Computing Research News

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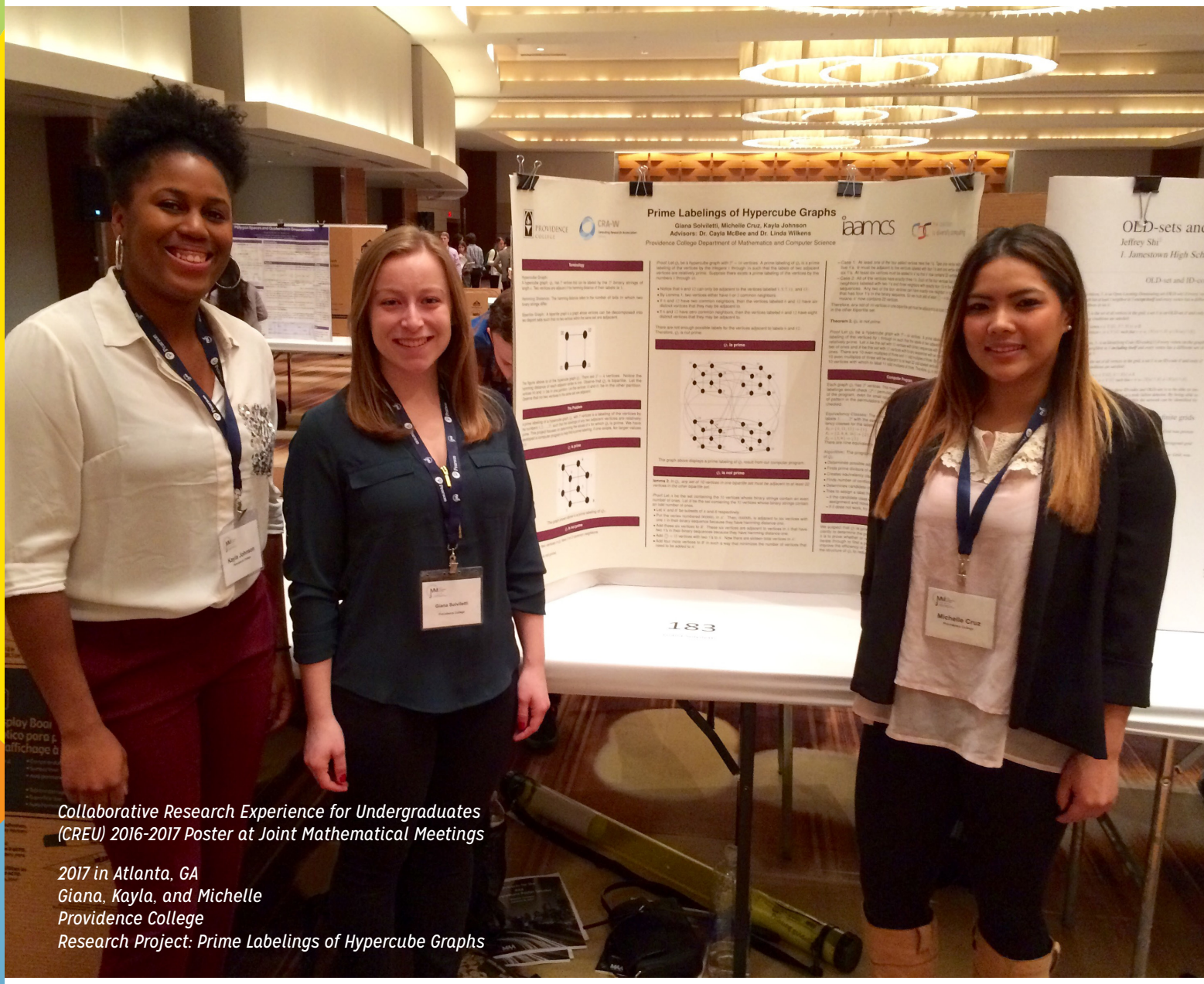
Computing Research Association, Uniting Industry, Academia and Government to Advance Computing Research and Change the World.



Collaborative Research Experience for Undergraduates (CREU) 2016-2017 Poster at Joint Mathematical Meetings

2017 in Atlanta, GA
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COMPUTING RESEARCH ASSOCIATION, UNITING INDUSTRY, ACADEMIA AND GOVERNMENT TO ADVANCE COMPUTING RESEARCH AND CHANGE THE WORLD.

Inside MERL: Making Innovation Happen

By Richard C. Waters, Mitsubishi Electric Research Labs

Mitsubishi Electric Research Labs (MERL) is a Lab and Center member of CRA. This article is the third in a series of our industry member profiles. MERL sponsors the CRA Outstanding Undergraduate Researcher Award in alternate years, along with Microsoft Research.

Mitsubishi Electric Research Labs (MERL) is the North American subsidiary of the corporate research and development organization of Mitsubishi Electric Corporation. MERL conducts application-motivated basic research and advanced development in areas important to Mitsubishi Electric. With 63 researchers, MERL is small enough to be flexible and agile, while gaining leverage from our global parent Mitsubishi Electric.

Stable, long-term funding provides us with the freedom to choose aggressive long-term goals and make foundational scientific contributions. We turn our technical achievements into impacts on the world by partnering with the tens of thousands of researchers and engineers in Mitsubishi Electric's operations around the world.

MERL is home to world-leading experts in six main areas. Underlying all of our work is physical modeling and simulation. Without a clear understanding of the physics underlying a problem, it is very difficult to make progress. Much of MERL's day-to-day research involves signal processing (including audio, video and other sensor data processing, and compressive sensing); control (of electromechanical systems); and optimization (both generating optimal plans and optimal control to follow those plans). These capabilities combine to produce Artificial Intelligence systems (including computer learning, computer vision, and speech recognition). Lastly, most of MERL's output is in the form of new algorithms; our specialty is producing highly efficient algorithms for solving complex problems in real-time.

Our overriding vision is delivering innovation that will be remembered 100 years from now. For more than 25 years we have produced cutting-edge technological advances, fundamentally rethinking a number of problems and delivering radical improvements.

We focus on a high level of collaboration both within our staff and with the wider scientific community. The publication of our research output is highly encouraged, as is participating in a variety of activities, such as serving on editorial boards, technical committees, and conference program committees.

We maintain close relationships with key universities and collaborate with leading academic research groups in our areas of interest. A central aspect of our relationship with universities is our graduate student internship program. The internship program provides students with the type of experience that helps them enhance and accelerate their professional careers, while also contributing to initiatives at MERL and helping us to identify good researchers to hire. Although we host students throughout the year, the main influx of students is during the summer when our research staff doubles as students from all over the world arrive at our Cambridge, Mass., office.

Seven Examples of MERL's Scientific Research

The following examples illustrate the wide range and importance of research at MERL.

Optical Communication

MERL researchers developed a new multi-subcarrier transceiver technology that experimentally achieved a capacity of 1 Tbps using a single optical receiver. Spectral efficiency of 9.2 b/s/Hz was achieved, which was a world

record for single receiver 1 Tbps transmission. A key feature of MERL's approach is the use of a pilot signal to enable high-quality compensation for signal impairment over a fiber. MERL's technology is compatible with currently installed optical fiber systems, allowing for a smooth upgrade path.

Railway Energy Conservation

A key problem with regenerative power in electrified railway systems is that standard systems maintain all the substations at a constant voltage near the maximum voltage the wires can support. This significantly limits the amount of power than can flow from a breaking train to an accelerating one. Mitsubishi Electric developed equipment that can vary the voltage at each substation in real-time. MERL developed an algorithm to optimize the voltage at the substations so that the flow of power from one train to another can be maximized. In a simulated experiment, this enabled a 5% reduction of total railway energy consumption.

Representing Surfaces in 3D Space

MERL developed a novel representation for surfaces in 3D space called Adaptively Sampled Distance Fields (ADFs). Polygonal graphics representations explicitly define the surface of an object. Distance fields describe a surface via parametric mathematical functions defining the distance between each point in space and the nearest part of the surface. ADFs use a detail-directed adaptive partitioning of space and can represent very high levels of detail, using much less memory than polygonal approaches and allowing some calculations to be much more efficient. ADFs have been applied to Computer Numerical Control (CNC) milling to create extremely accurate simulations of a complex cutting program that can reveal minute details of the milled surface to help diagnose errors in the program.

Virtual Environments

In 1995, MERL demonstrated a multi-user virtual environment called Diamond Park that supported multiple geographically separated participants interacting in a 3D virtual world. This was the first virtual reality system capable of supporting real-time spoken interaction between participants. More importantly, it was the first to support the arbitrary modification and extension of the environment during continuous operation, which are essential features of today's massive online gaming environments.

Spacecraft Trajectories

MERL has developed an end-to-end trajectory design framework for space missions to the moon and beyond using 3-body gravitational dynamics. Small resonant perturbations from the moon's gravity can increase the size of a spacecraft's orbit even when it is far from the moon's primary sphere of influence. Additionally, there are pathways in the earth-moon system through which a spacecraft can transit from an Earth orbit to a moon orbit, without using any fuel. MERL has computed trajectories that can save up to 7%

of fuel while reaching the moon in only five months. Since fuel weight is a large fraction of total spacecraft weight, a 7% fuel savings enables a 10x increase in payload.

Computer Reasoning

Belief Propagation is a message-passing algorithm for performing inference on graphical models. The basic Belief Propagation algorithm works well most of the time; however, while it often produces the correct result when applied to a cyclic graph, it doesn't always do so. This is unfortunate since most graphs encountered in real-world situations are cyclic. In 2000, MERL researchers pioneered the development of Generalized Belief Propagation algorithms that are guaranteed to work on every graph. This work triggered the start of a new sub-field of research that continues to this day.

Speech Processing

One of the central problems of speech processing is being able to separate out one voice from a mixture of many voices. This is something the human auditory system does well, but computer systems do not do well. For 15 years, MERL has pioneered advances in source separation. Combining originality with solid theoretical foundations, MERL's methods have dramatically influenced the field and solved problems that were previously out of reach. Some of our current developments are based on a fundamentally new way to use domain knowledge as the basis for novel deep-learning architectures. We believe our latest technology is poised to solve the general audio-separation problem, opening up a new era in spontaneous human-machine communication.

MITSUBISHI ELECTRIC
RESEARCH LABORATORIES

About the Author

Richard C. Waters received his Ph.D. from the MIT AI lab and worked there for 13 years before becoming a founding member of MERL in 1991. At MERL, he worked on multiuser virtual reality systems before becoming MERL's president and CEO in 1999. As president, he combined what had been multiple small research labs in the U.S. into a single unified lab and has nurtured that lab to become Mitsubishi Electric's premier long-range research laboratory.

About Mitsubishi Electric's Research Division

Mitsubishi Electric's research division has more than 2,000 researchers in five labs in four countries. The labs conduct both long-range fundamental research and applied development for Mitsubishi Electric's wide range of business areas, including HVAC, auto parts, elevators, factory automation, optical and wireless communication, high-power semiconductors, satellites, railway transportation, and electric generation, transmission and distribution.
For more information about Mitsubishi Electric Research, see www.mitsubishielectric.com/company/rd/.
For more information about MERL, see www.merl.com.

Research Highlight: CRA Board Member Sarita Adve

By Sarita Adve, University of Illinois at Urbana-Champaign

What value should a memory read return? The answer to this simple question is surprisingly complex for modern systems running parallel software. The memory consistency model, which governs this answer, is a fundamental part of the hardware-software interface, but has been one of the most challenging and contentious areas in parallel hardware and software specification. As we approach the end of Moore's law, the hardware-software interface is evolving with profound implications for how easily we can use our systems and how well they perform. My research is at this interface. Although my "home" community is computer architecture, my work necessarily spans the system stack, and has included hardware design, programming language semantics, parallel algorithms for emerging applications, cross-layer system energy and resiliency management, and approximate computing.

I started exploring memory consistency in 1988 as a junior graduate student, not knowing that it would take more than 15 years for the work to have real impact and that I would circle back in an unlikely instance of déjà vu 25 years later. The most intuitive model, sequential consistency, is the simplest to program, but most systems do not provide it for performance reasons. Instead, when I started, the solution was to have divergent models – often ambiguously specified – for different hardware. My early work, with my advisor, Mark Hill, departed from the prevalent hardware-centric approaches to use a combined hardware/software view more appropriate for an interface. We observed that for well-synchronized programs, formalized as data-race-free, both sequential consistency and high performance could be achieved. The consistency model became a contract where the system guaranteed sequential consistency if software was data-race-free. Over several years, I worked closely with hardware and software researchers and practitioners, including Hans Boehm, Bill Pugh, and many others, to forge consensus towards adopting the data-race-free model as the standard. More than 15 years after its inception, data-race-free became the foundation of the consistency models for most of the popular programming languages such as Java, C++, and C.

Today, as we approach the end of conventional transistor scaling, the next phase of performance increases will likely come from clever architectures. These architectures will be driven by application requirements more than ever, resulting in an explosion of specialized and heterogeneous systems that are orders of magnitude more efficient than current homogeneous, general-purpose systems. We are already seeing the start of this revolution with large scale adoption of specialized platforms that were considered impractical just a few years ago, including FPGAs in data centers at Amazon and Microsoft, GPUs everywhere, and Google's tensor processing unit. An increasing number of systems will be built out of many specialized accelerators combined together at multiple scales from within the same chip to across large scale distributed systems enabling future applications that we can barely imagine. Today's mostly opaque hardware-software interfaces, however, are an obstacle to exploiting the inherent efficiencies promised by such systems.

My group's DeNovo project is exploring the design of such heterogeneous systems, with a focus on efficient data movement and a richer hardware-software interface. For example, we have shown that recent, complex consistency models being proposed for heterogeneous architectures fall into the same trap of hardware-centric design we navigated 25 years ago – they are hard to program and constrained in their performance benefits. Instead, a hardware-software interface driven approach such as data-race-free again results in better performance, programmability, and design complexity. Another result showed that we don't have to choose between the efficiencies of specialized memories such as scratchpads and the programmability of a global address space provided by a general-purpose cache – our stash architecture achieves both.

A more revolutionary change in the hardware-software interface will be needed if we are to exploit approximate computing to compensate for the slowdown of Moore's law. As computing cycles are increasingly spent on human-centric tasks, most computations no longer require a single precise answer. But how do we design systems that can systematically exploit application-level flexibility to improve metrics such as efficiency and reliability? How do we test such systems? We are currently working with researchers in software engineering and testing to adapt the software development workflow to approximations in hardware and software.

Regardless of what techniques finally succeed, the relationship between hardware and software is poised for a change. The effective design of future systems depends on a closer collaboration between hardware and software communities. I am honored to chair ACM SIGARCH at this exciting time for computer architecture. The SIGARCH executive committee, with many other volunteers, has begun several initiatives with the goal of reaching out to other communities, both to expose them to our advances and to invite them to work with us to drive the design of future systems. Babak Falsafi, Boris Grot, and Alvin Lebeck (editor) recently launched a blog, Computer Architecture Today, to inform the broader community about current activities and future trends in computer architecture. Luis Ceze, Joel Emer, and Karin Strauss are spearheading broad-interest visioning workshops at the intersection of computer architecture and other areas at our flagship conferences. The next workshop, led by Olivier Temam, will be on "Trends in Machine Learning," in conjunction with ISCA. You can follow SIGARCH news on twitter @acmsigarch, led by Adrian Sampson.

About the author

Sarita Adve is the Richard T. Cheng Professor of Computer Science at the University of Illinois at Urbana-Champaign. Her research interests are in computer architecture and systems. She co-developed the memory models for the C++ and Java programming languages based on her early work on data-race-free models. She is a recipient of the Anita Borg Institute Women of Vision award in innovation, the ACM SIGARCH Maurice Wilkes award, and an Alfred P. Sloan Research Fellowship. She is a fellow of the ACM and the IEEE and was named a University Scholar by the University of Illinois. She is currently the chair of ACM SIGARCH and on the board of the Computing Research Association. She received the Ph.D. in computer science from Wisconsin in 1993 and a B.Tech. in electrical engineering from IIT-Bombay in 1987.

Expanding the Pipeline:

The Social Science Side of CERP

By Jane Stout, CERP Director

CERP
Computing Research Association
Evaluation

The CRA's Center for Evaluating the Research Pipeline (CERP) turns four years old this month. During the past four years, CERP has been working steadily toward its goal of building diversity in computing through evaluation and social science research. CERP is staffed by Director Jane Stout, Research Scientist Burcin Tamer, and Research Associate Heather Wright. As seen on CERP's About page, CERP staff are an eclectic mix of social scientists with expertise in quantitative and qualitative methods and a passion for diversity research.

CERP may be best known for its flagship program, the Data Buddies Project, which was created by the Committee on the Status of Women in Computing (CRA-W) and the former Coalition to Diversity Computing (CDC) as a key part of the NSF Broadening Participation in Computing award to CRA (CNS-1246649). The Data Buddies Project is collaboration between CERP and more than 100 computing departments at universities and colleges across the United States. By collaborating with this network of department "buddies," CERP collects survey data from thousands of undergraduate and graduate students each year. CERP's data tap into students' experiences in the computing community (e.g., sense of belonging), aspirations for the future (e.g., a computing research career), and past experiences that may relate to success in computing (e.g., research experiences for undergraduates [REUs]). Data Buddies data have served as a means to evaluate intervention programs through a comparative evaluation framework: intervention participants (e.g., REU students) and students in Data Buddies departments complete the same annual Data Buddies survey, allowing CERP to compare student outcomes among program participants versus non-participants.

> building diversity in computing through evaluation and social science research.

At the same time, Data Buddies data have served as a rich data source for social science research on issues of diversity in computing education. The size of the Data

Buddies datasets allows CERP to assess the experiences of underrepresented students in computing. Moreover, the data allow for research on subgroups of underrepresented students in computing (e.g., women from different racial/ethnic backgrounds). As a case in point, CERP collected data from 7,300 undergraduate students during the 2016 Data Buddies survey. As seen in Table 1, when these data are parsed into gender and race/ethnicity demographics, Data Buddies data afford ample opportunity to assess experiences in computing among diverse groups of students. In 2014, Stout obtained grant funding from the National Science Foundation (DUE-1431112) to do just that.

This grant-funded research draws from and advances existing theory concerning predictors of persistence and success in computing fields among various groups of underrepresented students. To date, the CERP team has published several peer-reviewed articles on underrepresented students' experiences in computing education settings, such as lesbian, gay, bisexual, transgender, and queer (LGBTQ) students, women, first-generation college students (including an article paying special attention to women who are first-generation college students), students from underrepresented racial minority groups, and students with disabilities. In addition, CERP research findings have been presented at meetings of several professional societies including the American Association for the Advancement of Science (AAAS), the American Psychological Association (APA), the American Physical Society (APS), and the Association for University Women (AAUW); numerous conferences such as the Grace Hopper Celebration of Women in Computing, SIGCSE, and the Society for the Psychological Study of Social Issues; and at academic colloquia and symposia at a variety of institutions such as the Colorado School of Mines and the Massachusetts Institute of Technology.

One line of research that CERP studies is first-generation students' experiences and successes in computing education college settings. Recently, one of CERP's papers on this topic was awarded an Exemplary Paper Award at SIGCSE 2017. Jennifer Blaney, a CERP collaborator and doctoral student at UCLA, collaborated with Stout on this project. The paper focused on introductory computer science students' sense that they are welcomed in computing (i.e., sense of belonging), as well as their perceptions that they can be successful in a computing career track (i.e., self-efficacy). Importantly, decades of research indicates students who feel a secure sense of belonging and strong self-efficacy tend to feel motivated and perform well in school. In our research on introductory computer science students, we

Table 1. Student Demographics from CERP's 2016 Undergraduate Sample.

	Gender Identity				
Race/Ethnic Identity	*Women*	*Men*	*Non-binary*	*Missing*	**Total**
Asian or Asian American	836	1080	17	1	1934
Arab/Middle Eastern/Persian	23	46	0	0	69
Black/African American	110	143	2	1	256
Hispanic/Latina/o	117	241	6	0	364
White	889	2248	71	5	3213
Mixed Asian/White	95	138	8	1	242
Mixed Underrepresented	122	238	7	2	369
Other	24	46	10	0	80
Missing	23	44	2	704	773
Total	2239	4224	123	714	7300

Note: "Mixed Underrepresented" students are those who identified with more than one ethnic group, at least one of which was the following: Arab/Middle Eastern/Persian, Black/African American, Hispanic/Latina/o, Native American, or Pacific Islander. "Other" students are those who identify as Native American, Pacific Islander, or more than one ethnic group that were not specified.

found first-generation college students who are women feel a particularly low sense of belonging and self-efficacy in computing, compared to their peers. Importantly, women first-generation college students' sense of belonging in computing and their self-efficacy appear to be linked (correlated) with the following social dynamics of the introductory course: the extent to which introductory course instructors interact with students inside and outside of the classroom, and perceptions that the instructor is inclusive and supportive. That is, feeling as though introductory computing instructors are available and supportive is particularly important for women first-generation college students' sense that they "fit" and can succeed in computing.

CERP data allow for research on subgroups of underrepresented students in computing.

Another line of CERP research pertains to LGBTQ students' sense of belonging and persistence in computing programs. One CERP paper shows that among undergraduate computing majors and graduate students in computing, LGBTQ students feel less welcomed than their cisgender, heterosexual peers. Further, women who identify as LGBTQ feel a particularly low sense of belonging in computing. Importantly, feeling a low sense of belonging is linked with students' thoughts about leaving their degree program—students who feel as though they don't belong are more likely to think about leaving their program.

Based on this work, CERP has developed the following recommendations to foster belonging and self-efficacy among underrepresented students—particularly students who are women, first-generation college students, and/or members of the LGBTQ community:

- Increase the frequency of interaction with students in class (e.g., via class discussion). Another advantage to class discussion is that it fosters a sense of collaboration in class, which is also known to be beneficial for women in computing.
- Normalizing the challenging nature of computing courses can be helpful for first-generation college students, who may be particularly likely to interpret poor performance in introductory classes to mean they do not belong in college.
- To connect with students outside of class, encourage students to drop by during office hours, even if only to say "hello" and introduce themselves.
- Students may feel more "connected" to their instructor if the instructor shares personal stories about their own experiences learning computing concepts.
- Create explicitly inclusive classroom settings. For instance, the use of gender-inclusive language (he or she; him or her) or gender-neutral language (they; them; one) in the classroom is a relatively low-effort means of suggesting to students that everyone "belongs" in the computing.
- Consider including an inclusivity statement in syllabi that explicitly refers to sexual orientation, gender identity, and socio-economic status, among other identities.

A recurrent theme in CERP's work is the importance of taking the complexity of students' identities into consideration when studying issues of diversity. In the case of the papers discussed here, women's experiences in computing depended on their other identities (e.g., sexual orientation or college generation status). This nuanced approach to diversity research (often called "intersectional," given its observations at the intersection of multiple identities), can pinpoint groups of students who may need support the most.

Since May 2013, the CERP team has published a graphic in each issue of *Computing Research News* on issues of diversity in the computing pipeline. If you are interested in receiving CERP infographics via email, please subscribe to our email list at: http://cra.org/cerp/email-list/.

CERP's work is supported through National Science Foundation awards CNS-1246649 and DUE-1431112, and direct CRA contributions.

CERP and Collaborators Bios:

Jane Stout is the director of CERP, where she leads social science research and evaluation for the computing community. She and the CERP team focus on understanding how best to promote success and persistence among underrepresented groups in computing. Stout obtained her Ph.D. in social psychology at the University of Massachusetts Amherst with a concentration in quantitative methods in 2011. She has been working for the CRA since 2013.

Burçin Tamer is the CERP research scientist. At CERP, she manages complex, longitudinal datasets and consults with the CERP team on data analysis. She completed her doctoral training in political science and women's studies in 2015 at the Pennsylvania State University. Tamer has been working for the CRA since 2015.

Heather Wright is a research associate for CERP. She acts as a liaison and evaluator for CERP clients, and is passionate about diversity and inclusion. Wright obtained her B.S. in sociology at Radford University with minors in technical and business writing and women's studies. She has been working for the CRA since 2013.

Jennifer Blaney has been a CERP collaborator since 2015. Blaney is working toward her doctorate at UCLA in the field of higher education, and earned her M.A. in Higher Education from UCLA in 2015. Blaney is also a member of the Building, Recruiting, and Inclusion for Diversity (BRAID) research team, which examines the experiences of underrepresented students in computing.

Collaborative Research Experience for Undergraduates

CRA-W will be accepting applications for the 2017-2018 Collaborative Research Experience for Undergraduates (CREU) program starting April 15.

Application Deadline: May 18, 2017

CREU is an undergraduate research program that provides research stipends to teams of students working on research projects under the guidance of a mentor at their home institutions. Students supported by CREU collaborate with each other and with their mentors during the academic year and, in some cases, the following summer. Students are strongly encouraged to present their CREU research at national or regional conferences. The program provides travel funds to support such participation and past CREU participants have found such activities to be extremely valuable.

CREU Team from UMBC Wins Best Student Paper.

Read firsthand about the CREU experience and the opportunities this program provides both during and after the research experience.

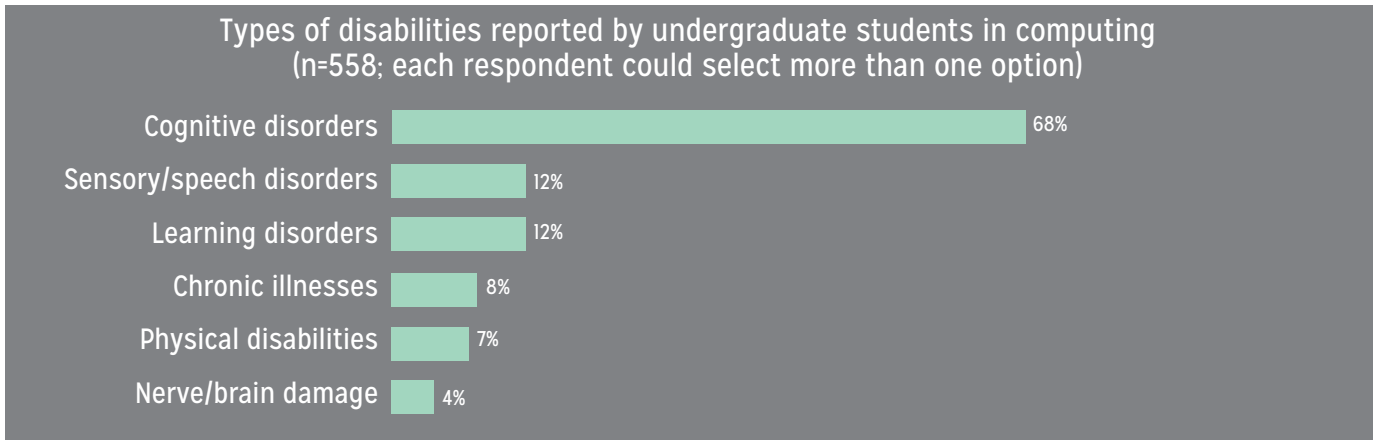
The objective of the CREU program is to increase the number of women and underrepresented groups entering graduate studies in the fields of computer science and computer engineering by exposing them to the joy and potential of research.

CREU is supported by the National Science Foundation and partners with other organizations committed to broadening participation in computing to administer their REU programs. The NSF funded Institute for African-American Mentoring in Computer Sciences (iAAMCS) is a current partner, and the Coalition to Diversify Computing (CDC) was previously a program partner.

For more information, please visit the CREU website: http://cra.org/cra-w/creu/

Cognitive Disorders are the Most Common Disability Reported by Undergraduate Students in Computing

By Burçin Tamer, CERP Research Scientist



CERP's 2016 Data Buddies survey collected data on students' disability status from 6,447 undergraduate students in computing. Eight percent of these students reported having at least one type of disability. This chart illustrates that the most common disabilities are not visible. These data serve as a reminder that some computing students may be faced with an additional set of challenges in and outside of the classroom due to their disability or disabilities.

Notes. The Data Buddies project collected survey data from 7,300 undergraduate students in 2016. Eighty-eight percent (n=6,447) of these students responded to a question asking if they have any type of disability. Of those students, 8% (n=558) reported having at least one type of disability. These students were asked to indicate the type(s) of disabilities they had. In this infographic, options provided in the survey were collapsed into the following six groups: cognitive disorders (n=377; attention deficit hyperactivity disorder [ADHD], autism spectrum disorder, mental illness), sensory/speech disorders (n=68; deaf/hard of hearing, speech or language disability, visual), learning disorders (n=66; specific learning disability, intellectual disability), physical disabilities (n=39; mobility or orthopedic disability), nerve/brain damage (n=25; traumatic brain injury/head injury, nerve damage), and chronic illnesses (n=43). Note that among the 558 students who reported a disability, 25 did not indicate any specific type of disability and were not displayed in the chart here. The categories used here were adapted from AccessComputing and disabled-world.com.

The prevalence of different types of disabilities among the undergraduate students surveyed via Data Buddies roughly aligns with the 18-34 year old U.S. population, based on data from the American Community Survey (ACS). According to the ACS, 6% of 18-34 year olds have a disability (U.S. Census Bureau, 2015). The ACS and Data Buddies record disabilities differently; nevertheless, we present the ACS data for interested readers. The distribution of different types of disabilities as a percentage of the individuals with a disability in this age group are reported by ACS as follows: cognitive difficulty: 63%; independent living difficulty: 38%; ambulatory difficulty: 23%; vision difficulty: 18%; self-care difficulty: 14%; hearing difficulty: 14%.

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This infographic is brought to you by the CRA's Center for Evaluating the Research Pipeline (CERP). CERP provides social science research and comparative evaluation for the computing community. To learn more about CERP, visit our website at http://cra.org/cerp/. To subscribe to the CERP newsletter, click here.

CERP Offers New Resource

The CRA Center for Evaluating the Research Pipeline (CERP) is an evaluation and research center designed to help increase diversity in the field of computing research.

Since May 2013, the CERP team has published a graphic in each issue of *Computing Research News (CRN)* that analyzes the experiences of underrepresented students and professionals in computing. Each month, CERP's newsletter will share the infographic published in *CRN* and news about CERP. If you are interested in receiving this newsletter, subscribe here.

Recent CERP infographics include:

- Participation Rate in Computing-Related Contests Highest Among Men, and Among Asian Students
- Nearly 10 Years Later, CRA-W Career Mentoring Workshop Participants are More Advanced in their Careers Than Non-Participants
- Difficulties with Coursework Make Students Consider Leaving Computing; Job Prospects and Support from Friends and Family Help Students Stay
- After Leaving Computing, New Majors Tend to Differ by Gender
- Undergraduate Computing Majors Talk about Institutional Support at Their College or University for Becoming a Middle or High School Teacher

CRA-E Selects New Graduate Student Fellow

CRA's Education Committee (CRA-E) is pleased to welcome its new 2017 CRA-E Graduate Student Fellow – Booma Sowkarthiga Balasubramani. The Graduate Fellows Program was established in 2015 to give graduate students the opportunity to contribute to CRA-E projects, engage in advocacy for mentoring undergraduate students, and promote computer science research and undergraduate education at the national level.

Booma was selected from a pool of several talented applicants. She is a Ph.D. student in computer science at the University of Illinois at Chicago (UIC). Booma holds an M.S. in software systems from Birla Institute of Technology and Science, India. Before stepping into her Ph.D., she worked as a software engineering senior analyst at Accenture. Her research interests include data integration, semantic web, information retrieval and data mining.

Booma currently holds a research assistantship at UIC, as part of which she is collaborating with the City of Chicago's Department of Innovation & Technology on a project related to business data integration. She also has been a teaching assistant at UIC for various undergraduate and graduate level courses at UIC and a dedicated mentor to several students (graduate and undergraduate) including to several women at the ADVIS lab in UIC. Apart from a couple of research internships, she worked with Girls Who Code as a Summer Immersion Program teacher last summer and taught CS courses to girls in high school level.

After UIC, she looks forward to working in a challenging environment that enables her to research and develop solutions for social good. Booma believes that CRA-E is the right platform to gain experience in enhancing the research experiences for undergraduates. She is very excited about working with CRA-E and has several ideas on improving and adding more resources to the Conquer site.

In 2016, CRA-E selected two Fellows, Keith Feldman (Notre Dame University) and Max Grossman (Rice University). Keith will join Booma and continue as a CRA-E Fellow for a second year, and Max will end his term. Max has completed his Ph.D. this year and has launched into his post-grad plans by founding a small software company in Houston, TX called 7pod Technologies. 7pod focuses on offering dynamic and adaptive high-performance computing software for organizations running data- or compute-intensive workloads. CRA-E would like to thank Max for his efforts and ideas during his time as a CRA-E Fellow.

CCC @ AAAS 2017 – The Technology of the Future

Contributions to this post were provided by Computing Community Consortium (CCC) Council members Maja Matarić and Shwetak Patel.

Recently, we have been highlighting CCC's role at the 2017 Annual Meeting of the American Association for the Advance of Science (AAAS) and have posted blogs about *Health in Your Pocket: Diagnosing and Treating Disease with Smartphones* and What Happens When Everyday Objects Become Internet Devices: A Science Policy Agenda.

The focus of this post is on the Technology of the Future flash talks that CCC Council members Maja Matarić and Shwetak Patel presented.

In Matarić's Socially Assistive Robotics: Creating Robots That (Provide) Care talk, she described work in the new field of socially assistive robotics, which focuses on creating robots capable of providing personalized therapy and care through social, as opposed to physical, interaction. She talked about the implications of augmentation vs. automation on the future of work, and discussed the research challenges of developing human-centered technologies for stroke patients, Alzheimer's patients, healthy elderly, and children with autism spectrum disorders. You can read her full abstract here and her recently published Science Robotics article on Socially assistive robotics: Human augmentation versus automation.

Shwetak Patel and Maja Matarić

In Patel's The Emerging Role of Mobile Phones in Health talk, he discussed how mobile phones and computing plays a critical role in personal health monitoring. He described a set of projects where it is already possible to conduct clinically relevant health diagnostics using just the sensors already present on a smartphone. These tools can be used for population level screening, managing chronic diseases, and as case finding tools in developing regions. You can read his full abstract here and see his slides here.

Computing Community Consortium (CCC) Response to NITRD "Smart Cities and Communities Federal Strategic Plan: Exploring Innovation Together"

CCC Chair Beth Mynatt contributed to this post.

The Networking and Information Technology Research and Development (NITRD) program, an interagency Federal-coordinating group, recently posted a draft Smart Cities and Communities Federal Strategic Plan for public comment.

The Computing Community Consortium (CCC) responded to the request and submitted a response to the draft strategic plan.

From the CCC Response:

> While this plan lays out a comprehensive, multi-agency approach for smart cities and communities, bridging research to implementation to evaluation, this plan does not fully capture the transformative potential to reshape our lived environments, ranging

from rural communities to dense urban environments. The research community can and should be engaged in articulating grand challenges that raise smart city and community efforts from settling for incremental improvements to reaching for transformative change in economic opportunity and inclusive innovation, civic participation and privacy, and interactive and intelligent systems. Additionally challenges in research infrastructure, authentic evaluation, sustainability and workforce development should not be underestimated. Addressing these barriers will require deep multidisciplinary research from computer science to public policy and sustained civic-academic industry partnerships.

The CCC continued by describing these challenges that merit increased attention in the NITRD Strategic Plan for Smart Cities and Communities.

Economic Opportunity: Many persistent socio-economic barriers to education, economic wellbeing, and healthcare and wellness could be challenged through far-reaching, integrative approaches to smart communities and cities.

Universal Access: Access to city and community services by people with physical and cognitive impairments is problematic.

Security: Security is a foundational challenge in intelligent infrastructure.

Privacy: New research in privacy-preserving approaches to data collection and use is needed to ensure the adoption and fairness in smart city and community approaches.

Computational Materials: New research in computational materials that extend beyond cyber-physical systems and the greater integration of computer science and the programming of biological and other physical materials should be part of the smart city and communities strategic plan.

Learning Systems / AI: Also conspicuous in its absence is a discussion of how intelligent infrastructure should incorporate machine learning and mixed initiative experimentation and control approaches.

Scale: This plan frequently collapses attention to cities and communities as if those needs are interchangeable. Rural communities have unique needs that warrant dedicated research and development efforts.

Infrastructure for research and authentic evaluation: We also wish to emphasize, and not underestimated the difficulty of the creating useful research infrastructure and supporting authentic evaluation in the context of real use.

IT Sustainability: Economic sustainability is a formidable barrier for the long-term success of intelligent infrastructure investments.

Education and workforce development: We wish to amplify the importance of educational programs and approaches that integrate key information regarding data analytics, sensing, communication, security, and privacy.

Meeting these challenges requires sustained investment in basic research while proactively integrating these visions into current smart community and city approaches to ensure capacity and interoperability for future gains. **See the full response to learn more.**

CCC @ AAAS 2017 – What Happens When Everyday Objects Become Internet Devices: A Science Policy Agenda

CCC Director Ann Drobnis contributed to this blog post.

Previously, we posted a blog about *Health in Your Pocket: Diagnosing and Treating Disease with Smartphones*, a press briefing that CCC members, Elizabeth (Beth) Mynatt, Shwetak Patel, and Gregory Hager presented at the Annual Meeting of the American Association for the Advance of Science (AAAS) in early February.

The focus of this post is on the Internet of Things (IoT). **CCC Chair Beth Mynatt, CCC Executive Council Member Ben Zorn, and CCC Council Member Shwetak Patel were on a panel moderated by CCC Director Ann Drobnis on *What Happens When Everyday Objects Become Internet Devices: A Science Policy Agenda.***

Mynatt began the presentation by asking how informational, physical and programmatic components reflect social and physical frameworks such as the boundaries of places, human roles, and expectations of intelligence in her presentation called *How People Think and Reason About an Internet of Things*. She warned that a computational system does not necessarily reflect human understandings and may be dumb, dangerous or many points in between. In a presentation titled Programming a Secure, Robust, and Sustainable Internet of Things, Zorn talked about the potential that IoT has to enhance the process of doing science, but cautioned that it also creates an increasing dependence on the underlying software and hardware infrastructure. Finally, Patel presented on *The Future of Smart Environments and the Internet of Things* and the problem it creates due to the lack of policy and a rapidly growing industry. This, he suggested, has led to a number of security, deployment, and sustainability challenges for industry.

The presentation concluded with some policy recommendations:

- Define lifecycle requirements for IoT devices and the companies that sell them.
- Define objective measures of software quality (akin to existing certification) for a broader range of software/ IoT devices.
- Consider user interfaces as a part of quality checks (akin to FDA 510k usability tests).
- Create mechanisms for privacy audits. How is information in the home collected, stored and shared?

You can see the full presentation here.

The panel was well attended with over 80 individuals from academia and industry and a number of important questions were addressed during the discussion such as ownership: who owns the "things" in IoT, who owns the data, and what is the economic model, what are the incentives for ownership? Another question that generated a lot of discussion was around regulations for the Internet of Things – should they come from the policymakers or from the community?

CCC Chair Beth Mynatt presenting at AAAS 2017.

Announcements

CRA Board and Committee Members Honored

CRA Board Member Greg Hager Inducted to American Institute for Medical and Biological Engineering College of Fellows

(see original CCC Blog post)

The American Institute for Medical and Biological Engineering (AIMBE) recently inducted the 2017 College of Fellows at their 2017 Annual Event at the National Academy of Sciences in Washington, D.C. Greg D. Hager, a professor at Johns Hopkins University, was one of the inductees. Hager is a CRA Board member and past chair of the Computing Community Consortium (CCC).

Members of the College of Fellows are considered among the top two percent of the country's medical and biological engineers and include distinguished and accomplished research directors, professors, engineering and medical school chairs, and successful entrepreneurs and innovators.

Hager was recognized for his development of computationally enhanced imaging and image guidance and for data-driven quantification of human performance with interventional systems.

CCC's Cynthia Dwork Co-winner of 2017 Gödel Prize

The 2017 Gödel Prize was recently awarded to Cynthia Dwork, Frank McSherry, Kobbi Nissim and Adam Smith for their paper:

Calibrating Noise to Sensitivity in Private Data Analysis Journal of Privacy and Confidentiality, Volume 7, Issue 3 2016 (preliminary version in Theory of Cryptography, TCC 2006.)

Dwork is a CCC Council Member.

The Gödel Prize for outstanding papers in the area of theoretical computer science is sponsored jointly by the European Association for Theoretical Computer Science (EATCS) and the Special Interest Group on Algorithms and Computation Theory of the Association for Computing Machinery (ACM SIGACT). This award is presented annually, with the presentation taking place alternately at the International Colloquium on Automata, Languages, and Programming (ICALP) and the ACM Symposium on Theory of Computing (STOC).

Cynthia Dwork, Frank McSherry, Kobbi Nissim and Adam Smith will receive the 2017 Gödel Prize at the 49th Annual ACM Symposium on the Theory of ComputiTng (STOC 2017), 19-23 June 2017, in Montreal, PQ, Canada.

Former CRA Board Member Accomplishments

Valerie Taylor Named Argonne National Laboratory Division Director

Former CRA Board Member Valerie Taylor has been appointed as the next director of the Mathematics and Computer Science (MCS) division at the U.S. Department of Energy's (DOE) Argonne National Laboratory, effective July 3, 2017. She most recently served as the senior associate dean of academic affairs in the College of Engineering and a Regents Professor and the Royce E. Wisenbaker Professor in the Department of Computer Science and Engineering at Texas A&M University.

From the Argonne National Laboratory announcement:

> "Valerie brings with her a wealth of leadership experience, computer science knowledge and future vision," said Rick Stevens, Argonne Associate Laboratory Director for Computing, Environment and Life Sciences. "We feel strongly that her enthusiasm and drive will serve her well in her new role, and are pleased to have her joining our staff."

In addition to being a former CRA board member, Valerie has also participated on the CRA Education Committee (CRA-E) and Committee on the Status of Women in Computing Research (CRA-W). She also serves as the executive director of the Center for Minorities and People with Disabilities in IT (CMD-IT).

Laura M. Haas Named Dean of the College of Information and Computer Sciences at UMass Amherst

Former CRA Board Member Laura M. Haas, an IBM Fellow at IBM Research – Almaden, has been named dean of the College of Information and Computer Sciences (CICS) at the University of Massachusetts Amherst.

From the UMass announcement:

> "Laura Haas is a visionary leader in the field of computer science who has built major engines of basic and applied research for one of the most renowned firms in the world," says Newman. "We are incredibly fortunate to have attracted her to UMass, where she will lead a dynamic, accomplished and enthusiastic faculty. The sky is the limit for this college."

NCWIT AA Accepting Award Nominations & Proposals & Winners Announced

By Kim Kalahar, NCWIT

Thanks to the continued support from our sponsors, the NCWIT Academic Alliance (AA) is pleased to announce the call for nominations and proposals for the latest round of awards. Below you'll find submission details:

NCWIT Seed Fund – Proposal and Dean/Chair Letter of Recommendation

Deadline: 10/30/2017

The NCWIT Academic Alliance Seed Fund awards non-profit, U.S. university members of NCWIT's AA with startup funds to develop and implement initiatives for recruiting women and underrepresented populations in computing and IT. To date, sponsor Microsoft Research has awarded nearly $600,000 to AA member organizations and will award up to $10,000 per project for the next round of recipients as well as funding for one PI per proposal to attend the Summit 2018. Submit a proposal, or find out more information at www.ncwit.org/seedfund.

Congratulations to this year's winners: Claflin University (PI: Cheryl Swanier); Fairleigh Dickinson University (PIs: Laila Khreisat and Neelu Sinha); Green River College (PI: Tina Ostrander); University of North Carolina at Charlotte (PIs: Manuel Pérez Quiñones, David Wilson, and Audrey Rorrer). All Seed Fund winners are listed here (along with a brief description of their proposal that may trigger your creative spirit for your own submission!).

NCWIT Harrold and Notkin Research and Graduate Mentoring Award

Nomination Deadline: 10/30/2017

NCWIT
Harrold and Notkin
Research and Graduate
Mentoring Award

Do you know someone who has combined outstanding research accomplishments with excellence in graduate mentoring? Has he or she served as an advocate for recruiting, encouraging, and promoting women and minorities in computing fields? If so, be certain to take a few moments to nominate that person for this award (self-nomination is also perfectly acceptable), sponsored by NCWIT's Board of Directors. Each winner will receive $5,000 as a gift for the winner's institution and a trip to the Summit 2018. Submit a nomination, or find out more information at www.ncwit.org/harroldnotkin.

Congratulations to this year's winner: Jennifer Rexford of Princeton University. All Harrold and Notkin winners are listed here.

national center for women & INFORMATION TECHNOLOGY

Do you have a student you feel would benefit from the NCWIT Summit?

If yes, have them submit an application so they will be considered. While there is no registration cost, they will need to pay for their own travel.

Have a terrific spring and don't let those deadlines creep up on you in the fall!

Professional Opportunities

Aalto University

Professor in Cryptology

Aalto University School of Science invites applications for tenure track or tenured position in Cryptology. The vacancy is open to talented individuals who are interested in an excellent opportunity to pursue a successful scientific career. The position is targeted primarily at candidates for the Assistant Professor level. However, candidates with an outstanding record for Associate or Full Professor levels may be considered.

The professorship is a joint position between the Department of Computer Science (http://cs.aalto.fi/en/) and the Department of Mathematics and Systems analysis (http://math.aalto.fi/en/). With strong research groups in systems security, theoretical computer science, algebra and discrete mathematics, and stochastics, Aalto University is emerging as a leader in information security. The selected candidate is expected to establish independent research and teaching in cryptology. We solicit applications from candidates with expertise in any area of modern cryptology including, but not limited to, symmetric-key and public-key cryptography and cryptanalysis, information-theoretic and complexity-theoretic perspectives of cryptology, as well as implementational and applicational aspects of cryptographic primitives.

The full advertisement and instructions: http://www.aalto.fi/en/about/careers/jobs/view/1210/

The review of the applications will begin on April 1, 2017.

Activision

Sr. Research Engineer

Activision Central Technology's CTX group is seeking a Sr. Research Engineer to join our team in Santa Monica, CA. We are a team of artists, scientists, and engineers who collaborate with Activision studios to develop pioneering workflows and techniques for game content creation. We combine expertise from the game industry and the film industry to advance real-time visuals to levels which were previously exclusive to motion pictures. We are looking for an exceptionally skilled – and flexible – researcher to develop novel technologies to take on production challenges!

Responsibilities:

- Lead R&D projects related to performance capture, character animation, and other focus areas as directions evolve
- Proactively come up with ideas for new research directions, workflows, etc.
- Work with team members and studio collaborators to design and implement novel technologies to meet production needs
- Jump into both long-term R&D efforts as well as short-term production support as needed
- Engage with the academic and industry R&D communities, and identify collaboration and partnership opportunities
- Present research findings in scientific journals and/or conferences
- Advise and mentor interns

Requirements:

- Research experience, Ph.D. preferred, with a strong record of research publications
- Expert knowledge of Python, C++, and object-oriented programming practices
- Solid software engineering skills, including the ability to write robust, maintainable, well-architected, well-documented code
- Strong knowledge of mathematics for 3D graphics, particularly linear algebra
- Experience with computer vision and/or numerical optimization
- The ability to track down bottlenecks and accuracy/quality issues, wherever they may be in a pipeline
- Strong problem-solving skills
- Strong verbal and written communications skills, and ability to work effectively with multiple teams
- Self-motivated and able to quickly learn new areas of development
- Strong ability to innovate

Recommended:

- 5+ years' experience in software R&D in a CG production environment
- Strong understanding of the CG production process
- Strong working knowledge of Maya
- Strong understanding of game content creation pipelines
- Knowledge of current industry character animation practices, techniques, and technologies
- Qt / PyQt / PySide development
- Maya plugin development

Great Games Start with Great People! This is an exciting time to join us!

Ask anyone who works at Activision, or with Activision, their favorite thing about it, and they'll tell you, it's the people. We have world class brands, infrastructure and resources, but our success doesn't come from assembly lines producing widgets. Our success comes from people producing greatness together. We are nothing without our employee's brilliance. So if you're interested in our biggest priority, it's the people.

Headquartered in Santa Monica, CA, Activision operates at the intersection of technology, entertainment, esports, and consumer products. Activision is more than just the leading developer and publisher of video games, we are the creators of some of the world's biggest, most ground-breaking titles in the industry. Our portfolio includes Call of Duty®, Skylanders®, and Destiny®.

Please apply at: http://bit.ly/2lisJTC

Colgate University

Visiting Assistant Professor of Computer Science

The Computer Science Department at Colgate University invites applications for one or more Visiting Assistant Professor positions

Professional Opportunities

beginning fall semester 2017. Appointments will be made for one year with the possibility of renewal. We encourage candidates in all areas of specialization to apply.

Each semester, candidates can expect to teach two courses plus associated laboratory sections, which may include courses in the candidate's area of specialization. To support the candidate's scholarship, Colgate offers support for travel, professional development, and student researchers.

Colgate is a highly selective undergraduate liberal-arts college in central NY committed to promoting excellence in both teaching and research. Colgate is an Equal Opportunity Employer; candidates from historically underrepresented groups, women, persons with disabilities, and protected veterans are encouraged to apply.

Review of applications will begin March 20, 2017 and will continue until the position is filled. For more information, and to apply, visit https://academicjobsonline.org/ajo/jobs/8952.

香港中文大學
The Chinese University of Hong Kong

Applications are invited for:-

Faculty of Engineering
Professors / Associate Professors / Assistant Professors
(Ref. 1700004N)

The Faculty of Engineering is seeking several faculty posts at Professor / Associate Professor / Assistant Professor levels with prospect for substantiation. The professors will play a significant role in the Cyber Security Center, which will be established by the Faculty of Engineering.

Cyber security is identified as one of the Faculty's strategic research areas, to be developed by both the Department of Computer Science & Engineering and Department of Information Engineering. Talented candidates are sought to complement existing efforts and create new synergies. Candidates in the following areas are encouraged to apply:

- cryptography and computational theory in security
- network, system and software security
- data security and privacy
- computer forensic
- hardware and IoT security

Applicants should have a relevant PhD degree and a good scholarly record demonstrating potential for teaching and research excellence.

Appointments will normally be made on contract basis for up to three years initially commencing August 2017, which, subject to performance and mutual agreement, may lead to longer-term appointment or substantiation later. The exact start date can be worked out with the successful applicants.

Applications will be accepted until the posts are filled.

Application Procedure

Applicants please upload the full resume with a cover letter, copies of academic credentials, publication list with abstracts of selected published papers, a research plan, a teaching statement, together with names and e-mails addresses of three to five referees to whom the applicant's consent has been given for their providing reference (unless otherwise specified).

The University only accepts and considers applications submitted online for the posts above. For more information and to apply online, please visit http://career.cuhk.edu.hk.

Eastern Michigan University

Assistant Professor - Information Assurance

The School of Information Security & Applied Computing (SISAC) in the College of Technology at Eastern Michigan University invites applications for a tenure-track position in IA starting Fall, 2017. SISAC is a designated Center of Academic Excellence in Information Assurance Education with an undergraduate IA program as well as graduate and PhD concentrations in Information Assurance.

Essential Duties and Responsibilities Include:
Plan and teach courses that fulfill the SISAC curriculum goals and objectives. Responsibilities also include supporting SISAC course load, developing course syllabi, following established college policies and procedures, and supporting the mission for the program. Candidates should remain active in research in the field and shall develop externally funded research programs in IA and succeed in securing such funding.

Position Requirements:
Candidates must possess:

- Ph.D. in Computer Science, Computer Information Systems, or a closely related field
- Evidence of ability to deliver high-quality instruction in Information Security and Applied Computing disciplines.
- Documented publications and/or proposal development for external funding in a

Professional Opportunities

relevant field, and the ability to continue such an agenda

- Expertise in two or more of the following areas (understandably these overlap):

a. Defensive/offensive security
b. Malware analysis
c. Digital Forensics and Incident Response
d. Systems/Network Security and Administration
e. Software Development (Web, Mobile, Cloud, Secure Dev, Architecture, etc.)
f. Data Administration, Analytics, Mining, and/or Management

EMU offers competitive salaries. Official review of the applications will begin immediately and continue until the position is filled. All applications must be made online at http://agency.governmentjobs.com/emichedu/default.cfm. Application materials should include a letter of application - which contains a statement of qualifications and teaching as well as research interests, CV and names, addresses and phone numbers of three references.

Eastern Michigan University is an Equal Opportunity Employer and Educator that is strongly committed to achieving excellence through cultural diversity.

Hartwick College

Assistant Professor - Big Data/Cyber Security

Big Data/Cyber Security: The Department of Computer Science at Hartwick College invites applications for a full-time, tenure-track appointment at the rank of Assistant Professor starting in August 2017.

For detailed information about this position and how to apply, please visit our website, http://www.hartwick.edu/about-us/employment/human-resources/employment-opportunities/faculty-positions

Huawei R&D

Staff Engineer - Cloud Solutions (Research/Applied Research)

The Programming Technologies Lab of Huawei is seeking candidates w/ expertise in the broad area of cloud computing technologies. Our lab is young but growing and has a vast technical space to explore. We welcome researchers and engineers alike. More information about Huawei can be found here.

As a member of a highly talented team, you get to do creative work and make an impact by solving real customer problems. While our current projects include language design, compiler & JVM, and performance optimization, the lab continues to grow and expand to explore software technologies in new domains (e.g., cloud, distributed computing, smart devices). As such, we are not looking for people w/ a fixed set of skills, but rather for "growth-mindset" people who have versatile experience in the field and are undaunted by acquiring new skills.

Responsibilities:

- Research in: performance analysis & optimizations; program analysis tools design, prototypes and implementation; with focus on distributed and cloud computing.
- Proactively engage with customers to identify opportunities for cloud technology solutions; bootstrap projects from scratch; and turn ideas into prototypes and production.

Requirements:

- Ph.D. in Computer Science or 5+ years of work experience in the relevant areas
- Expertise/experience in one or more of the following areas:
- Distributed and cloud system architectures, tools technologies, its challenges and solutions on these systems.
- Methodologies of performance optimization in VM; runtime and library; and full stack software profiling; software engineering tools on distributed or/and cloud systems.
- Performance measurement, analysis and optimization via experience in a relevant area, such as performance modeling, parallel software development.
- Strong software development skills, proficient in software engineering techniques and methodologies
- Fluency in C/C++/Java and many other cloud-based programming languages

Preferred qualifications:

- Because we develop cloud tools technology for a variety of purposes, competence in a breadth of distributed systems in heterogeneous environment is a plus
- Experience with runtime system, such as memory management and concurrent task scheduling, and in newer, cloud based languages like Go, Rust, Scala, and Swift
- Experience with developing programming technologies for the Cloud and/or distributed environment and smart devices
- Prior engagement in open-source projects, developers' community, and/or research community

Email: brian.gilmore@huawei.com

Huawei Inc. is proud to be an Equal Opportunity Employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability, protected veteran status, or any other characteristic protected by law.

Iowa State University

Assistant Professor of Computer Science

The Department of Computer Science at Iowa State University seeks outstanding applicants for a faculty position at the rank of Assistant Professor. This is a tenure-track appointment with 60% teaching, 30% research, and 10% service focus.

For more information or to apply, please visit: http://www.iastatejobs.com/postings/24140.

Professional Opportunities

Lafayette College

Visiting Assistant Professor
Department of Computer Science

Lafayette College is a highly selective, private, liberal-arts college located in the Lehigh Valley of Pennsylvania. The college is 70 miles north of Philadelphia and 70 miles west of New York City.

The Computer Science Department at Lafayette College is inviting applications for a one-year Visiting Assistant Professor position starting in the fall of 2017, with the possibility of renewal. All areas of CS will be considered. The Computer Science Department at Lafayette College has five full-time tenure-track members and is accredited by ABET. The teaching load for visitors is 6 courses per year.

Qualifications:

- Applicants with earned Master's degrees in CS will be considered, but preference will be given to applicants with an earned Ph.D. in CS or closely aligned fields by or near the time of appointment.

Review of applications will start on April 1th 2017, although applications will be accepted until the position is filled.

Application Instructions:

To apply, please submit a cover letter, a current CV, three letters of reference, a teaching statement and a research statement. Your cover letter should address how your teaching, mentoring, and/or community service support Lafayette College's commitment to diversity and inclusion articulated in the College's diversity statement: http://www.lafayette.edu/about/diversity-statement/. For further information please visit at https://apply.interfolio.com/40897, and any questions may be emailed to the search committee chair at compsci@lafayette.edu.

Lafayette College is committed to creating a diverse community: one that is inclusive and responsive, and is supportive of each and all of its faculty, students, and staff. All members of the College community share a responsibility for creating, maintaining, and developing a learning environment in which difference is valued, equity is sought, and inclusiveness is practiced. Lafayette College is an equal opportunity employer and encourages applications from women and minorities.

NEC Laboratories America, Inc.

Researcher - Machine Learning

The Machine Learning Department in Princeton, NJ, has openings for researchers with a passion for developing the next generation of machine intelligence. Expertise in machine learning with an proven track record of original research as well as a keen sense for developing practical applications are prerequisites for this position. One opening is at the level of research staff member, the second one for a postdoc position.

At NEC Laboratories America (www.nec-labs.com) we pursue forward looking research, and our nine departments cover a broad range of technologies in computer and communication science. Our focus is on projects in high-impact areas where creative research can provide strong support for NEC's business.

The Machine Learning department has been at the forefront of research in such areas as deep learning, support vector machines and semantic analysis for over a decade. Many technologies developed in our group have been integrated into innovative products and services of NEC, such as systems for recruiting, surveillance, sonar detection, and digital pathology. In addition to contributing to NEC's business, our research is published in premier venues. Among the challenges we are tackling now is how to move machine learning to more abstract reasoning and how this can enable new applications in traffic safety, video surveillance, human resource management, and automation of manufacturing. www.nec-labs.com/research-departments/machine-learning/machine-learning-home

Requirements:

- PhD in computer science, statistics, electrical engineering, or equivalent.
- Research experience in machine learning with strong publication record.
- Strong algorithm and numeric computation background.
- Programming experience in Python, Lua, C++, or any other language.
- Experience with any of the deep learning libraries and platforms, e.g. Torch, TensorFlow, Caffe, or Chainer a plus.

For more information about NEC Labs, please access www.nec-labs.com and submit your CV and research statement through our career center at https://www.appone.com/MainInfoReq.asp?R_ID=1500523.

EOE-M/F/V/D

NEC Laboratories America

Researcher - Mobile Communications and Networking

The Mobile Communications and Networking research department at **NEC Laboratories America** in Princeton, NJ, has multiple Researcher positions available. In the last couple of years, the department has initiated research focusing on end-to-end wireless networking and sensing solutions in different vertical domains (such as retail, transportation, safety) leveraging technologies such as RFID, Bluetooth, WLAN and cellular. Details about our projects can be found at http://www.nec-labs.com/research-departments/mobile-communications/mobile-communications-home.

The current search is for candidates who can contribute to aforementioned solutions oriented research. Specifically, candidates with experience in building wireless

Professional Opportunities

networking and/or sensing systems with expertise in one or more of the following: software radios, embedded systems, autonomous and mobile sensing platforms, are invited to apply. Applications are also welcome from candidates with networking and systems experience outside of the wireless area who can contribute to our endeavor at the mobile applications and services layer (e.g., mobile-edge computing platforms and services, IoT services, etc.).

Candidates must have or expect to receive a PhD degree in EE or CS. Candidates should be able to carry out original research, develop and prototype innovative technologies, work towards technology transfer to relevant business units within the company and maintain a track record of high-quality peer-reviewed publications.

For more information about NEC Labs America, please access http://www.nec-labs.com/, and submit your CV and research statement through our career center at https://www.appone.com/MainInfoReq.asp?R_ID=1528968.

EOE-M/F/D/V

Northeastern University

Location: Boston Main Campus, Silicon Valley, Seattle, Charlotte

Position Summary: The College of Computer and Information Science (CCIS) at Northeastern University invites applications for positions at the rank of Lecturer/Assistant Teaching Professor/Associate Teaching Professor/Full Teaching Professor in the Computer Science ALIGN Program at our main campus in Boston and for our regional campuses located in Silicon Valley, Seattle and Charlotte, beginning in September 2017 or January 2018. The ALIGN Program offers intellectually curious students who did not study computer science as an undergraduate from all backgrounds (technical to liberal arts) the opportunity to earn a Master of Science in Computer Science (MSCS) and to transition to successful careers in the dynamic field of computer science. Students first take courses in a two semester sequence to give them the background necessary to move into the MS-level classes in computer science. This innovative program is in its 4th year and its graduates now have positions at top tech companies across the country. This program was designed to increase the diversity of thought and demographics in computer science.

We are seeking highly-motivated individuals committed to excellence in teaching. Full-time appointments at all ranks are renewable, career-focused non-tenure-track positions with responsibilities in teaching and service. Primary responsibilities include teaching graduate courses in the Computer Science ALIGN Program. The successful candidate will create course content and materials and collaborate with colleagues to develop new academic programs and relationships with the business community. Student advising and service to the college and university are an integral component of the position. Opportunities for research and scholarship are possible. Northeastern University is a global university recognized by our renowned co-op program and our focus on experiential learning. We are experiencing dramatic growth in enrollment and academic innovation. The College of Computer and Information Science is one of the fastest growing colleges in the university.

Qualifications: Candidates must hold a PhD in Computer and/or Information Science from an accredited institution by the start date. Teaching experience at the graduate level is strongly preferred. Rank of appointment at either the Lecturer, Assistant Teaching Professor, Associate Teaching Professor, or Full Teaching Professor level will be determined on prior teaching experience and will be discussed with candidates during the interview process. Successful candidates will have demonstrated an expert grasp of knowledge of the field and be creative in their approach to teaching in an environment of experiential education. Strong written, oral and interpersonal skills are required in order to communicate effectively with diverse and exceptional students in person and online.

For more information about the College, please visit http://www.ccs.neu.edu. For additional information about the ALIGN Program, please see https://www.ccis.northeastern.edu/program/align-master-of-science-in-computer-science/.

Additional Information: Please submit a cover letter of interest highlighting teaching accomplishment and relevant professional experience, a curriculum vitae, and the names and contact information of at least three references.

Boston Campus
Silicon Valley
Seattle
Charlotte

Compensation is commensurate with qualifications and includes an outstanding benefits package.

Northeastern University is an Equal Opportunity, Affirmative Action Educational Institution and Employer, Title IX University. Northeastern University particularly welcomes applications from minorities, women and persons with disabilities. Northeastern University is an E-Verify Employer.

Northeastern University

Lecturer/Assistant/Associate/Full Teaching Professor

Location: Boston Main Campus, Silicon Valley, Seattle, Charlotte

Position Summary: The College of Computer and Information Science (CCIS) at Northeastern University invites applications for one or more positions at the rank of Lecturer/Assistant Teaching Professor/

Professional Opportunities

Associate Teaching Professor/Full Teaching Professor beginning in September 2017 or January 2018 at our campus in Boston and for our regional campuses located in Silicon Valley, Seattle and Charlotte. In Boston we offer undergraduate, masters and PhD programs. In Seattle, Charlotte and Silicon Valley, we offer professional masters programs. We are seeking highly- motivated individuals committed to excellence in teaching. Full-time appointments at all ranks are renewable, career- focused non-tenure-track positions with responsibilities in teaching and service. Primary responsibilities include teaching undergraduate and graduate courses. We are seeking faculty who can teach in one or more of the following areas: Computer Science, Data Science, Cyber Security, Health Informatics and Information Science. The successful candidate will create course content and materials and collaborate with colleagues to develop new academic relationships within the university and the business community. Student advising and service to the college and university are an integral component of the position. Opportunities for research and scholarship are possible on the teaching track and several of our faculty are research active within the field of Computer Science and within the area of Education Research in Computer Science.

Northeastern University is a global university recognized by our renowned co-op program and our focus on experiential learning. We are experiencing dramatic growth in enrollment and academic innovation. The College of Computer and Information Science is one of the fastest growing colleges in the university. It is home to over 1200+ undergraduate students and 1000+ graduate students. We have three undergraduate majors (Computer, Data and Information Science) and over 26 combined majors (CS+X). In the graduate program we offer masters in CS, Data Science, Information Assurance and Cyber Security, Health Informatics and Health Data Analytics. Many of our programs are interdisciplinary programs with other colleges here at Northeastern.

Qualifications: Candidates must hold a PhD in Computer and/or Information Science from an accredited institution by the start date. Teaching experience at the undergraduate and graduate levels is strongly preferred. Rank of appointment at either the Lecturer, Assistant Teaching Professor, Associate Teaching Professor, or Full Teaching Professor level will be determined on prior teaching experience and will be discussed with candidates during the interview process. Successful candidates will have demonstrated an expert grasp of knowledge of the field at all levels and be creative in their approach to teaching in an environment of cooperative, interdisciplinary and experiential education. Strong written, oral and interpersonal skills are required in order to communicate effectively with students in person and online.

For more information about the College, please visit http://www.ccs.neu.edu.

Additional Information: Please submit a cover letter of interest highlighting teaching accomplishments and relevant professional experience, a curriculum vitae, and the names and contact information of at least three references.
Boston Campus
Silicon Valley
Seattle
Charlotte

Compensation is commensurate with qualifications and includes an outstanding benefits package.

Northeastern University is an Equal Opportunity, Affirmative Action Educational Institution and Employer, Title IX University. Northeastern University particularly welcomes applications from minorities, women and persons with disabilities. Northeastern University is an E-Verify Employer.

Sarah Lawrence College

Full-Time Visiting Faculty Member

The Department of Computer Science at Sarah Lawrence College seeks to hire a full-time visiting faculty member for the 2017-18 academic year. Candidates should have a commitment to excellence in teaching and should have completed or made significant progress towards a Ph.D. For more information and to apply, visit https://slc.peopleadmin.com/postings/835.

Review of applications will begin April 15, 2017.

SLC is an Equal Opportunity/Affirmative Action employer.

Shanghai Jiao Tong University

Faculty Position at John Hopcroft Center for Computer Science

The John Hopcroft Center for Computer Science at Shanghai Jiao Tong University (SJTU) is seeking to fill several tenure-track positions in computer science at the rank of Assistant Professor and above.

Shanghai Jiao Tong University is one of the oldest and most prestigious universities in China, which enjoys a long history and a world-renowned reputation. John Hopcroft Center for Computer Science, founded in January 2017, focuses on the fundamental problems in computer science, exploring new theories and efficient algorithms for the future, and fostering talents in computer science. The center will provide a favorable international academic environment for faculty members.

Professor John Hopcroft, 1986 Turing Award winner, has been working at SJTU since 2011. Over the last five years, he has dedicated tremendous amount of efforts and made great contributions to the development of computer science research and the undergraduate teaching quality in SJTU. In 2016, he was awarded the "Chinese Government Friendship Award", which is

Professional Opportunities

the highest recognition to a foreign expert who has made outstanding contributions to China's economic and social progress.

Strong candidates in all areas will be considered with special consideration given (but not limited) to AI, BigData, and Mobile Internet etc. An internationally competitive package for salary and benefits will be offered by the Center. SJTU makes a great effort to provide a startup research grant. In addition to conduct research in the Center, faculty members are required to teach courses and supervise Ph.D. students and master students. The overall teaching load is one course per semester. Our equal opportunity and affirmative action program seek minorities, women and non-Chinese scientists.

The criteria for promotion will be professional reputation as judged by international experts in the candidate's field and excellence in teaching.

Application, including vita and the names of three references, should be sent to Professor Xinbing Wang (xwang8@sjtu.edu.cn) and to Ms. Bing Li (binglisjtu@sjtu.edu.cn).

Texas A&M University

Associate or Full Professor - Tenure on Arrival

CSE invites applications for multiple tenure on arrival positions at the associate and full professor levels. Candidates are being sought in the areas of theory, systems, software, human-centered computing, applications, and computer science education. Applicants doing research in the frontiers of computer science with other disciplines will generate the most interest. Exceptional candidates in other areas are also welcome to apply. Successful candidates will be expected to teach at the undergraduate and graduate levels, develop an independent, externally funded research program, advise graduate students, participate in all aspects of the department's mission, and serve the profession.

Applicants must have a Ph.D. in computer science, computer engineering, or a closely related field.

Applicants should submit a cover letter, curriculum vitae, teaching statement, research statement, and a list of three references (including postal addresses, phone numbers and email addresses) by applying for this specific position at www.tamengineeringjobs.com. Applications received after that date may be considered until positions are filled. It is anticipated the appointment will begin fall 2017. For specific questions about the positions, contact: search@cse.tamu.edu.

University of Connecticut

Associate Professor in Residence

The Department of Computer Science and Engineering at the University of Connecticut invites applications for two non-tenure track positions at the rank of Assistant or Associate Professor-in-Residence. The successful candidate will primarily contribute to the department's teaching program, but is encouraged to pursue his or her research interests and collaborate within the department. Interested candidates will also be considered for the position of Associate Director of Undergraduate Studies in Computing. Candidates must be able to begin work on August 23, 2017 for Fall semester start.

Visit https://academicjobsonline.org/ajo/jobs/8902 for more information and to apply.

University of Georgia

Lecturer Positions in Computer Science at UGA

The Department of Computer Science at the University of Georgia invites applications for two Lecturer positions starting August 2017. The responsibilities of this position include teaching foundational courses in the undergraduate major and periodically teaching a senior/beginning graduate level course in his/her specialty. In addition, this position allows for opportunities to develop new undergraduate courses for our expanding program.

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Successful Lecturer candidates should hold a Ph.D. degree in Computer Science or a closely related field. Scholarly credentials should reflect a strong commitment to teaching Computer Science courses at the undergraduate level. Although not tenure track, it is expected that the person holding this position will remain with the department long term.

The University of Georgia (http://uga.edu/), founded in 1785, is the oldest land-grant university in the nation and the largest university in Georgia (exploregeorgia.org), with a student body of over 35,000. It is located in Athens (http://www.visitathensga.com/) a charming and historic university town of about 100,000, approximately 65 miles from Atlanta, with mild winters and warm summers. The University boasts a major Performing Arts Center and has one of the country's best fitness and exercise facility for students and faculty. It has been consistently ranked among the top 20 public universities by U.S. News and World Report. Applicants will find UGA and the rapidly growing technology sectors in Athens/Atlanta supportive of professional growth.

To apply, please go to http://facultyjobs.uga.edu/postings/1859

The search committee will begin reviewing applications on March 20, 2017, until the two positions are filled. Please see http://www.cs.uga.edu for more information about the department and the university.

The Franklin College of Arts and Sciences, its many units, and the University of Georgia are committed to increasing the diversity of its faculty and students, and sustaining a work and learning environment that is inclusive. Women, minorities, protected veterans and individuals with disability are encouraged to apply. The University of Georgia is an EOO/AA institution, and does not discriminate based on race, color, religion, sex, sexual orientation, gender identity, national origin, disability, or protected veteran status. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability, gender identity, sexual orientation or protected veteran status.

University of Kansas

Asst/Assoc/Full Professor of the Practice - Cyber Security

The University of Kansas (KU) Department of Electrical Engineering and Computer Science (EECS) at the Edwards Campus (KUEC) seeks an outstanding individual for a non-tenure track faculty Professor of Practice to join extensive and increasing programs in the area of information technology and cybersecurity in multiple campus locations and online. This position is a full-time, 9-month, non-tenure-track Assistant, Associate or Full Professor of the Practice (open rank). Depending on years of experience in the industry, an appointment as assistant, associate, or full Professor of the Practice is possible. Program needs are particularly great in the following areas: cybersecurity, management of information security, information privacy, and network security. Successful candidates will be expected to contribute to the development and expansion of cyber and information security program at the KUEC and to establish collaborative links with interdisciplinary programs cross campus. This faculty position will potentially teach in the Master's of Science in Information Technology (MSIT) program, the Bachelor of Science in Information Technology (BSIT) program, and the Homeland Security Master's program. These programs are offered at the Edwards Campus in Overland Park, Kansas and at the Leavenworth Campus in Leavenworth, Kansas. Hybrid and online teaching may also be required.

Apply to https://employment.ku.edu/academic/8042BR. Deadline to apply is June 30, 2017.

University of Kansas

Asst/Assoc/Full Professor of the Practice - Information Technology

The University of Kansas (KU) Department of Electrical Engineering and Computer Science (EECS) at the Edwards Campus (KUEC) seeks an outstanding individual for a non-tenure track faculty Professor of the Practice to join extensive and increasing programs in the area of information technology. We seek individuals with industry experience in the information technology who have exceptional communication skills and a strong commitment to train and develop future information technology professionals. The ideal candidate will have a developed teaching philosophy and a demonstrated desire to inspire students and encourage lifelong learning in information technology.

This faculty position will teach in the Bachelor of Science in Information Technology (BSIT) program. This program is offered at the Edwards Campus in Overland Park, Kansas. Hybrid and online teaching may also be required. Depending on years of experience in the IT industry, an appointment as assistant, associate, or full Professor of the Practice is possible.

Apply at https://employment.ku.edu/academic/8040BR. Deadline to apply is June 30, 2017.

University of Massachusetts Amherst

Director of Career & Student Development

The College of Information and Computer Sciences is looking for a Director of Career & Student Development.

For a complete position announcement including minimum qualifications and application instructions, please see https://www.interviewexchange.com/jobofferdetails.jsp?flush=true&JOBID=81393

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The University of Massachusetts Amherst is an Affirmative Action/Equal Opportunity Employer of women, minorities, protected veterans and individuals with disabilities and encourages applications from these and other protected group members.

The University of Oxford

Associate Professorship (TF) of Theoretical Computer Science

Department of Computer Science, Wolfson Building, Parks Road, Oxford

Salary on a scale from: £45,562 per annum (plus college benefits, including a housing allowance of £10,503 p.a. or single accommodation in college if available, a responsibility allowance of £1,527 p.a., and private medical insurance. An allowance of £2,655 p.a. would be payable upon award of Full Professor title.)

Applications are invited for the post of Associate Professor (or Professor) of Theoretical Computer Science to be held in the Department of Computer Science, with effect from October 2017 as soon as possible thereafter. The successful candidate will also be appointed to a Tutorial Fellowship at Jesus College. The appointment will be based at the Department of Computer Science, Wolfson Building, Parks Road, Oxford, OX1 3QD and Jesus College, Oxford, OX1.

The appointee will join one of Europe's leading computer science departments. The department supports a wide variety of research in theoretical computer science and continues to expand both in theory and in areas related to theory (e.g. machine learning, verification). The Associate Professor's research will focus on Theoretical Computer Science, and they will contribute to teaching on the Department's highly successful undergraduate and graduate programmes. At the same time the appointee will have many opportunities to interact with academics in other disciplines as part of Oxford's unique collegiate system.

The Associate Professor will be a member of both the University and the College community. They will be part of a lively and intellectually stimulating research community which performs to the highest international levels in research and publications and will have access to the excellent research facilities which Oxford offers. They will have a role to play in the running of the College as a member of the Governing Body and a trustee of the College as a charity.

The successful candidate will hold a doctorate in Computer Science, or a related subject, will have the ability to teach across a range of computer science subjects, and will also have a proven research record of high quality at international level in the area of Theoretical Computer Science, and experience of research collaborations at both national and international level.

The closing date for applications is 12.00 noon on 13 April 2017. Interviews will be held on 18 May 2017 – please allow a full day for these.

For further details and to apply please visit: https://www.recruit.ox.ac.uk/pls/hrisliverecruit/erq_jobspec_version_4.jobspec?p_id=127942

University of Rochester

Deputy Director and Instructor in Data Science

The University of Rochester Goergen Institute for Data Science (GIDS) seeks applicants for a full time Deputy Director for GIDS, who will also serve as an instructor in data science. We seek candidates with a PhD in computer science, statistics, or a related STEM field. The preferred candidate will have academic and/or other administrative and program leadership experience, college teaching experience, the demonstrated ability to develop new courses, strong interpersonal skills, flexibility, and a passion for interdisciplinary education. The position starts as early as July 1, 2017.

Responsibilities include:

Program Development and Leadership: Serve as part of GIDS leadership team, participating in GIDS strategic planning and oversight, including development and implementation of new initiatives.

Education Program: Direct the overall educational initiatives for GIDS, including the graduate and undergraduate programs. This includes assessing, planning and implementing changes to all aspects of the education programs, coordinating with schools and programs across the University. With support from the GIDS Program Director, oversee expansion of student recruitment, internships, career development and placement initiatives.

Instruction: Teach a total of 2-3 courses per year (1-2 per semester) in data science and computer science, in areas such as databases, data mining, and data science capstones and practicums. For the capstone and practicum courses, the instructor would work with industry partners and research groups across the university to create and supervise student projects based on real-world problems.

Advising: Advise Data Science majors, MS students, perspective applicants and participate in academic advising sessions, open houses, and similar events.

For more information about the Goergen Institute for Data Science, please visit: http://www.rochester.edu/data-science/

Applications accepted on-line, https://www.rochester.edu/faculty-recruiting

Candidates should upload a cover letter of interest, curriculum vitae, and teaching statement describing teaching experience and teaching philosophy. Review of applicants will begin immediately and continue until the position is filled.

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The University of Rochester, an Equal Opportunity Employer, has a strong commitment to diversity and actively encourages applications from candidates from groups underrepresented in higher education.

EOE Minorities/Females/Protected Veterans/Disabled

Venture Labs

Member of Technical Staff

Drawing on its Bell Labs and Applied Communication Sciences heritage, Vencore Labs delivers advanced applied research and engineering to enable government agencies, utilities and commercial enterprises to fully exploit the future of communications, data analytics and cyber security. From smart grid to smart phones, intelligent highways to intelligent battlefields, Vencore Labs' 200 scientists, engineers and analysts are consistently creating generation-after-next technologies and solutions. In doing so, our labs are helping to transform traditional government research. We connect our customers to advanced research and technology helping them to develop solutions to their toughest challenges.

We are currently seeking research scientists in the following 4 key areas:
Cyber Security
Machine Learning
Data Analytics
Wireless Networking.

Ideal candidates will have a graduate degree in either Computer Science or Electrical Engineering. We have the flexibility to offer positions at various levels, depending upon the amount of experience, education, and capability of each candidate. Due to the requirements of some of our federal government customers, candidates should be US Citizens. Most positions are based at either our Basking Ridge or Red Bank offices in New Jersey, though we also have positions available in the Washington, D.C. metro area. Further qualifications are specific to each job and can be found at the link below.

See a complete list of open positions and apply online here: https://careers-vencorelabs.icims.com/

Wheaton College

Visiting Assistant Professor

Wheaton College invites applications for a three-year Visiting Assistant Professor of Computer Science to begin Fall 2017.

For additional information and to apply, please visit: https://jobs.wheatoncollege.edu/postings/2008

Yahoo Research

Research Scientist

We are looking for PhD Research Scientists with a strong research track record in Applied Machine Learning, Data Mining, Visualization, Security, or related areas.

Details:

https://tas-yahoo.taleo.net/careersection/yahoo_us_cs/jobdetail.ftl?lang=en&job=1646039

Please send CV and research statement to yifanhu@yahoo-inc.com.

Yahoo Research

Research Scientist

Yahoo Research is growing its strategic research teams to enable the company to build new products and platforms that our customers need, now and in the future. We have exciting job openings in several technical focus areas (data mining, optimization, machine learning, computational economics) that are located in our New York City office located one block from Times Square.

The full job description is available here http://careers.yahoo.com (job number 1742024) or https://tas-yahoo.taleo.net/careersection/yahoo_us_cs/jobdetail.ftl?job=1742024

Please send your CV and a short letter of interest to Maxim Sviridenko (sviri at yahoo-inc dot com).