I announce that Robbie, the perpetual teacher of many of the beginning computer science courses, retired this past December. He will still continue to teach some courses over the summer, in a post retirement appointment, but most new students will not have the pleasure of learning their first programming language or learning the wonders of data structures from him. Best wishes to Robbie and his wife Rachel Folsom for a well deserved retirement.

This fall brought to an end our 50th Anniversary (and our first) Community Drive. With your contributions and participation, we were able to meet nearly all of our (50%*4) goals. We increased the total number of donors and the number of first time donors by over 50%. Amazingly, we also increased the number of endowed scholarships by over 50%, adding four new endowed scholarships: the Clarke Scholarship for women and minority graduate students, the Flynn Scholarship for undergraduates, the Kurose Scholarship for graduate students, and the Moll Scholarship for students who attended community college. We are delighted that some of our alumni have stepped forward to establish student scholarships, and those faculty who have had scholarships named in their honor are proud to have their name associated with supporting our students. I know that most of our faculty would agree with me that the best part of being a faculty member is to be involved in helping students achieve their goals in life. Thanks to everyone who contributed for the first time and to those that contribute regularly to CS. We owe a special thanks to alumnus and friend, Steve Vinter, site director at Google Cambridge, who initiated the Community Drive with a \$50,000 matching pledge and encouraged us to develop goals to help build our community. We can still use your help to achieve the final goal of increasing the number of email addresses of our CS alumni by 50%. To send us your email address, go to www.cs.umass.edu/forms/email-address-form. Don’t forget that our alumni are all entitled to a lifetime CS email address that can be forwarded to whichever email account you are currently using. We will not sell or distribute this email address to anyone. And, although we would like to use this email address to send you (infrequent) messages about CS activities, you can even opt out of receiving our messages. To sign up for an alumni email address go to www.cs.umass.edu/lifetime-email-forwarding.

3D SHAPES ----- cont. from page 1

input to these algorithms are linguistic attributes related to the desired shape category, geometry, and function. Users can interactively specify these attributes with interfaces that also enable exploration of design alternatives (see Figure 1 on page 1 - *More details can be found in "AttribIt: Content Creation with Semantic Attributes, Chaudhuri S., Kalogerakis E., Giguere S., Funkhouser T., Proceedings of ACM UIST 2013"*).

"How do these algorithms generate 3D shapes?" Kalogerakis answered that the core of these algorithms is machine learning, especially deep learning. The algorithms access large, online repositories of 3D models and learn statistical patterns and relationships between shape parts, patches, and feature points. For example, consider chairs. The position and geometry of the legs in a chair are strongly correlated to the position and geometry of the seat, back, and armrests, as well as the overall chair style and functionality. These correlations are hierarchically captured with latent variables in probabilistic models trained on the input repositories. Then the algorithm samples the probabilistic models to generate new shapes automatically, or perform statistical inference to generate the most likely shapes given high-level user specifications.

Figure 2 illustrates an example of input and output of the latest, deep learning algorithm developed by Kalogerakis and collaborators. On the left, an input collection of chairs, downloaded from an online repository, is shown. First, the algorithm segments the input shapes into semantic parts (backs, legs, armrests, and so on), continues estimating feature point correspondences (shown as blue spheres), and finally learns the probabilistic model based on these processed shapes. Segmentation and correspondences are performed with no or minimal human supervision; e.g., the user provides an exemplar segmentation of a four-legged chair, an office chair, and a bench. On the right, Figure 2 demonstrates chairs automatically generated by sampling the learned probabilistic model. The user can also interactively browse the generated shapes or parts with linguistic attributes using exploratory interfaces, such as the one shown in Figure 1. The relationships of shapes and their

parts with linguistic attributes are also learned from online repositories with sparsely labeled data.

"Can the generated shapes be readily used in the physical world or in a virtual environment?" Kalogerakis replied that the generated shapes can be used to populate a virtual world, however, they need further processing to be used in the physical world. The reason is that currently the synthesis algorithm is ignorant of physics and materials. "Nobody guarantees that if you print the chair or its parts with a 3D printer and then sit on it, it will not break!" Kalogerakis said. Ongoing research in the graphics lab involves the development of algorithms that optimize the geometry of a shape and connections between its different parts to ensure its functionality.

There are several other exciting research directions related to automatic shape synthesis. The current algorithms are limited to generate relatively small-scale objects, such as furniture, toys, and tools. Generating large-scale shapes, such as vehicles or buildings, require algorithms that understand complex part arrangements, symmetries, and topology variations. Functionality is also significantly more complicated in these shapes, since it involves dynamic movement and interactions of their parts. Another interesting future direction is to develop interfaces that allow users to specify attributes related to design styles for controlling shape synthesis. For example, users could specify high-level attributes for buildings, such as "gothic" or "baroque" architectural style. Kalogerakis said that developing algorithms that classify objects into temporal and geographic styles in a similar manner to humans is particularly challenging, since it requires discovering non-trivial patterns across shapes that are largely different in structure. Kalogerakis is currently investigating these research problems together with other members in the computer vision and graphics lab as well as external collaborators. His research is supported by an NSF grant and start-up funds provided by UMass Amherst CS.



Vangelis Kalogerakis

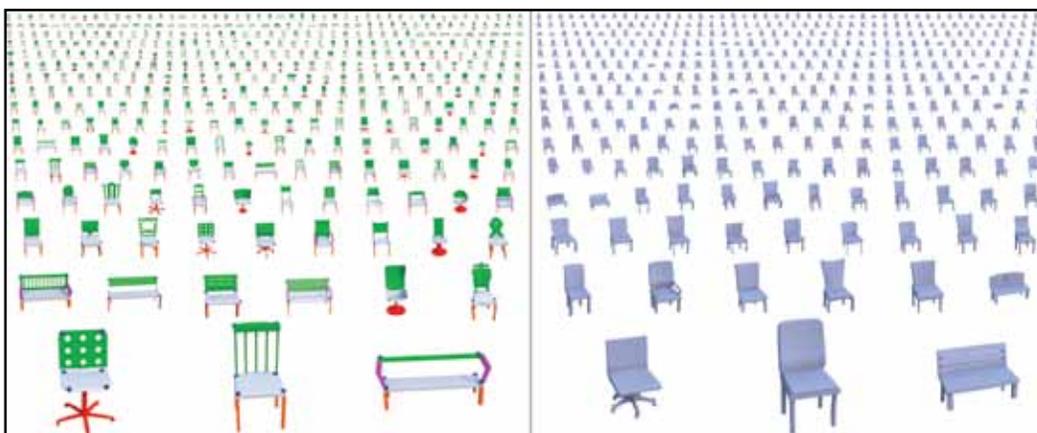


Figure 2: (Left box) Input repository of chairs. Chairs are segmented into semantic parts and feature point correspondences (blue spheres) are estimated across them. (Right box) New chairs are synthesized by sampling a probabilistic model trained on the input repository based on deep learning techniques.

KUROSE NAMED TO NSF POST – – cont. from page 1

the vice chancellor for research and engagement. “While we will miss Jim during his tenure at NSF,” said Lori Clarke, professor and CS chair, “we are delighted that CISE will be in such talented hands.”

“I’m honored to have been selected for this opportunity to serve the research community and the country,” Kurose said. “The role of computing in cybersecurity, infrastructure, networking, big data, and more continues to be of national importance. And NSF plays a crucial and fundamental role in contributing to our understanding of these and other issues.”

CISE’s mission is to promote the progress of computer and information science and engineering research and education and advance the development and use of cyber infrastructure; promote understanding of the principles and uses of advanced computer, communication, and information systems in support of societal priorities; and contribute to universal, transparent, and affordable participation in a knowledge-based society.

NSF Director France A. Córdova said, “Dr. Kurose has contributed significantly to the nation’s understanding of computer sciences, both through his research focus and through his engagement with students across the world. His stellar reputation in the complex field of computer networking will translate well at NSF, as will his achievements and leadership for which he has received impressive recognition through the years.”

UMass Amherst Chancellor Kumble R. Subbaswamy said, “I congratulate Dr. Kurose as he takes on this significant leadership role at the National Science Foundation. He has long been one of our most accomplished computer science researchers who is also a talented teacher and valued mentor. That one of the world’s pre-eminent research agencies has turned to Dr. Kurose to help set the nation’s agenda speaks highly of his expertise and all he has contributed as a member of UMass Amherst’s outstanding computer science faculty.”

“Jim Kurose is a fantastic choice for NSF CISE Assistant Director,” said J Strother Moore, chair of the CRA Board of Directors, Inman Professor of Computing in the Computer Science Department of the University of Texas at Austin and

former co-chair of the CISE advisory committee. “He has served on the CRA Board for seven years. He is thus very familiar with many issues in computing research and with the potential and broad impact of that research. We at CRA will miss his perspective and wisdom on the Board, but are thrilled that NSF has made such a superlative choice for CISE and the computing research community.”

Kurose’s research interests include computer network protocols and architecture, network measurement, sensor networks, multimedia communication and modeling and performance evaluation. He has been a visiting scientist at IBM Research, INRIA, Institut EURECOM, the University of Paris, the Laboratory for Information, Network and Communication Sciences, and Technicolor Research Labs.

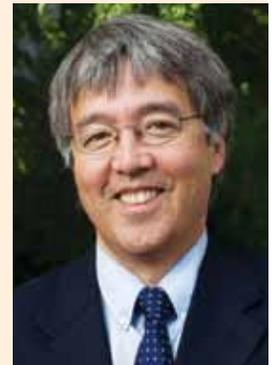
Kurose has served as editor-in-chief of the Institute of Electrical and Electronics Engineers (IEEE) *Transactions on Communications* and was the founding editor-in-chief of the IEEE/ACM *Transactions on Networking*. With Keith Ross, he co-authored the textbook, *Computer Networking: A Top-Down Approach*, which is in its 6th edition. He has received recognition for his research, including the IEEE Infocom Achievement Award, the ACM Sigcomm Test of Time award, and multiple conference best paper awards. He has also been recognized for a number of campus and regional outstanding teaching awards, the IEEE/CS Taylor Booth Education medal, and the Massachusetts Telecommunication Council Workforce Development Leader of the Year award. Within Massachusetts, he has helped lead the Commonwealth Information Technology Initiative and the Massachusetts Green High Performance Computing Center.

In addition to being an IEEE and ACM Fellow, Kurose has served on a variety of advisory boards, including the CISE advisory committee and the Board of Directors for the Computing Research Association (CRA). He received his Ph.D. and M.S. degrees in computer science from Columbia University and a B.A. degree in physics from Wesleyan University.

Visit us at www.cs.umass.edu
for the latest news

Kurose testifies before Congressional committee

During his first month on the job at NSF as Assistant Director of CISE, Jim Kurose testified before the Subcommittee on Research and Technology for the Science, Space, and Technology Committee of the U.S. House of Representatives. The hearing on cybersecurity and the expanding cyber threat was held on January 27th. During his testimony, Kurose noted that “the Nation’s cyber security research community is key to enabling the design, implementation, and deployment of systems that are secure and trustworthy. NSF continues to formulate and develop a comprehensive research portfolio around a view of systems that are deemed trustworthy, i.e., systems that people can depend on day after day and year after year to operate correctly and safely – from our avionics, mass transit, and automobile systems to medical devices operated remotely to save lives on battlefields. ... our Nation needs to continue to invest in long-term, fundamental and game-changing research if our cyber systems are to remain trustworthy in the future.”



UMass Amherst Launches new Center for Data Science

UMass Amherst is creating a new Center for Data Science to coordinate and significantly expand its capacity for research, training, and industrial collaboration in support of the exploding demand for the acquisition and analysis of “big data.”

“It is not hyperbole to claim that we have entered the ‘age of data,’ in which the most important advances in the international economy will be driven by the technical and analytic possibilities inherent in this new field,” said UMass Amherst Provost Katherine Newman. “We are building on our strong international reputation in machine learning and other areas of data science, and investing heavily.”

Augmenting the more than 20 new faculty hired over the past five years in various data-science-related fields, the Provost is providing funding for researchers, infrastructure, and six new faculty positions, while seeking additional funding for 30 more faculty to be hired over the coming ten years.

Data Science develops and applies methods to collect, curate, and analyze large-scale data, and to make discoveries and decisions using those analyses. It addresses challenges from how to design accurate wearable health sensors, to the interpretation of images and text, to the design of efficient parallel-distributed algorithms for streaming data at massive scale.

“Industry demand for our data science graduates has been insatiable—our students are snapped up, often receiving multiple job offers long before they graduate,” said Lori Clarke, chair of the School of Computer Science. The new center will coordinate the creation of a new MS concentration in data science—where the School expects to dramatically increase its student population—as well as new degree tracks in both the computer science BS program and experimental Information Technology (IT) program.

The Center for Data Science will be directed by Professor

Andrew McCallum, an international leader in the fields of machine learning, information extraction, and social network analysis. He is the current President of the International Machine Learning Society, which governs the flagship conference in the field. He is among the most highly cited authors internationally in the fields of natural language processing and social network analysis, with over 250 papers and almost 40,000 citations. He has former business experience as Vice President of Research & Development at a 170-person company and has collaborated with more than 20 companies during his tenure as professor at UMass Amherst.



“I am tremendously excited to help UMass grow in this important field that combines such interesting intellectual research and has such broad impact,” said McCallum. “I am looking forward to stimulating collaborations spanning the many data-science-related fields across the Five Colleges and with industry, as we shape our research and education programs.” The new education programs will include opportunities for mentorships and internships with industrial partners.

The UMass Amherst Center for Data Science (ds.cs.umass.edu) will be formally launched April 9, 2015 in an all-day event that will bring together faculty from across the Five Colleges, Massachusetts government officials, and more than 50 industry participants, including representatives of Google, Amazon, Microsoft, Yahoo!, Microsoft, IBM, MassMutual, Oracle, Thomson Reuters, BAE, venture capitalists, as well as the head of Computer and Information Science and Engineering at the National Science Foundation.

Research to enhance users' Internet experience

CS Professors Donald Towsley and Ramesh Sitaraman, with ECE Professor Christopher Holot and CS alum Zhi-Li Zhang (Ph.D. '97; now Prof. at Univ. of Minnesota-Twin Cities), are collaborating on a National Science Foundation-funded Internet content ecosystems interdisciplinary project, studying the increasingly complex ways in which content is delivered to users on the Internet and to invent new architectural and algorithmic mechanisms to coordinate these better.

According to the researchers, this project is “focused on gaining insights to help guide the evolution of future Internet services, resulting in better quality-of-experience (QoE) for the users, and greater system efficiencies for the entities in the ecosystem.”

“The Internet used to be a simple place, but no longer,” Sitaraman said. “Even the seemingly simple act of a user

watching an online video triggers a complex series of interactions between the content provider providing the video, the ISP providing Internet connectivity to the user, and one or more CDNs tasked with delivering the content. These interactions are often loosely coordinated and can sometimes go unexpectedly awry, leading to an inferior online experience.”

The key to the future success of the Internet rests squarely on understanding these complex interactions and in inventing new architectural and algorithmic mechanisms to coordinate them better, the researchers say. But this is no easy task because the Internet consists of thousands of organizations that often act independently with minimal coordination.

Towsley added, “Solving the puzzle requires a truly interdisciplinary approach. We will apply a rich set of techniques from control theory, network algorithmics, and mathematical modeling to develop new and better ways of managing complex interactions between these organizations.”



Provost Katherine Newman presents award to Bruce Croft

Croft honored with research award

During the UMass Amherst Faculty Convocation held in September, 2014, Distinguished Professor Bruce Croft was presented with the UMass Amherst 2014 Award for Outstanding Accomplishments in Research and Creative Activity. He is one of eight nationally and internationally acclaimed faculty members presented with the 2014 award. Croft is the founding director of the Center for Intelligent Information Retrieval (CIIR), and he recently graduated his 33rd Ph.D. student. His research interests span many areas of information retrieval (IR), including retrieval models, text representation, web search, query processing, and search architectures. Within the past year, he was honored with two lifetime achievement awards: the 2014 IEEE Computer Society Technical Achievement Award and the 2013 Tony Kent Strix Award. He has published over 250 scholarly articles, including an IR textbook, and has an h-index of 90 according to Google Scholar.

Mellon Grant awarded to explore big data in the humanities



Professor James Allan is collaborating with Northeastern University's NULab for Texts, Maps, and Networks on a half million dollar grant from the Andrew W. Mellon Foundation to develop the Proteus toolset for information retrieval and visualization.

Northeastern Professor David Smith (adjunct UMass Amherst CS faculty) and associated NULab faculty are working with Allan to build software tools to help researchers in the digital humanities to explore the contents of large, unstructured collections of historical books (two million out-of-copyright books), newspapers, and other documents. Users of the Proteus system will be able to interactively and incrementally build up collections by analyzing networks of text reuse among books, passages, authors, and journals; provide feedback on terms, phrases, named entities, and metadata; and explore these growing collections during search, while browsing, and with the Bookworm interactive full-text visualization tool.

CAREER AWARD - - - - - cont. from page 1

most critical challenges facing our society today, noted Brun. It is this challenge that is the central goal of Brun's CAREER grant. He will develop techniques and tools that help developers understand the complex software behavior and the behavioral implications of software changes. These techniques and tools aim to improve the quality of software by helping developers do their jobs better and make fewer mistakes. Improving software quality in this way will reduce the negative effects of buggy software, thus positively affecting the many aspects of society that rely on software.

One significant cause of defects and poor software quality is the inconsistency between what developers think their system does, and what the system actually does. Brun's project focuses on reducing this inconsistency by helping developers visualize, explore, and understand the runtime behavior of their systems, and how the behavior changes when the developers change the code. "Today, common ways to reduce this inconsistency are to study the source code directly, to observe executions via a runtime debugger, and to instrument key locations in the code and use logging to peek into an implementation's runtime behavior," added Brun. "But these processes are highly manual and labor intensive, and often force the developer to think of a single execution at a time, rather than consider the system behavior as a whole." Instead, his project creates techniques and tools that help developers reduce this inconsistency by inferring precise, concise, predictive behavioral models from system execution

logs, aiding developers in comprehension and debugging tasks by comparing, visualizing, and querying such models, and generating tests from such models.

Brun joined the School of Computer Science in 2012. He was previously a Computing Innovation postdoctoral fellow at the University of Washington, funded by an NSF grant to the Computing Research Association. 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. Brun received one of twelve 2014 Microsoft Research Awards from the Software Engineering Innovation Foundation, and a 2013 IEEE TCSC Young Achievers in Scalable Computing Award, which recognizes individuals who have made outstanding, influential, and potentially long-lasting contributions in the field of scalable computing within 5 years of receiving their Ph.D. degree.

The CAREER Program is a Foundation-wide activity that offers the National Science Foundation's most prestigious awards in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education, and the integration of education and research. Such activities build a firm foundation for a lifetime of leadership in integrating education and research.



CS students receive prestigious fellowships



Four UMass Amherst computer science doctoral students received prestigious fellowships from Facebook, Google, Microsoft, and NASA.

John Vilks was chosen for a 2015-2016 Facebook Fellowship, one of only 11 Ph.D. student winners in the U.S. and Europe. The fellowship is a two-year award that covers tuition and fees, a stipend, and an opportunity for an internship at Facebook. Vilks is advised by Professor Emery Berger.



Xiaolan Wang was selected to receive a 2015 Google Fellowship in structured data. The Google U.S./Canada Ph.D. Student Fellowship Program was created to recognize outstanding graduate students doing exceptional work in computer science, related disciplines, or promising research areas. Wang is one of 14 recipients in 2015 for this two-year fellowship. Her advisor is Assistant Professor Alexandra Meliou.

Pan Hu received a 2015 Microsoft Research Ph.D. Fellowship, chosen as one of 12 Fellowship recipients from 169 applications received. Along with a financial award, he was offered the opportunity to participate in a 12-week research internship at Microsoft Research. Hu is advised by Associate Professor Deepak Ganesan.



Doctoral student Li Yang Ku received a 2014 NASA Space Technology Research Fellowship for his work on Integration of Robot Perception and Action. According to NASA, the fellowships support the goal of creating innovative new space technologies for our Nation's science, exploration, and economic future, while providing the Nation with a pipeline of highly-skilled scientists, technologists, engineers, and mathematicians to improve America's technological competitiveness. He is advised by Distinguished Professor Rod Grupen and Associate Professor Erik Learned-Miller.



Ganesan and Marlin collaborate on NIH Big Data Center of Excellence

In October, National Institutes of Health director Dr. Francis Collins announced the National Center of Excellence for Mobile Sensor Data-to-Knowledge (MD2K). Prof. Deepak Ganesan is leading the Sensors-to-Information research area within the MD2K Center, while Prof. Benjamin Marlin is providing machine learning expertise across the Center's research activities. UMass Amherst is one of 12 institutions collaborating on the MD2K Center and will share in \$10.8 million in research funding over the next four years.

The MD2K Center is focused on the development of new computational tools to facilitate the collection and analysis of large-scale health data generated by mobile and wearable sensors. The Center will address two driving health problems with high mortality risk: smoking and congestive heart failure.

Michael Malone, vice chancellor for research and engagement, said, "This is an exciting and important collaboration that will have great synergies on campus with work in the Center for Personalized Health Monitoring in the Institute for Applied Life Sciences."

As the MD2K researchers explained, mobile sensors offer opportunities for accelerating biomedical discovery and optimizing care delivery, but significant technological and scientific challenges related to the complexities of mobile sensor data remain to be resolved. To address these challenges, the MD2K team includes computer scientists, engineers, statisticians, and biomedical researchers.

"The promise of mobile health sensing is that we can use body-worn sensors to detect various behavioral and

environmental cues that will help predict adverse health events in real-time. For example, it has long been known that smoking relapse is related to stress, alcohol consumption, and other cues. With wearable sensors, we can aim to detect these cues in real-time and offer interventions to patients before relapse occurs," said Ganesan.

"The challenge," Marlin added, "is making the data analytics highly robust and scalable while taking into account energy use and communications costs as well as the security and privacy of the data. The MD2K Center will explore solutions to all of these problems, with the immediate goal of developing accurate and reliable computational tools that biomedical researchers will be able to easily incorporate into health and behavior studies."

MD2K collaborators include Cornell Tech, Georgia Tech, Northwestern, Ohio State, Rice, UCLA, UC San Diego, UC San Francisco, the U. of Memphis, U. of Michigan and non-profit Open mHealth. The MD2K Center is part of the NIH Big Data to Knowledge (BD2K) initiative, which is designed to support advances in research, policy, and training needed for the effective use of big data in biomedical research.



Deepak Ganesan, above, and Benjamin Marlin



Automated planning for semi-autonomous vehicles

Professor Shlomo Zilberstein has embarked on a National Science Foundation-funded project to explore the planning and challenges involved in automated planning for semi-autonomous systems. On this four-year NSF grant, he is working with Professor Donald Fisher from UMass Amherst Mechanical & Industrial Engineering and Claudia Goldman from General Motors R&D.

“Autonomous systems offer transformational impacts on society as they help reduce human labor, decrease risks and costs, and improve productivity and efficiency. They have been deployed in a wide range of domains from household products to space exploration vehicles,” said Zilberstein. “In many areas, however, there are still considerable barriers to the deployment of fully autonomous systems. These barriers range from technological to ethical and legal issues. Examples include driving a car, robot deployment in search and rescue operations, automated farming, and robotic surgery. When full autonomy is not possible, it is desirable to automate parts of the process. But classical AI planning techniques are inadequate for these settings.”

Zilberstein’s project offers a comprehensive study of planning for semi-autonomous systems—systems that are capable

of autonomous operation under some conditions, but may require manual control in order to complete the task at hand.

“Planning for semi-autonomous systems is challenging because it must account for the different skills of the human operator and the automated system, the communication between them required to facilitate smooth transfer of control, the uncertainty about human responsiveness, engagement level and readiness to take over control, and the possibility of human error in interpreting or following the plan,” noted Zilberstein. The project addresses both the computational challenges and the challenges that arise when humans are involved, with semi-autonomous driving as the primary focus. The team will be using several testbeds, including two realistic driving simulators (one shown above) to evaluate their research.



Shenoy conducts smart energy meter project

Professor Prashant Shenoy and Electrical and Computer Engineering Assistant Professor David Irwin are heading up a team of UMass Amherst researchers conducting a pilot project with the Holyoke Gas & Electric (HG&E) Company that will show the utility and its customers how smart electric meters can save money and power. The project is funded by a grant from the Massachusetts Department of Energy Resources.

Shenoy’s and Irwin’s team is using information from several dozen volunteers from HG&E’s customer base to demonstrate how to improve electricity use based on their metered use. Shenoy said the key to the entire project is the smart meters that give a detailed record of electricity use in a home and allows the utility and the scientists to see what appliances, lights, and heating and cooling equipment are being used during the day. The meters report electronically every five minutes so there is a detailed record from each house that uses the device.

Since HG&E has already installed the meters in the homes of its more than 18,000 customers, the data is already available, Shenoy said. The project is looking at electricity use for individual homes from the volunteer group and determining where savings can be achieved. The data management task is being done at the Massachusetts Green High Performance Computing Center in Holyoke using high-speed computers. Enhanced data collection from the system allows HG&E to conduct analyses and develop strategies relative to load management, network planning, outage prevention, and ratepayer incentives.

Shenoy said his team is looking specifically at a few key

sources of energy consumption in the home, with an emphasis on heating. He said many homeowners have programmable thermostats, but may not be using them to their peak efficiency. “Significant savings can be collected by programming the heat to come on just prior to people waking up in the morning, reducing the heat again when people leave the house for work or school and turning the heat back on just before the family returns in the late afternoon or evening, said Shenoy. “Refining this program can be accomplished by looking carefully at the meter data that shows ‘occupancy information’ such as when lights and appliances are turned on. Matching the occupancy information with the heating program can lead to energy savings of between 5 percent and 10 percent in most cases.”

For customers, this translates to direct savings on their energy bills through reducing and optimizing energy needs. But what many people don’t realize is that energy efficiency also results in cost savings to the utility by reducing capacity, transmission, and energy charges, as well as increasing equipment lifespans by minimizing stresses.

“HG&E is a very progressive utility,” Shenoy said. The use of the smart meters has a number of critical uses beyond monitoring household use of electricity, as well. Shenoy says “HG&E no longer has to send people to read individual meters and in the case of a power outage, it is automatically reported to the utility.”



Leon Osterweil retires

Emeritus Professor Leon J. Osterweil retired in May 2014 after 21 years of service at UMass Amherst. Through a post-retirement appointment, Osterweil continues to co-direct the Laboratory for Advanced Software Engineering Research (LASER) within the School of Computer Science and is an active member of many CS committees.

Osterweil received an A.B. in Mathematics from Princeton University in 1965 and an M.S. and Ph.D. in Mathematics from the University of Maryland in 1970 and 1971, respectively. Osterweil began his faculty career in 1971 as an assistant professor at the Computer Science Department, at the University of Colorado at Boulder, where he was later chair from 1981-1986. He joined the Information and Computer Science Department of the University of California at Irvine in 1988, and served as Department Chair from 1989-1992. He was also the founding director of UCI's Irvine Research Unit in Software. He joined the faculty of UMass Amherst Computer Science in 1993 and served as Interim Dean of the UMass Amherst College of Natural Sciences and Mathematics from 2001-2005.

CS alums Peri Tarr (Ph.D. '96) and Alexander Wolf (Ph.D. '85), editors of the Springer published book *Engineering of Software – The Continuing Contributions of Leon J. Osterweil*, wrote in the preface of the book: “Software engineering research can trace its roots to a small number of highly influential individuals. Among that select group is Prof. Leon J. Osterweil, whose work has fundamentally defined or impacted major directions in software analysis, development tools and environments, and software process.” In the area of software analysis, in 1973 he developed DAVE, one of the first static analysis tools, to detect errors and suspicious anomalies in software systems. DAVE was followed by the Cecil/Cesar dataflow analysis system in the late 1980s, one of the first model checking systems and probably the first one to be directly applicable to programs (instead of abstracted models of systems). From his work on analysis tools, it was clear that developers would need help in selecting and integrating the results from a broad array of analysis and support tools. This led to work in the area of integrated development environments (IDEs). Osterweil was a leader in the development of the Odin object management system and the Toolpack project, which developed one of the first IDEs for numerical software systems. He was one of the founding principals of the ARPA-funded Arcadia project and the follow-on DARPA EDCS project. These projects were some of the first to explore and advocate for programming language and environment support for implicit invocation, persistent object management, and dynamic system configuration. From these projects, he realized that a more powerful integration mechanism was needed to support the collaboration among various software and hardware components as well as human agents. This led to the development of the Appl/A process programming language, followed by the Little-JIL process programming language. Subsequently, Osterweil has demonstrated how Little-JIL can be used to support human-intensive systems in areas

such as healthcare, digital government, and mediation, in addition to his initial concern for supporting software development.

Osterweil has been a keynote speaker at a number of conferences, most notably the 9th International Conference on Software Engineering, was Chair of the ACM Impact Project, and was General Chair of the 2006 International Conference on Software Engineering (ICSE 2006) and the Sixth International Symposium on the Foundations of Software Engineering. Osterweil has been the Program Chair of many conferences, including ICSE 16. He is a director of the International Software Process Association and has been a member of Technical Advisory Boards for the Software Engineering Institute, KLA-Tencor, SAIC, MCC, and IBM. In addition he has consulted for such companies as AT&T, Boeing, and TRW.

Osterweil is a Fellow of the ACM, has been an ACM Lecturer, and has served on the editorial board of *IEEE Software* and *ACM Transactions on Software Engineering and Methodology*. His paper suggesting the idea of process programming was recognized as the Most Influential Paper of the 9th International Conference on Software Engineering (ICSE 9), awarded as a 10-year retrospective. Another paper on software tool integration, presented at ICSE 6, was runner-up for this honor.

Osterweil received the ACM SIGSOFT 2003 Outstanding Research Award, the 2010 Influential Educator Award, and the 2014 Distinguished Service Award for promoting and expanding the field of software engineering. He is one of two individuals to receive all three of these honors from ACM SIGSOFT. In recognition of his research, Osterweil was honored with the UMass Award for Outstanding Accomplishments in Research & Creative Activity in 2010. A Festschrift honoring Osterweil was held in 2011 during the 33rd International Conference on Software Engineering to celebrate his achievements with a series of talks by prominent members of the community. The Festschrift was well attended by his colleagues and by a large number of his academic descendants (see *Significant Bits*, Summer 2011).



We're on Facebook and LinkedIn

Keep up-to-date on the School's latest events and announcements. Join us on

Facebook: UMASS CS
and

LinkedIn:

UMass Amherst Computer Science

EMC student awards



EMC's Marie Gunning (l.) and CS undergrad Maya Bergandy (top); and Karl Schmeckpeper

EMC Corporation established an undergraduate scholarship this year, and continued funding the EMC Student Participation Awards. The 2015 recipients of the EMC Award for Outstanding Achievement as a Sophomore are Maya Bergandy and Karl Schmeckpeper. The award is given to top sophomore undergraduates in the UMass School of Computer Science, as chosen by a faculty committee.

In 2014, EMC established the Student Participation Award to assist CS students in conference travel and other activities. The 2015 EMC Student Participation Award recipients are Apoorva Rao Balevalachilu, Myungha Jang, Tiffany Liu, Sneha Shankar Narayan, Emma Strubell, Ameer Trivedi, Jing Xie, and Dan Zhang. This year's funding will help defray costs for the recipients to attend the CRA-W Grad Cohort Workshop in San Francisco. Four other CS graduate students, Yunmeng Ban, Ishita Dasgupta, Liudmila Elagina, and Sofya Vorotnikova, are also able to attend the Workshop through CRA-W funding.

CISCO undergraduate scholarships



Since 2008, Cisco Systems has provided undergraduate scholarships to students within the School of CS. The recipients of the 2015 Cisco Systems Awards for Outstanding Achievement as a Junior Undergraduate are Batkhuyag Batsaikhan, Anna Deng, Molly McMahon, and Isaac Vawter. This award is given to the top junior year undergraduates in the School 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, Nathan Greenberg was awarded the 2015 Cisco Systems Scholarship for Underrepresented Undergraduate Students at UMass Amherst Computer Science. Greenberg will graduate in 2017.

(above, l. to r.): Cisco's Yedidya Dotan, Isaac Vawter, Batkhuyag Batsaikhan, Cisco's David Putterman, Molly McMahon, and Anna Deng; (upper right) Nathan Greenberg

CS research review and career fair

On October 30th, 2014, the UMass Amherst School of Computer Science held an Industrial Affiliates Program Day with a Research Review and Career/Internship Fair. During the morning research review, attended by industrial affiliate partners and CS alumni, nine CS faculty discussed some of the latest research being undertaken within our School. Topics ranged from "securing untrustworthy JavaScript on the Web" to "machine learning for health care data analytics." In the afternoon, the School hosted the second annual Computer Science Career/Internship Fair, where students had an opportunity to meet with CS Industrial Affiliates Program members. IAP companies in attendance included Akamai, BBN/Raytheon, Cisco, EMC, Facebook, Fiksu, Google, HP, Juniper Networks, Liberty Mutual, Pegasystems, TripAdvisor, Vistaprint, and Yahoo!. The room was filled to capacity with over 300 students in attendance.



CS students attended the Grace Hopper Celebration of Women in Computing (GHC) in October, joining nearly 8,000 women at the event held in Phoenix, AZ. Yahoo! provided travel support for some of the students to attend the conference.

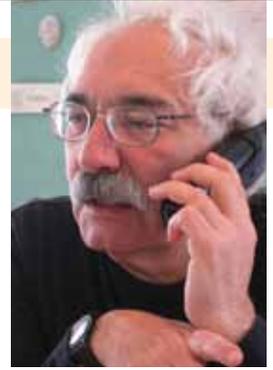
GHC Attendees (l. to r.): Myung-ha Jang, Kaleigh Clary, Katerina Marazoupoulou, Shiri Dori-Hacohen, Catherine Feldman, and Janet Guo. Missing: Yunmeng Ban



Robert Moll retires

Professor Robert Moll retired this past December, after spending more than forty years on the UMass Amherst Computer Science faculty. He arrived with a full black beard from MIT in the fall of 1973, after completing a doctorate in theoretical computer science that spring. “These were early days in the computer revolution,” noted Moll. Four years later, in 1977, Ken Olson, Digital Equipment Corporation founder, famously announced that “there is no reason why anyone would want a computer in their home.”

Early on, Moll’s research was in theoretical computer science, computational logic, and machine learning/optimization. His interests changed in the early 2000s, when he became interested in online interactive teaching and learning. Working with the Center for Educational Software Development (then CCBIT), he developed an online automated homework system for elementary Java instruction, and this work led to the creation of the online interactive textbook *iJava*. This text has been the mainstay of the department’s introductory programming class, CS 121 (which has a current enrollment of 550 students/semester), for many years now. The textbook is also being used at no cost by more than fifty high schools.



Beginning in the late 1980s, Moll was the department’s undergraduate program director. He was then associate chair of the department for ten years, during the chairmanships of Bruce Croft and Andrew Barto. One of his singular contributions during these years was the creation of the department’s Bay State Fellowship Program, through which our strongest undergraduates are offered support to complete a two year master’s degree. Close to one hundred students have now received Bay State Fellowships. Moll will continue to oversee this program post-retirement.

“For four decades, Robbie has been the face of computer science to our incoming freshman as well as to students across campus who want some exposure to programming,” noted Lori Clarke, chair of computer science. “Now at alumni events, the most asked for faculty member is Robbie. We are delighted that summer students wanting to learn introductory programming skills and problem solving will still be able to benefit from his experience and enthusiasm.”

Scholarship established in honor of Moll

Things were very different on campus when Professor Robert Moll began teaching in the 1970s. In the Campus Center, for example, instead of clusters of tables with laptops like are seen today, there were rows of pinball machines. It was at the “Fireball” pinball machine that alum Steve Willis (’78) spent time as a student on campus and met Moll. “I can’t remember the machine Robbie liked; I just know he was there a lot, and he was very good,” notes Willis. A friendship ensued, and Moll became Willis’s academic advisor. Forty years later, they are still friends.

When Moll announced his retirement last fall, Willis stepped forward to create the “Robert Moll Scholarship in Computer Science.” Of the scholarship, Willis remarked, “Robbie’s advice while I was student ensured that I received a solid academic foundation in computer science, and he encouraged me to explore the diverse research opportunities that were going on. Through the decades, Robbie helped hundreds of students just like me. It’s an honor to set this up, so that his legacy will continue and our appreciation is known to him.”

The Robert Moll Scholarship in Computer Science will be awarded to Computer Science students who transfer to UMass Amherst from a community college. If you would like to contribute, please visit www.cs.umass.edu/donate or contact Jenn Cooper at 413-545-2771 or jcooper@cns.umass.edu.

Engineering and Computing Career Day for Women

More than 200 young women from 30 high schools in Massachusetts and the region attended the Engineering and Computing Career Day Conference held on campus on Oct. 27th, 2014. The program aims to inspire and encourage female high school students to pursue engineering or computer science in higher education and to choose it as a career path.

The event included a keynote presentation from industrial engineering alumna Renee Harbers Liddell, founder and CEO of Harbers Family Foundation, as well as hands-on computing and engineering activity sessions. School of Computer Science professor Benjamin Marlin led three 50-minute computer programming activity sessions facilitated by 15 computer science student volunteers from across the School. The three sessions were attended by a total of nearly 90 participants.

Career Day attendees also had a chance to tour engineering and computer science labs and meet with industry representatives from Raytheon, Google, BAE Systems, Fiksu, Vistaprint, Pegasystems, Tighe and Bond, and Verizon (Land, Wireless, and Terremark).

The conference is sponsored by the College of Engineering, the School of Computer Science, Raytheon, and Women for UMass Amherst. Laptops for the School of Computer Science hands-on activities were provided by CAITE.

CS alum social event held in Cambridge

In October, the School of Computer Science welcomed CS alumni and friends to a social event held at Amazon's Cambridge, MA facility. The event was at capacity with 150 registered to attend. CS Chair Lori Clarke welcomed attendees and provided a short update on the CS happenings. Professor James Allan gave an overview of his information retrieval research, and CS alum speakers Renu Chipalkatti ('87), Aaron St. John ('05), and Irene Ros ('06) provided brief remarks about their work. Guests spent the evening networking with faculty and alumni and enjoying the food and drinks.

Special thanks to Wayne Duso ('85) for hosting the event and to our alumni organizing committee: Carla Brodley ('94), Carol Broverman ('91), Duso, Marisa Pacifico ('10), Mary-Ellen Prescott ('84), Ros, John Woods ('80), Steve Vinter ('85), and Steve Willis ('78). Visit www.cs.umass.edu/alumnievent for details on upcoming alum social events.



After 11 years at the University of North Carolina at Charlotte, first as an assistant professor and then as a tenured associate professor, **Anita Raja** (Ph.D. '03) is now the Associate Dean of Research and Graduate Programs in the Albert Nerken School of Engineering in The Cooper Union for Advancement of Science and Arts in lower Manhattan. She is also a tenured professor in Computer Science at Cooper Union. While at UMass Amherst, Raja was advised by Distinguished Professor Victor Lesser.

Two Ph.D. alumni from Professor Prashant Shenoy's Laboratory for Advanced Systems Software were recently promoted. **Peter Desnoyers** (Ph.D. '08) was promoted to Associate Professor at Northeastern University and **Purushottam ("Puru") Kulkarni** (Ph.D. '07) was promoted to Associate Professor at IIT Bombay.

Peter Chikov (BS '07), current Western New England University School of Law student, and teammate Jean Derderian were selected as semi-finalists in the American Bar Association National Law Student Tax Challenge.

CS is saddened to announce the passing of alum **Thomas Probert** (Ph.D. '81) who died at the age of 66 on November 14, 2014 in Natick, MA. For the past seven years, he was President of Stegosystems, Inc., a cybersecurity business that he established.

Join us on May 1, 2015

The seventh annual Outstanding Achievement and Advocacy (OAA) Awards banquet will be held on the evening of Friday, May 1st, 2015 in the Marriott Center of the UMass Amherst Campus Center. During the banquet, awards will be presented to recognize the remarkable accomplishments of graduates of the School's degree programs and to acknowledge the support of important friends of the School. Current student awards will also be presented. For details and to register for the event, go to: www.cs.umass.edu/oa2015.

Lifetime email addresses for Computer Science alums

We are pleased to announce that CS alum email forwarding addresses are now available for any of our UMass Amherst CS alums. Although you might change employers or Internet providers, your CS alum 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 www.cs.umass.edu/lifetime-email-forwarding.

Recent Computer Science Ph.D. graduates (September 2014)



John Altidor; *Subtyping with Generics: A Unified Approach*; Yanniss Smaragdakis, Advisor; Sept.

2014; Researcher, BBN Technologies



Sean Barker; *Model-Driven Analytics of Energy Meter Data in Smart Homes*; Prashant

Shenoy, Advisor; Sept. 2014; Visiting Assistant Professor, Department of Computer Science, Bowdoin College



Michael Crouch; *Streaming Algorithms via Reductions*; Andrew Mc-

Gregor, Advisor; Sept. 2014; Member of Technical Staff, Bell Labs, Ireland



William Dabney; *Adaptive Step-Sizes for Reinforcement Learning*; Andrew Barto,

Advisor; Sept. 2014; Machine Learning Scientist, Amazon.com



Junghee Jo; *Defining, Evaluating, and Improving the Verification of Patient Identifiers*

During Medication Administration; Lori A. Clarke and Jenna Marquard, Advisors; Sept. 2014; Senior Researcher, Electronics and Telecommunications Research Institute (ETRI)



Youngho Kim; *Searching Based on Query Documents*; W. Bruce Croft,

Advisor; Sept. 2014; Postdoctoral Research Scientist, IBM Watson Research



Wentian Lu; *Privacy-preserving Sanitization in Data Sharing*; Gerome

Miklau, Advisor; Sept. 2014; Software Engineer, Google Inc.



Marc Maier; *Causal Discovery for Relational Domains: Representa-*

tion, Reasoning, and Learning; David Jensen, Advisor; Sept. 2014; Data Scientist, MassMutual



Trek Palmer; *Using Formal Methods to Verify Transactional Abstract Concurrency*

Control; J. Eliot B. Moss, Advisor; Sept. 2014; Chief Engineer at NuoDB Inc.



Abhinav Parate; *Designing Efficient and Accurate Behavior-Aware Mobile Systems*;

Deepak Ganesan, Advisor; Sept. 2014; Researcher, HP Research Labs



Jae Hyun Park; *Retrieval Models based on Linguistic Features of Verbose Que-*

ries; W. Bruce Croft, Advisor; Sept. 2014; Software Engineer, Nuance Communications, Inc.



Anand Seetharam; *Efficient Routing and Scheduling in Wireless Networks*; James

F. Kurose, Advisor; Sept. 2014; Assistant Professor, California State University, Monterey Bay



Robert Walls; *Inference-Based Forensics For Extracting Information From*

Diverse Sources; Brian Levine, Advisor; Sept. 2014; hPostdoctoral Researcher, Department of Computer Science, Pennsylvania State University



Xiaoxi Xu; *Computational Communication Intelligence: Exploring*

Linguistic Manifestation and Social Dynamics in Online Communication; Beverly Woolf, Advisor; Sept. 2014; Data Scientist, Rovi Corporation

See details on the September graduates' research at: www.cs.umass.edu/news/recent-computer-science-phd-graduates-september-2014.

ImmermanFest held during LCC 2014

In honor of Professor Neil Immerman's 60th birthday, an "ImmermanFest" Workshop was organized as part of the Fifteenth International Workshop on Logic and Computational Complexity (LCC 2014) held in Vienna, Austria. During the daylong ImmermanFest Workshop, six leading researchers who were influenced by Immerman's work presented lectures of their research. Immerman's former student, Kousha Etessami (CS Ph.D. '95), was the primary organizer of the event, with assistance from Anuj Dawar, Mooly Sagiv, and CS Professor Shlomo Zilberstein. Event organizers noted that Immerman "has been one of the leading figures in the development of descriptive complexity, which has elucidated intimate and beautiful con-



nections between complexity theory and finite model theory." At the end of the ImmermanFest program, participants were invited to a dinner to celebrate Immerman's birthday. After dinner, the group celebrated

with a cake decorated with a picture of the cover of Immerman's book. ImmermanFest was affiliated with the "Vienna Summer of Logic," two weeks of meetings that included twelve large conferences and numerous workshops related to logic and computer science.



Faculty News



Professor **Andrew McCallum** was an invited speaker at the 2014 Workshop on Automated Knowledge Base Construction (AKBC). He and co-authors received Outstanding Paper Awards at AKBC 2014 for their papers “Knowledge Base Completion using Compositional Vector Space Models,” by Arvind Neelakantan, Benjamin Roth, and McCallum, and “Domain Specific Knowledge Base Construction via Crowdsourcing,” by Ari Kobren, Thomas Logan, Siddharth Sampangi, and McCallum.



Four CS faculty received Google awards recently. Professor **Andrew McCallum** received a research grant from Google for his machine learning research. Professor **James Allan** received a 2014 Google Faculty Research Award for the project “Seeking Controversial Topics and Stances.” Assistant Professor **Arjun Guha** received a 2014 Google Faculty Research Award for the project “Debugging and Upgrading Puppet Manifests.” Assistant Professor **Amir Houmansadr** received a 2015 Google Faculty Research Award for his work in privacy.

Assistant Professor **Subhransu Maji**, with co-authors Catherine Wah and Serge Belongie, received the Best Paper Award of the Vision and Learning Session of the 2015 IEEE Winter Conference on Applications of Computer Vision (WACV 2015) for “Learning Localized Perceptual Similarity Metrics for Interactive Categorization.”



Professor **Emery Berger** and doctoral student Emma Tosch received the ACM OOPSLA (Object-Oriented Programming, Systems, Languages & Applications) 2014 Best Paper Award for “SurveyMan: Programming and Automatically Debugging Surveys.” In December, Berger gave a Distinguished Lecture at the University of California, San Diego on “Programming Languages for the Sciences.” He presented details on SurveyMan and CheckCell, two software systems developed by his research group. CheckCell, a system which reveals data and methodological errors in spreadsheets, was listed as one of “10 cool network and computing research projects” in **Networkworld.com**.



Two papers written by Professor **Prashant Shenoy** and co-authors received Best Paper Runner Up at the 2014 ACM International Conference on Embedded Systems for Energy-efficient Buildings (BuildSys 2014). “PowerPlay: Creating Virtual Power Meters through Online Load Tracking in Smart Homes” was authored by S. Barker, S. Kalra, D. Irwin, and Shenoy. “Minimizing Electricity Costs by Sharing Energy in Sustainable Microgrids” was authored by Z. Huang, J. Su, T. Zhu, A. Sharma, A. Ambegaonkar, Y. Gu, A. Mishra, D. Irwin, and Shenoy.

Professor **Hava Siegelmann** was reelected to the board of the International Neural Network Society.



Associate Professor **Ramesh Sitaraman** published a new book, *Advanced Content Delivery, Streaming, and Cloud Services*, in the Wiley Series on Parallel and Distributed Computing Series.



Professor **Shlomo Zilberstein** is serving as Chair of the Conference Committee of AAAI. He is also Program Co-Chair of ICAPS’15 (International Conference of Automated Planning and Scheduling), which will take place in Jerusalem in June 2015. Zilberstein is also on the Selection Committee of the IFAAMAS Victor Lesser Distinguished Dissertation Award, given annually by the International Foundation for Autonomous Agents and Multiagent Systems.



Assistant Professor **Hannah Wallach** was selected as one of *Glamour* magazine’s top new women leaders in technology. She was highlighted as one of “35 Women Under 35 Who are Changing the Tech Industry.” Wallach was also featured as one of 15 profiled women in the new book, *Women in Data: Cutting-Edge Practitioners and Their Views on Critical Skills, Background, and Education*, published by O’Reilly.



Professor Emeritus and Expanding Computing Education Pathways (ECEP) PI **Rick Adrion** is serving on the panel that is developing voluntary Digital Literacy and Computer Science Standards for the Massachusetts Board of Elementary and Secondary Education, working in collaboration with the Massachusetts Computing Attainment Network (MassCAN). The panel expects to have a draft prepared for review by June of this year. Adrion was also appointed to the Technology Talent Initiative Advisory Committee for the Mass. Dept. of Higher Education.



Adjunct Professor **Hong Yu** received the F1000 Poster Award at the 22nd Annual International Conference on Intelligent Systems for Molecular Biology (ISMB), the official conference of the International Society of Computational Biology. The poster, selected from nearly 600 presented at the conference, reported on figure searching in the biomedical literature research. This fall, Yu was awarded two National Institutes of Health research grants for “EMR Adverse Drug Event Detection for Pharmacovigilance” and “EHR Anticoagulants Pharmacovigilance.”



Researcher News

Working with the VISION Lab, **Pia Bideau** is a Visiting Scholar from Ruhr-Universität Bochum, Germany.

Shangsong Liang is a Visiting Researcher from the University of Amsterdam who is working with the CIIR.

Student News

Rachel Gordon was selected for honorable mention for the Computing Research Association's (CRA) 2015 Outstanding Undergraduate Female Researcher Award. Gordon has worked with Professors Rick Adrion and David Jensen. Her honors thesis is on evaluating algorithms for learning causal models.

Doctoral student **Jennie Steshenko**, Visiting Scientist Vasanta Chaganti, and Distinguished Professor Jim Kurose received the Best Poster/Demo award at the 2014 ACM MSWiM (Modeling, Analysis and Simulation of Wireless and Mobile Systems) Conference in Montreal Canada.

Graduate students **Pengyu Zhang**, **Pan Hu**, and **Vijay Pasi-kanti** and Associate Professor Deepak Ganesan received Best Paper Runner Up at the 2014 ACM International Conference on Mobile Computing and Networking (Mobicon) for "EkhoNet: High Speed Ultra Low-power Backscatter for Next Generation Sensors."

Graduate student **Misha Badov** and co-authors Distinguished Professor Jim Kurose, CS alums Anand Seetharam (Ph.D. '14) and Victor Firoui (Ph.D. '98), and Soumendra Nanda of BAE Systems received the Runner Up Best Paper Award at the first ACM Information-Centric Networks Conference in Paris, France.

The paper "Doppio: Breaking the Browser Language Barrier," by doctoral student **John Vilks** and Professor Emery Berger was awarded a SIGPLAN Research Highlight, one of two papers selected across the entire area of programming language research.

The Commonwealth Honors College chose undergraduates **Tung Pham** and **Ryan Szeto** to receive Honors Research Grants, and **Nikhil Garg** and **Freddy Nguyen** were chosen to receive Research Assistant Fellowships. For their Honors College projects, Garg was advised by Deepak Ganesan, Nguyen was advised by Tim Richards, and Pham and Szeto were advised by Rick Adrion.

CS graduate student **Rufina Chettiar** and UMass SmartMPL teammates Divyashri Bhat and Abhishek Dwaraki (both ECE) won first prize in the Juniper Networks/Comcast Northeast Division Hackathon Software Defined Networking (SDN) Workshop and Competition held in November. For the competition, the team worked on building an efficient content transport and monitoring system for a constrained legacy network provided by Juniper's OpenLab.

Three UMass Amherst Computer Science teams placed in the top five of the Northeast Regional Preliminary Contest of the 2014/2015 ACM International Collegiate Programming Competition. The second place team, "The Wrath of Khanh," consisted of **Kaleigh Clary**, **Ishan Durugkar**, and **Khanh Nguyen**. The team advanced to the Northeast North America Finals, held at Rochester Institute of Technology, where they placed fifth. Associate Professor Erik Learned-Miller coached the UMass Amherst CS teams.

In 2014, CS undergraduate **Dhovan Hauserman** received the U.S. Congressional Award Gold Medal from Congress

Scanlon Award for May



Zachery May, an undergraduate majoring in computer science and journalism,

was chosen as a recipient of the 2014-2015 Gerald F. Scanlon Student Employee of the Year Award. The award recognizes and honors students who have demonstrated outstanding performance by contributing their time and/or skill to help the University achieve its goals and objectives. May, who will be graduating this spring, is an essential member of the computer science main office staff, where he has worked since March, 2012. May has also been on the Computer Science Recruiting and Outreach Committee (ROCKs) since its inception in the fall of 2012. He is one of only ten students selected from a large pool of very qualified applicants across campus for this year's Scanlon award.

for dedicating hundreds of hours to Voluntary Public Service, Personal Development, Physical Fitness and an Expedition. The Congressional Award Gold Medal is the highest award bestowed by the United States Congress to civilian youth under the age of 23.

Staff News

Thomas Logan joined IESL as a Software Engineer.

As co-PI of the ECEP Alliance, **Renee Fall** moderated a panel on State-level Computing Education Reform for Diversity at the Tapia Celebration of Diversity in Computing in Boston in February. Along with Professor Emeritus Rick Adrion, she led the volunteer committee for the conference. Fall was also invited by the Commissioner of Higher Education to be part of the Massachusetts Technology Talent Initiative Advisory Committee, to guide implementation of recommendations for workforce development.

CS Undergraduate Dean's List – Fall 2014

See full Fall 2014 Dean's List and list of Student Citations (students recognized for their outstanding performance in the classroom) at www.cs.umass.edu/people/fall-2014-deans-list-and-citations.

Newsletter of the
School 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
School 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
them electronically to bits@cs.umass.edu.

Department Chair Lori A. Clarke
Editor Jean Joyce
Art Direction North Haven Design
Graduate Student
Liaison Jennie Steshenko
Contributors Vangelis Kalogerakis, UMass Amherst News
Office staff

NONPROFIT ORG.
U.S. Postage
PAID
Permit No. 2
AMHERST, MA

Thanks for your support

The following alumni and friends have actively supported the School of Computer Science from July 2014 through December 2014. Such financial support is greatly appreciated and helps maintain a world-class instructional and research program. Contributions from alums and friends help to fund scholarships and important special activities that are not supported through the state budget.

Those interested in helping the School should visit www.cs.umass.edu/about/donate for online donations or send a check made out to *UMass Amherst* to:
Attn: Donna Falcetti, School of Computer Science
University of Massachusetts Amherst,
140 Governors Drive, Amherst, MA 01003-9264
Please state that your gift is restricted to Computer Science.

Anonymous (4 donors)
Stevie L. Sellers and Daniel
Amirault ('10)
Mr. Justin R. Aquadro ('09)
Dr. Krishnamoorthy Arvind ('91)
Lynn and Robert Barnes
Mr. Anthony J. Bellissimo ('03)
Murray and
Rebecca Berkowitz ('71)
Christopher Morely and
Debra Bernstein ('82)
Ms. Cynthia A. Bliss ('90)
Dr. Eric W. Brown ('96)
Mrs. Mary C. Brown ('85)
Dale and William Burgess
Dr. Brendan D. Burns ('02)
Dr. Aaron G. Cass ('05)
Ms. Lesley A. Cederlund ('85)
Ms. Joan C. Charbonneau ('68)
Lina and Dansong Chen ('02)
Dr. Shenze Chen ('92)
Mr. Eric Christophersen ('05)
Dr. Panayiotis K. Chrysanthis
('91)
Thuynhung Nguyen and
Hiep V. Chu
Mr. Richard S. Colon ('79)
Todd Comeau and
Carla Cavallero Comeau ('85)
Dr. James C. Corbett ('92)
Dr. Daniel D. Corkill ('83)
Dr. Robert H. Crites ('96)
Mr. Christopher M. D'Amour

Dr. Jody J. Daniels ('97)
Mrs. Deborah Dimaggio ('76)
Mr. Wayne W. Duso ('85)
Mr. William M. Fisher ('75)
Ellen and Balint Fleischer
Mrs. Teresa M. Foster ('81)
Mrs. Virginia C. Frongillo
in memory of
Michael J. Frongillo
Mr. Thomas A. Galanis ('99)
Mr. Jiuhe Gan ('95)
Dr. Alan J. Garvey ('96)
Jon and Lisa Glass ('85)
Mr. John Goshdigian ('73)
Marilyn and Glenn Gurney
Ms. Elicia M. Harrell ('82)
Cheryl and
Edmund Harrington ('75)
Christopher and
Heddi Holmes ('91)
Mr. Steve J. Hoogheem ('79)
Mr. Scott A. Janousek ('96)
Mr. Yufeng Jing ('94)
Mr. Christian J. Johnstone ('02)
Mr. Aristotelis Karageorgos
('08)
Mrs. Colleen B. Kettle ('84)
Mr. Gordon M. Koizumi ('72)
Mr. E Micah Kornfield ('02)
Mr. Praphul Krottappalli ('08)
Mr. David J. Lee ('81)
Prof. Victor Lesser
Mr. Jones S. Leung ('04)

Mr. Jin Hao Li ('11)
Mr. Saul R. Marcus ('77)
Mr. Edward J. Mazur III ('09)
Mr. Brian J. Morris ('91)
Mr. Munuhur Rajagopal
Dr. Daniel E. Neiman ('92)
Dr. Albert E. Novark ('07)
Ms. Terri A. Noyes ('83)
Mr. Kalicharan Pachika
Dr. Jitendra D. Padhye ('00)
Dr. Ron Papka ('99)
Mr. Lawrence M. Pizette ('86)
Mr. Munuhur Rajagopal
Lynn and Peter Reiff
Qin Yao and Yao Ren ('00)
Vivian and Gilbert Ross Jr. ('82)
Christina Fong and
Tuomas Sandholm ('96)
Mr. Evan G. Shelhamer ('12)
Mary and Brian Sheppard
Mr. Steven P. Shwartz ('12)
Mr. Michael J. Sullivan ('71)
Mr. Cem A. Tanbay ('95)
Mr. Matthew J. Tassinari ('06)
Susan and Donald Teich
Mr. Andrew D. Tirella ('01)
Mrs. Renee B. Venne
Dr. Rukmini Vijaykumar ('88)
Changting Wang
Yunqing Wang ('02)
Mr. Harteg S. Wariyar ('07)
Mrs. Nancy W. Wasiuk ('79)

Prof. Charles C. Weems, Jr. ('84)
Mr. Samuel M. Weinger ('04)
Mr. Yan Xiao ('00)
Dr. Zhongfei Zhang ('96)

CS Community Fund
Ms. Sue-Fen Wang Cuti and
Richard A. Cuti ('85)
Dr. Anita Raja ('03)
Mr. Shiraj Sen ('08)

Lori A. Clarke Scholarship
Dr. Vanessa G. Murdock ('06)

James F. Kurose Scholarship
Mr. Armen P. Babikyan ('02)
Dr. Benyuan Liu ('03)
Dr. Henning G. Schulzrinne
('93)

Victor Lesser Scholarship
Christina Fong and
Tuomas Sandholm ('96)
Dr. Xiaoqin Zhang ('02)

Robert Moll Scholarship
Mr. Steven R. Willis ('78)

**Robin Popplestone
Fellowship**
Professor Kristin Morrison

**Edward Riseman and
Allen Hanson Scholarship**
Mr. Joseph R. Daverin ('00)
Mr. Byrisetty Rajeev ('96)

**Paul Utgoff
Memorial Scholarship**
Marina and Philip Braswell
Dr. Carla E. Brodley ('94)
Dr. Michael T. Rosenstein ('03)
Mrs. Karen Utgoff
Dr. Victor A. Utgoff

**Corporate and
Matching Gifts**
Adobe Systems, Incorporated
Apple Inc.
Cisco Systems Inc
EMC Corp.
Fiksu Inc.
General Motors Corporation
Google Inc.
HP
Liberty Mutual
Microsoft Corp.
Northrup Grumman Foundation
Paul G. Allen Family Foundation
Pegasystems
TripAdvisor L.L.C.
Verizon Foundation
Vistaprint
Yahoo! Inc.