COMPUTING RESEARCH NEWS

Congress Appears Bullish on NSF, NIST
DOE Science, Defense May Not Fare Quite as Well

By Peter Harsha

Congress appears favorably inclined to approve significant increases to some key science agencies next fiscal year, based on early action by both the House and Senate Appropriations Committees. Before the August recess both of the House and Senate Commerce, Justice, Science Appropriations subcommittees approved increases for the National Science Foundation and National Institute of Standards and Technology that were at or just below the significant increases requested by President Obama in his FY 2011 budget request in February.

Also significant was House passage of a reauthorization of the America COMPETES Act that would authorize a continued path to doubling the budgets of NSF, NIST and DOE's Office of Science over seven years—though the bill's path to passage was not without some drama.

In all, the early action suggests that Congress remains supportive of investments in the "physical sciences"—which, in D.C. parlance, includes anything that is not a "life science"—despite growing concerns about federal spending, the increasing deficit, and an election season which has dramatically altered the political calculus in Washington.

In June, members of the House Commerce, Justice, Science appropriations subcommittee "marked up" their version of the appropriations bill containing funding for NSF, NIST, NOAA, and NASA, and included an 8 percent increase for NSF in FY 2011 compared to the FY 2010 level—essentially matching the President's requested budget for the agency. The appropriators did alter the President's priorities slightly, however, reducing the agency's request for its Research

and Related Activities account by $58 million and increasing the agency's Education and Human Resources request amount by $66 million. The committee mark puts R&RA at $5.96 billion in FY 2011, an increase of $343 million over FY 2010. EHR would see an increase of $86 million to $958 million in FY 2011.

The committee also approved an increase to NIST's overall budget for FY 2011. Under the committee mark, NIST's budget would increase to $883 million in FY 2011, up $26 million from $857 million in FY 2010. NASA's Science budget would also see an increase in the committee mark to $4.7 billion in FY 2011, up $236 million from $4.5 billion in FY 2010.

The Senate Commerce, Justice, Science appropriations subcommittee adopted very similar numbers for NSF as the House, a fact which may bode well as the appropriations process continues. The Senate committee approved an overall budget of $7.35 billion for NSF in FY 2011, an increase of $427 million above the FY 2010 level. The total includes $6 billion for research funding and $892 million for NSF's EHR directorate. Also included in the legislative report accompanying the Senate bill

is language prohibiting NSF from following through on its proposed plan to merge three distinct initiatives aimed at broadening participation in the science, technology, engineering and mathematics (STEM) fields. In its FY 2011 budget request, the agency had announced its intention to merge the Historically Black Colleges and Universities Undergraduate Program (HBCU-UP), the Louis Stokes Alliances for Minority Participation (LSAMP) and the Tribal Colleges and Universities Program (T-CUP) into one "Broadening Participation" program. The committee language would prohibit this approach with the simple justification that "one size will not fit all." It's not clear whether this development will impact the NSF's Computer and Information Science and Engineering directorate's plans for its Broadening Participation in Computing program—a program that was just given plaudits in a report by the AAAS.[1]

The Department of Energy's Office of Science did not fare as well as NSF and NIST during its first markup in the House Energy and Water

Inside CRN

Education a Hot Topic at Snowbird Conference

It seems so obvious that it hardly needs to be repeated: the future of computing research depends on a reliable pipeline of talented young researchers who share a passion for expanding the boundaries and advancing the frontiers of computation. As the organization that represents academic and industrial computing research in North America, CRA has a vital interest in ensuring the health of the research pipeline. In 2008, after consulting with many organizations, the CRA Board established the CRA Education Committee (CRA-E) and charged it with finding ways for CRA to take additional responsibility for the continued flow of quality researchers to the field.

In the summer of 2008, Andy van Dam from Brown University convened CRA-E—*the Mark I* committee as it has become known. Mark I was a panel of world-class computing researchers and educators who were asked to identify and recommend best practices for preparing undergraduates for research careers in computing. At an inaugural meeting at the 2008 Conference at Snowbird, the committee developed as its mission

statement: "Our charter is to explore the issues of undergraduate education in computing and computational thinking for those who will do research in disciplines from the sciences to the humanities. As technology and teaching methodologies continue to evolve, how should programs in computer science, computational science, and information science co-evolve? Can we communicate a core set of ideas, principles, and methodologies that is domain-independent?"

The committee's subsequent work produced a White Paper that was released at CRA's Conference at Snowbird in July. The paper documents best practices and provides six recommendations for institutional structures, principles, and mechanisms to support undergraduates in acquiring the skills needed for computationally oriented research in all fields.

The recommendations are arranged into three thematic groups: 1) foundational computational thinking courses, including contextualized versions that address current student interests; 2) approaches that combine a leaner-than-traditional "common core" with

greater breadth and flexibility in specialization through various kinds of tracks and through integrated joint majors; and 3) identification of cognitive, mastery, and research skills, including design under constraints, that should pervade the entire curriculum. The 100+ page White Paper contains a wealth of resources, including copious references and exemplar courses and curricula to provide tools for implementing the recommendations. A summary of findings and recommendations appears on p. 4 of this issue of *Computing Research News*. The full report is available at http://www.cra.org/resources/research-issues/CRA-E-Computation-Education.pdf

As the CRA-E Mark I committee was completing its work, the CRA Board looked to establish ongoing programs and projects and to seek the broadest possible engagement from CRA members in tracking, influencing, and aiding the educational programs that feed the research pipeline—thus the creation of CRA-E Mark II under the leadership of Rich DeMillo. Their inaugural report, pointing towards ongoing and future activities, also appears in this issue of CRN on p. 5. ∎

Expanding the Pipeline
Advancing Women in Engineering at the University of Pennsylvania

By Susan **Davidson**, Michele **Grab**, and Rita **Powell**

Attracting women to study computer science and engineering is an ongoing challenge at colleges and universities across the nation. In the fall of 2007, women in the School of Engineering and Applied Science (SEAS) at the University of Pennsylvania made up 30 percent of the undergraduate population. This was better than the national average (largely due to the popularity of Bioengineering as a major), but was nevertheless a figure that we wished to improve. Seeded by a generous alumni donation, the Advancing Women in Engineering (AWE) program was therefore launched to recruit and retain women in engineering. This comprehensive program of outreach targets middle school students all the way through graduate students in an effort to address this national problem on a local level.

Middle School Outreach–PennGEMS

Reaching out to middle school students is primarily accomplished through PennGEMS, a week-long day camp for girls who have just completed grades 6, 7, and 8. Our goal is to influence their conceptions of who can be an engineer or computer scientist and what engineers actually do, as well as to excite them about studying math, science, and technology/engineering. Students participate in a variety of activities in bioengineering, nanotechnology, mechanical engineering, computer science and materials science through catchy themes such as "Glow in the Dark Science," "How Stuff Works" and "Imagination to Animation." In our end-of-program survey, one participant wrote, "I now realize that engineering involves so many things I didn't know it did before." This was echoed by many others in the program. To date, more than 120 girls have participated in PennGEMS, and the demand exceeds our capacity. Scholarships for this program are provided using corporate and private support.

High School Outreach—WICS High School Day for Girls, Guidance Counselor and Teacher Day to Encourage Women in Computer Science, and Boot Up! Camp

Before AWE was established, undergraduate women in the Computer and Information Science department (CIS) organized Women in Computer Science (WICS) to raise awareness and foster communication in CIS around the issues that women face, as well as to create a sense of community and encourage women to pursue a computer science degree and career. A graduate student group called CISters was similarly created

to connect women from different research areas in computer science. Individually, as well as collectively, these groups program a variety of social, professional, and outreach activities. One is the WICS High School Day for Girls, which has been offered since 2007 with an average of 80 students per year. The program brings high school students interested in computer science to campus, where they hear about the excitement, breadth and societal impact of computer science, see demonstrations of exciting research projects in our robotics, graphics and embedded systems laboratories, experience hands-on programming using Scratch in our newly renovated computing classrooms, and learn about the college admissions process.

Observing the interest of teachers who accompanied the girls to campus, in 2009 we expanded our outreach to 30 area high school guidance counselors and teachers by creating a separate day for them to visit campus. In addition to the activities provided for high school girls, we discuss how guidance counselors and teachers can help encourage girls to study computer science, what skills/knowledge will best prepare students for success in computer science, and what a college curriculum in computer science entails. A high note of the day for this group is a lunchtime panel of WICS and CISters students who speak about what it is like to be a (female) college student in computer science and what was helpful to them from their high school preparations. These programs were funded by grants from Microsoft Research and the NSF-funded National Center for Women & Information Technology (NCWIT).

CIS faculty also mentor high school teachers through ACM Computer Science Teacher Association (CSTA) workshops and through a Google CS4HS@Penn workshop.

Undergraduate Programs

AWE's pre-orientation program for incoming women engineers has been one of our most successful initiatives. Students are invited to move into the dorms early, meet upper-class students and faculty, and get support and advice for being successful in college. As one student said, "Coming [in] . . . as a freshman without the . . . Program, I would have been frightened, friendless, confused, and pretty unaware of the amazing community of women in engineering here at Penn. I'm so thankful for the opportunity AWE Pre-Orientation provided." The program grew from 19 to 51 students in one year. This year we will host 66 students, nearly 50 percent of the women in the incoming class. To date, only 3 students who attended

pre-orientation have transferred out of engineering. Scholarships for the pre-orientation program have been obtained from industry.

Other undergraduate initiatives focus on retention, and include a peer-mentoring program, major- and career-related programs, and support for travel to professional conferences such as the Grace Hopper Women in Computing Conference and the Society of Women Engineers national meeting.

Cascading Mentoring Model

Partnering with Dr. Yasmin Kafai and Quinn Burke from Penn's Graduate School of Education, as well as Jean Griffin (CIS), Dr. Joe Sun (SEAS) and Michelle Slattery (Peak Research), in spring 2010 we were awarded an NSF grant for Broadening Participation in Computing. In this project, we are implementing a cascading mentoring model through a service learning course (SLC), a summer camp for students in grades 9 and 10 (*Boot Up!*), and after-school programs and PennGEMS for middle school students. Penn undergraduates who have taken introductory computing can enroll in the SLC and obtain academic credit for learning how to teach computational thinking to high school students who, in turn, help teach middle school students. The tools used in the SLC include Scratch (scratch.mit.edu), Python, and computational textiles.

From our initial offering in June 2010, it is clear that the high school students and undergraduates relate strongly and benefit from each other: The high school students indicated that the undergraduates were the most significant influence on their learning. In turn, the undergraduates found that their experience as mentors reinforced their own learning of computer science principles. The feedback from the high school students was also enormously encouraging for our undergraduates. One SLC student recently wrote, "Thanks for sending me the feedback from the camp. I can't express how fulfilled I feel right now." While not specifically targeting women, both SLC and *Boot Up!* have attracted a disproportionate number of women and minorities, and are therefore an important component of AWE.

Graduate Programs

Our focus at the graduate level has been to help create a community for women from across SEAS to come together around common issues. In particular, we have sponsored two successful book discussions on topics related to mentoring and negotiation.
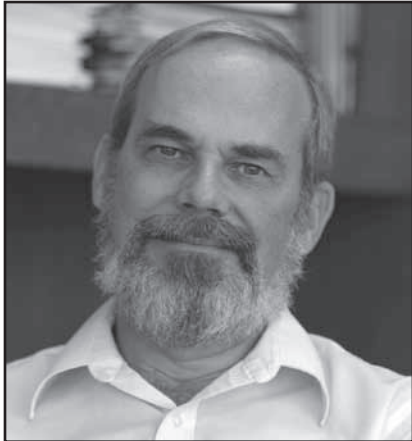
Musings from the Chair
Reinvigorating the Field

By Eric Grimson, CRA Board Chair

A few weeks ago, members of the computing research community assembled for the 19th biennial Conference at Snowbird, the flagship conference for chairs of Ph.D.-granting departments of computing and allied fields and leaders from U.S. industrial and government computing research laboratories and centers. Here are some observations on trends in the field evident during the meeting.

Throughout the conference, I was struck by a sense of cautious optimism and renewed energy shared among department chairs. Challenges remain, but the perception that key aspects of the field are slowly, yet steadily, improving was evident throughout the conference:

• Funding for computing research is increasing, and sources of funding seem to be stabilizing. Ken Gabriel, Deputy Director of DARPA, highlighted the commitment of DARPA to re-engage with the academic research community—a re-engagement that recognized the need to balance the desires of the research community to tackle difficult problems without onerous bureaucratic constraints on reporting and deliverables with the need to serve DARPA's core mission to national security. DARPA is clearly committed to a major shift in its interactions with academic research. Other major funding agencies for computing research similarly show signs of growth, as highlighted by Peter Harsha's plenary presentation on CRA's government affairs committee's interactions with Congress. Over the past 10 years, government funding of IT R&D has doubled; a very encouraging sign.

• Enrollments in computer science, computer engineering, and information science are stable and slowly rising, as documented in CRA's most recent Taulbee Report. New majors have been slowly rising since 2005; while we are still below our peak, we are on a positive trend.

• We are weathering the financial storm of the past two years. The CIFellows program, funded by NSF and administered by CCC and CRA, has helped 60 recent PhD graduates find exciting research homes for two years, while the job market stabilizes. Listening to presentations on the effort, and hearing from selected participants, this program has clearly helped bridge a gap in the intellectual continuum of the field. More generally, discussions with many department chairs indicated that departments and institutions are cautiously emerging from hiring freezes, another encouraging sign.

There was also a growing sense of shared community among department heads. One instance emerged in the discussions and presentations of the CRA-E committees. The first version of the CRA Education group, chaired by Andy van Dam, released its final report, articulating a vision of how computation curricula have evolved: more flexible, better integrated with other disciplines, yet still providing a foundational mode of thinking that supports other intellectual disciplines. Their report, discussed in this issue of *CRN*, provides a valuable roadmap of alternatives being explored at multiple institutions, and articulates a vision for further evolution of curricular material. The second instantiation of CRA-E formally launched its activities at Snowbird during a packed breakfast meeting where the committee laid out plans and goals (as articulated elsewhere in this issue of *CRN*). Clearly there is a shared sense in the community of the need to adapt our curriculum to meet the interests of today's students, and to develop a new generation of researchers who will tackle compelling challenges in security, energy, environmental sustainability, finance, health care, and information technology.

A second instance of shared community emerged during a session on faculty hiring practices. While every institution is governed by local nuances, and must act to best serve its needs, what emerged from this session was a conviction that coordination among departments can improve the hiring process for everyone. It was very encouraging to hear many department heads publicly commit to common dates for applications, interviews, and decisions, and to shared methods for communicating decisions in a timely manner to applicants.

Challenges remain, however. Despite significant efforts by many members of the CRA community, there is a clear sense that computation remains a "poor cousin" of the sciences in the eyes of national leaders—evidenced by challenges in ensuring that computation is a full partner in discussions on STEM education, in revising the CS AP exam to make it relevant to modern views on computing, and in ensuring that congressional committees include computing in their long-term visions for technological and scientific growth for the nation.

There is a concern that computing is still not fully "taken seriously" by policy makers, a view potentially exacerbated by the pending NRC rankings of doctoral programs, as articulated in the May 2010 issue of *CRN*. During a panel session at Snowbird, Charlotte Kuh presented current plans for the release of the NRC rankings report and data. Some progress has been made since last spring:

• For computer science, the NRC will now count publications in journals and conferences based on CVs submitted by faculty members, rather than relying on citations from the Thomson-Reuters Web of Science database. Unfortunately, the corollary is that NRC will not be able to make use of any citation data in their report.

• The NRC will print a revised methodology report highlighting the use of 90% confidence intervals for ranking ranges, and other changes.

• Computer science rankings will be released when all the program rankings are released, now expected in fall 2010.

• Computer engineering will not be ranked, as there were not enough programs to meet the NRC criterion.

While this is an improvement in that rankings will not be based on flawed publication data, the lack of ranking of Computer Engineering departments, the lack of citation data for Computer Science publications, and the concern that even with best efforts by the CRA, the set of publications used by the NRC is incomplete—all create concern that the field may not be well presented in the final rankings. One continuing concern is that university administrators will naturally compare statistics across fields. If CS and CE are not fully and fairly reported, we may suffer in such a comparison, with artificially low productivity numbers compared to other fields. So work remains, and the CRA Board will continue to work with the NRC and other groups to create a fair evaluation system.

Eric Grimson is the Bernard Gordon Professor of Medical Engineering and head of the Electrical Engineering and Computer Science Department at MIT. ∎

Service Awards Presented at Snowbird

The 2010 A. Nico Habermann Award was presented to Anne Condon, University of British Columbia by Executive Director Andrew Bernat. Board Chair Eric Grimson presented the 2010 Distinguished Service Award to Moshe Vardi.

Credit: CRA Staff Photo.

(l to r) Andrew Bernat, Anne Condon, Moshe Vardi, and Eric Grimson

New CRA Board Member

CRA is pleased to welcome Ran Libeskind-Hadas, Professor of Computer Science and Associate Dean of Faculty, Harvey Mudd College, to its Board of Directors, effective August 30, 2010. He was appointed by CRA Board Chair Eric Grimson to complete the term of Susanne Hambrusch, Purdue University, who resigned from the Board when she became Director of the NSF CISE Division of Computing and Communication Foundations (CCF) on August 30, 2010.

Hambrusch was elected to the board in 2008, and has served as Board Secretary since July 2009. Martha E. Pollack, Vice Provost for Academic and Budgetary Affairs and Professor of Information and of CSE at the University of Michigan, will replace her as Board Secretary.

CRA-E White Paper Summary
Creating Environments for Computational Researcher Education

By Andy van Dam and Rosemary Simpson, Brown University

Goal

The overall goal of this White Paper is to provide guidance that will help institutions create an undergraduate environment that supports the acquisition and internalization of the computationally-oriented researcher mindset. We addressed overall directions rather than comprehensive details, not a curriculum design. The committee tried not to duplicate work being done by related efforts, such as the ACM/IEEE Computer Science Curricula 2001 report/2008 update, or any effort having to do with K-12 education such as ACM's Model Curriculum for K-12 Computer Science and NSF's CS/10K Project, whose goal is the revision of the AP computer science course. Instead, the work was complementary to these efforts, providing a specific focus in line with the overall goal of computationally-oriented education at all levels in the 21st century. Computer science departments take on a new and critical role as identifiers and promulgators of the core set of cognitive skills and computational concepts that inform various computational-X programs, independent of their domains.

Mechanisms

Three major mechanisms for meeting this goal are: 1) develop flexible curricular structures that can more easily reflect and adapt to change, 2) provide a "research-oriented" environment in the undergraduate program, and 3) support the assimilation and putting into practice of enduring cognitive skills and core concepts over four years and different contexts through the deepening process of building mastery.

Themes

We encode these mechanisms into six recommendations, arranged into three thematic groups:

(1) Introduce students to computational thinking by foundational courses that address student interests within the fundamental range of computational thinking concepts and skills.

(2) Re-factor computer science curricula to provide a flexible and adaptable range of options for computationally-oriented directions in any domain.

(3) Identify cognitive, mastery, and research skills that should pervade the entire curriculum, from introductory courses through the advanced courses taken by seniors heading to graduate school.

Recommendations

Computationally-Oriented Foundations

1. **Introductory Courses—** addressing a broad range of student interests:

   Address student interests while at the same time ensuring that these courses address a significant subset of the fundamental range of concepts and skills that comprise computational thinking.

   Use these courses to instill a set of cognitive skills such as learning how to create, validate, and establish relationships among abstractions from data and information on hand, a key skill in effective modeling, simulation, and validation. This skill in working with abstractions, in turn, undergirds both the scientific method and computational thinking, and should be a part of every computationally-oriented course. The differences among such courses help to reinforce the underlying skills as students meet the same concepts in different contexts.

   Other examples of cognitive skills include: working with the tradeoffs involved with different representations; moving, where appropriate, from a declarative understanding of a problem to an imperative understanding of that problem; reducing computationally intractable problems to related tractable problems; and building, simulating, and validating computational models that shed light on important questions.

Refactoring Computer Science Curricula

2. **Core/Foundation for All Computer Science Graduates—** lean core with focus on enduring concepts, techniques, and skills:

   A relatively lean core emphasizes foundational concepts and skills while allowing students more time to explore areas in depth, both by taking courses and by engaging in undergraduate research. Additionally, a lean core makes it easier for students with multidisciplinary interests to pursue a joint major *[See Recommendation 4 - Specialization: Integrated Joint Majors]* while still sharing a common experience with computer science majors.

3. **Specialization: Tracks, Threads, and Vectors—** flexible approaches to gaining understanding and skills:

   Define sets of meaningful specializations to permit students to pursue their interests in a context that guides their development while providing strong motivation. Ensure that these 'tracks' are specialized enough that a course sequence can lead to a student attaining some reasonable depth in the area, but broad enough that someone in a company or graduate school will be able to fit it into their institutional context.

4. **Specialization: Integrated Joint Majors—** deep collaboration among disciplines:

   Coherent, integrated multidisciplinary, inter-departmental joint majors provide a balanced approach that addresses the differences in intellectual culture, concepts, and strategies between different fields by establishing the common ground between them. Use these integrated joint majors to provide a creative synthesis beyond that which can be provided by a computer science department alone, one that blends the cultures and mindsets of multiple departments and synergistically establishes new techniques for problem solving.

Establishing Mastery across the Curricula

5. **Design Under Constraints and the Gaining of Mastery—** deepening the skill set:

   Provide students the ability to attain mastery by gaining experience in learning new technologies and techniques, building and analyzing artifacts, and learning to understand design as an iterative process that involves evaluating tradeoffs, analyzing system performance, and testing at each step. Create design and development experiences that tap into the actual interests of the students within a structure that both rewards effort and requires debugging/dealing with the uncertainties and approximations of real-world non-determinacy.

6. **Attracting, Selecting, and Preparing Students for Research Careers—** developing computationally-oriented researchers:

   Skillfully introduce research problems and their intellectual

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New Activities
of the CRA Mark II Working Group on Education (CRA-E)

By Rich DeMillo, Georgia Institute of Technology

In the summer of 2008, Andries van Dam from Brown University convened the CRA-E committee—the *Mark I* committee as it has become known. Mark I was a panel of world-class computing researchers and educators who were asked to identify and recommend best practices for preparing undergraduates for research careers in computing. A summary of their findings and recommendations appears elsewhere in this issue of *Computing Research News*.

At the 2010 Conference at Snowbird, the van Dam committee report was turned over to CRA-E *Mark II*, chaired by Georgia Tech's Rich DeMillo. The objective of the Mark II committee is to make use of these and other recommendations to establish ongoing programs and projects and to seek the broadest possible engagement from CRA members in tracking, influencing, and aiding the educational programs that feed the research pipeline.

CRA-E is modeled on the successful CRA-W committee that uses a core membership and extensive liaisons with partner organizations to give CRA members visibility into and influence over gender diversity. Like CRA-W, CRA-E will rely on community building and collaboration. There are obvious synergies between CRA-E, ACM/SIGCSE, IEEE, SIAM, ASEE, CDC, CCC/UR-Zone, and the CS/10K effort to enhance AP offerings. CRA-E will collaborate and partner with these and other efforts and invites participation from those groups.

CRA-E is an exciting and ambitious new venture for CRA—one that gives members a seat at the table as important curriculum and policy decisions are made. In chartering CRA-E, the CRA board made it clear what was *not* part of the committee's mission. CRA-E is *not* prescriptive: it will not develop curricula, nor will it compete with educational activities of ACM, IEEE and other professional societies. It will not advocate on behalf of particular learning and educational methods and technologies. Above all, CRA-E will avoid win-lose choices between computing research and education.

Rather, as a working group of the CRA, CRA-E *will* be concerned with how education fits into the broader picture of computing-oriented research, and how education can better serve research needs. What CRA-E *will* do is offer advice, help, and resources to the educational institutions that prepare students for computing research careers, beginning with making information available about the health of the pipeline.

What exactly does CRA mean by the *health* of the pipeline? This is one of the first questions to be answered by CRA-E. According to NSF data for the academic years 2004-08, one-half of the approximately 6,200 computer science students granted PhDs in North America received their undergraduate degrees from foreign colleges and universities. Yet the effect on domestic graduate programs of this reliance on an overseas pipeline is almost entirely anecdotal. Data gathered over the next year will help to give CRA members insight into these and other issues.

Non-PhD-granting institutions—including departments that are otherwise unrepresented in CRA—will also play a critical role. Nearly half of the computer science PhDs who received bachelor's degrees from U.S. and Canadian institutions attended programs that conduct little or no doctoral research. There are virtually no data that indicate whether these departments have access to the same resources and materials that research institutions—the so-called R1 universities—enjoy. And regardless of research activity, CRA members do not know with any precision the extent to which the best students are attracted to research careers by their undergraduate experiences. There are literally dozens of indicators of a healthy pipeline that would give CRA a window into the future of the field. One task of CRA-E is to begin the development of a dashboard that provides answers to such basic questions. Collaboration with other data-gathering projects aimed at undergraduate institutions has already begun.

The impact of an effective dashboard could be immediate. For example, the committee has heard about the positive effect of Research Experience for Undergraduates (REU) supplements to NSF grants. Pipeline data might show, for example, the effect of changes in the mix of R1 and non-doctoral recipients of REU funds. Or the data might suggest more productive ways for research and non-research departments to collaborate in REU projects.

CRA-E is seeking your help and input. Comments as well as ideas for projects, workshops, and seminars may be sent to CRA-E chair Rich DeMillo (rad@gatech.edu). An online community for CRA-E will be operational in the next few weeks and will be accessible from the CRA website.

Rich DeMillo, *Distinguished Professor of Computing at the Georgia Institute of Technology, is a member of the CRA Board of Directors and Chair of CRA-E.* ∎

2010 Undergraduate Researcher Awards Presented

CRA's 2010 Outstanding Undergraduate Researcher Awardees were recognized in several venues this year.

Female winner, **Justine Sherry** (University of Washington), received her award at the 7th USENIX Symposium on Networked Systems Design and Implementation in San Jose in April. The Vice Chair of the CRA Board of Directors, Laura Haas, made the presentation.

Male winner **Matt McCutchen** (University of Maryland) received his award at a CS departmental reception on March 1. **John Silberholz,** Finalist, and **Allison Hoch,** Honorable Mention, were also recognized. CRA Board Member, Jeff Hollingsworth, made the presentations.

Male winner, **Elyot Grant** (University of Waterloo) was honored at a departmental reception in April and later recognized on June 6 at STOC in Cambridge, MA.

At Pomona College, **Lucy Vasserman,** Runner-Up for the female award, received her award at the CS department reception for graduating seniors in May. ∎

Credit: Brenda Chick.

Lucy Vasserman, Pomona College, with Runner-Up Award.

Justine Sherry (left) with CRA Vice Chair, Laura Haas.

Credit: Brenda Chick.

Credit: Brenda Chick.

Credit: Brenda Chick.

CRA Board member Jeff Hollingsworth presented awards to Matt McCutchen (upper left photo), John Silberholz, and Allison Hoch at the University of Maryland.

NSF's Broader Impact Criterion

By Andrew Bernat, Kathleen Fisher, Susanne Hambrusch, and Jim Kurose

NSF proposals must address, and are evaluated according to, two fundamental criteria: Intellectual Merit and Broader Impact. Intellectual Merit is well understood (if frequently argued)—how well does the proposed research advance the field? Broader Impact, however, is not nearly as well understood and consequently often has played a more minor role in the review process. This might very well be changing. The purpose of this article is to provide context and information around recent discussions of Broader Impact, and to identify issues that the CISE academic research community may soon face

NSF CISE's 2009 divisional Committees of Visitors have noted the confusion and inconsistencies regarding Broader Impact, and have urged that the criterion be re-evaluated. Perhaps more importantly, Congress is also paying attention—the House-passed COMPETES Reauthorization Act of 2010 (http://democrats.science.house.gov/Media/file/Commdocs/HR5116.pdf) directs the NSF to apply the Broader Impact review criterion to achieve a number of societal goals, and to implement a plan for achieving this within six months of the Act becoming law. Congress has provided examples of what it considers Broader Impact:

1. Increased economic competitiveness of the United States.
2. Development of a globally competitive STEM workforce.
3. Increased participation of women and underrepresented minorities in STEM.
4. Increased partnerships between academia and industry.
5. Improved pre-K-12 STEM education and teacher development.
6. Improved undergraduate STEM education.
7. Increased public scientific literacy.
8. Increased national security.

Conspicuously missing from this list is a catchall bullet—"Whatever the PI wishes to consider as Broader Impact." At the same time, the eight items cover a very broad range of possible activities. In particular, the list encompasses "broader impact" activities common in many NSF proposals—graduate student training, diversity programs, and undergraduate and graduate curriculum development, in addition to activities in which some researchers already participate.

CISE and NSF want to be out front on the issue of Broader Impact (BI). As part of the process of understanding the criterion and how BI should be evaluated, CISE funded a workshop to gather community input. The Broader Impacts for Research and Discovery Summit was held in June 2010. CRA Board members Kathleen Fisher, Susanne Hambrusch and Jim Kurose and CRA Executive Director Andy Bernat were invited to attend. The report of the workshop organizers is/will be posted at http://cisebroaderimpacts.org.

At the workshop, it was noted that, beyond the prodding of Congress, there are many reasons to care about BI and to connect science to society in order to:

- Ensure better public understanding of science and engineering.
- Ensure better public appreciation of research, its purpose and impact.
- Inspire the young to enter science and engineering.

It was also noted that researchers supported by NSF have a long-standing, implicit compact with taxpayers to use public funds to pursue avenues that will, in the aggregate, ultimately benefit society. Broader Impact seeks to ensure that this commitment is met.

At the BIRDS workshop, participants discussed examples of broader impact activities lying within the context of the COMPETES language. These included:

- Develop educational materials for elementary, high-school and undergraduate students.

- Involve high-school and undergraduate students in research where appropriate.
- Create or participate in existing effective mentoring programs.
- Develop, maintain and operate a shared research infrastructure.
- Establish international, industrial or government collaborations.
- Form start-up companies.
- Present research results to non-scientific audiences from policy-makers to average citizens.
- Give presentations about the field to the public to foster life-long learning.
- Develop exhibits in partnership with museums.

These examples include not only the "traditional" activities, but also those focused on improving the infrastructure for research with multiplicative affects. As is clear from these examples, broader impact activities are typically more focused on direct impact than the "innovation" that is a hallmark of intellectual merit. Indeed, it is often preferable to leverage current validated efforts than to attempt new ones for the sake of BI innovation.

As CISE develops its understanding of broader impact, based on community advice, there are many issues to raise and to address. For example:

- Does the measure of broader impact depend on the level of effort involved, on the impact, or on some other measure?
- How should reviewers evaluate broader impact statements?
- How much should broader impact "count" compared to intellectual merit?
- How should NSF monitor progress of broader impact statements?
- How should PIs be held accountable for their current and past statements?
- How does one measure the success of a broader impact activities?
- What is the cost of broader impacts and where should

funding come from? Line item in budget? Separate program?

The House version of America Competes has potential implications for CS departments and their institutions as well, as it "requires principal investigators applying for Foundation research grants to provide evidence of institutional support for the portion of the investigator's proposal designed to satisfy the Broader Impacts Review Criterion, including evidence of relevant training, programs, and other institutional resources available to the investigator from either their home institution or organization or another institution or organization with relevant expertise."

This suggests that departments, universities and professional organizations could look more closely at existing or future activities that can be strengthened by faculty involvement and which translate to broader impact activities. NSF CISE is interested in beginning a dialogue with departments planning to provide such opportunities for their faculty; for more information, contact Jan Cuny (jcuny@nsf.gov).

The discussions regarding Broader Impact are ongoing, with even the final legislative wording to be determined. As the representative of the computing research community, CRA intends to remain engaged in this process of exploring the Broader Impact criterion, to raise relevant issues, and to advocate for review and implementation processes that work to improve the health of the computing research system.

Andrew Bernat is CRA's Executive Director. **Kathleen Fisher** *(AT&T Labs Research),* **Susanne Hambrusch** *(Purdue University), and* **Jim Kurose** *(UMass) are members of CRA's Board of Directors.* ∎

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excitement in all courses, thus helping to entice potential research students by disabusing them of the notion that our field has become routinized. Successful courses that attract and excite students present new concepts within the context of the ongoing research of the R&D community.

Combine explicit research skill training with an apprenticeship approach to acculturate future researchers to their communities of practice. Provide systematic guidance in the practices of computationally-oriented research from freshman year through graduation, combined with the support provided by close relationships with graduate students at all levels, faculty and other members of research groups.

Implementation Tools

The White Paper contains a wealth of resources to help individual departments and institutions develop approaches that reflect their culture, goals and resources:

1) Each recommendation section contains background issues, examples, and solution approaches, with the resulting recommendations summarized at the end of the section.
2) The complete recommendation set is provided as a single document in Appendix A to give a sense of the set as a whole.
3) The references (Appendix B) contain both a bibliography and the complete set of all the URLs that are mentioned in the report.

4) The Report White Paper and the appendices contain descriptions of exemplar courses and curricula.
5) The index supports both search and browsing modes through extensive 'See Also' trails.

URL

http://www.cra.org/resources/research-issues/CRA-E-Researcher-Education.pdf ∎

CCC: Audacious Visioning for the Future

By Erwin P. Gianchandani and Ed Lazowska, Computing Community Consortium

"The [Computing Community Consortium (CCC)] has played an important role in identifying and promoting exciting research 'visions' for the future of information technology (IT) research," Tom Kalil, the Deputy Director for Policy in the White House Office of Science and Technology Policy (OSTP), recently blogged. "[These] ideas ... have the potential to attract the best and brightest to the field, drive economic growth, and address national challenges in areas such as health, energy, and education."[1] Kalil's comments serve as renewed inspiration for our efforts.

As we have reported in previous issues of the Computing Research News, the CCC was established in 2006 through a cooperative agreement between the National Science Foundation and the Computing Research Association. A council of experts drawn from and chosen by the computing research community, the CCC seeks to mobilize the community to debate long-range research challenges, to build consensus around specific research visions, and to articulate those visions, including developing the most promising ones into clearly defined initiatives. In this update, we summarize our most recent activities in support of these goals:

As a standing committee of CRA, the CCC helped launch the Computing Innovation Fellows Project in 2009.[2] This fall, the CIFellows Project will support a new cohort of 47 talented recent Ph.D.s, retaining them in computing research and teaching during exceptionally difficult economic times. These 2010 CIFellows follow an initial cohort of 60 CIFellows funded last fall. The

2009 CIFellows have already reported incredibly rewarding experiences. For example, 17 have landed other opportunities, including tenure-track faculty positions and permanent jobs at industrial research labs. Importantly, the CIFellows Project is designed to ensure broad institutional participation. (Read more about the CIFellows Project elsewhere in this CRN: "NSF Funds a Second Cohort of Computing Innovation Fellows.")

Last September, the CCC published a list of landmark contributions by students in computer science, describing truly game-changing contributions that undergraduate and graduate students have made in the course of their studies.[3] The timing of the list coincided with the leadership transition at the Defense Advanced Research Projects Agency (DARPA), and emphasized the tremendous value in Federal funding for education in computing.

The CCC has funded over a dozen community-initiated workshops to define new research directions. Last fall, CCC Council vice-chair Susan Graham (University of California-Berkeley) organized a workshop on health information technology; the workshop report (Information Technology Research Challenges for Healthcare: From Discovery to Delivery[4]) describes basic R&D challenges in the space, and it has helped NSF establish a new FY 2011 program on "Smart Health and Wellbeing." In the past year, Beverly Woolf (University of Massachusetts-Amherst) organized a series of workshops and drafted a Roadmap for Education Technology[5] describing the role and impact of computing and technology in education. Woolf has

already received enthusiastic feedback on the roadmap from NSF and the U.S. Department of Education's Institute of Education Sciences. In addition, CCC-led efforts have yielded outstanding visions for theoretical computer science[6] (led by Salil Vadhan at Harvard University) and global development[7] (led by Tapan Parikh at the University of California-Berkeley), and they are catalyzing Federal investment in robotics[8] (Henrik Christensen, Georgia Institute of Technology).

This spring, the CCC commissioned a series of fast White Papers on data analytics,[9] including data mining, machine learning, predictive modeling, knowledge discovery in databases, and others. These short reports—on topics such as eScience, healthcare, new biology, intelligence, energy, transportation, and education—specifically link data analytics to the missions of the corresponding Federal funding agencies.

The CCC website includes special features such as "Computing Research Highlight of the Week"[10]—allowing individual researchers to showcase breakthroughs to the community and beyond—and a newly published "Undergraduate Research Opportunities (URO) Zone"[11]—explaining computing research opportunities for undergraduates throughout the United States.

The CCC Blog[12] is an increasingly followed resource for the computing research community, highlighting landmark research advances, new funding opportunities, and news and information about Federal agencies. In addition, the CCC Blog serves as a voice for the community—for example, recently calling for a large-

scale, comprehensive, coordinated, collaborative, and multi-disciplinary basic research investment in health information technology by the Federal government.[13]

To learn more about the CCC, please visit our website today: http://www.cra.org/ccc. We enthusiastically welcome your involvement!

Dr. Erwin Gianchandani *is the Director of the Computing Community Consortium (CCC) and the Computing Innovation Fellows Project (E-mail: erwin@cra.org; Phone: 202-266-2936; Fax: 202-667-1066).* **Dr. Ed Lazowska** *is Chair of the CCC Council and Bill & Melinda Gates Chair in Computer Science & Engineering at the University of Washington.*

Notes:
[1] http://www.whitehouse.gov/blog/2010/06/02/setting-21st-century-research-agenda.
[2] http://www.cifellows.org.
[3] http://www.cra.org/ccc/docs/Student_Achievements.pdf.
[4] http://cra.org/ccc/docs/init/Information_Technology_Research_Challenges_for_Healthcare.pdf.
[5] http://cra.org/ccc/docs/groe/GROE%20Roadmap%20for%20Education%20Technology%20Final%20Report.pdf.
[6] http://cra.org/ccc/theory.php.
[7] http://cra.org/ccc/globaldev.php.
[8] http://cra.org/ccc/robotics.php.
[9] http://cra.org/ccc/initiatives.php.
[10] http://cra.org/ccc/rharchive.php.
[11] http://cra.org/ccc/uro-zone.php.
[12] http://www.cccblog.org.
[13] http://www.cccblog.org/2010/06/14/taking-on-healthcare-the-time-is-now/. ∎

Nominees Sought for CRA Board

The Computing Research Association seeks your help in suggesting nominations for its Board of Directors. The deadline for receipt of nominations is **December 1, 2010.**

Each spring CRA's member organizations elect about one-third of the association's board members to three-year terms. It is important that the CRA Board represents the interests of the entire computing research community, and it is CRA's policy to solicit a broad range of candidates. Candidates are not required to be affiliated with CRA member organizations.

- **On January 7, 2011,** from the nominations received, the Elections Committee will announce its candidates for the ballot.
- **On February 7, 2011,** nominations are due for candidates nominated by petition signed by the heads of at least 10 Constituent Member Organizations that are current in dues payment.

The CRA board is a working board, and all members are expected to actively participate. CRA has a relatively small professional staff, and board members have detailed involvement in all major projects. Recent and current projects include:

- Working with the computing research community to envision the future.
- Planning the biennial CRA Conference at Snowbird.
- Conducting the annual CRA Taulbee Survey.
- Conducting other surveys (e.g., departmental budgets, space, personnel).
- Developing workshops on critical policy issues for computing research.
- Thinking strategically about the future of computing education.
- Planning workshops on academic and industrial careers.
- Increasing the participation of women and minorities in computing research, with the help of National Science Foundation grants.
- Improving public and policymaker understanding of the importance of computing and computing research in our society.

Additional information on CRA and its activities is available on the Web at http://www.cra.org.

In addition to actively participating in board projects, board members are asked to attend two board meetings per year and pay their travel and hotel costs.

Please contact the person you are nominating before submitting his or her name to ensure that the nominee is willing to stand for election to the board. Those who are nominated are required to write a brief statement (not to exceed 100 words) supporting their nominations. Questions about the nomination and election process, as well as requests for a nomination form, can be sent to elections@cra.org. *Nominations must reach CRA by December 1, 2010.* ∎

NSF Funds Second Cohort of Computing Innovation Fellows

By Erwin P. Gianchandani

Earlier this spring, the National Science Foundation awarded the Computing Research Association a new grant for a "Second CIFellows Project," enabling a new set of 47 recent Ph.D. graduates to be supported as Computing Innovation Fellows beginning this fall.

These CIFellows follow 60 other exceptional young researchers who were awarded one- to two-year postdoctoral positions at research institutions throughout the country last fall—as part of a unique partnership between NSF and CRA to retain new Ph.D.s in computing research and teaching during difficult economic times.

For the initial cohort of 2009 CIFellows, the project has already proved worthwhile, offering them uniquely independent research experiences that have helped them sharpen their skills and enhance their credentials. (The CIFellows Project was first described in the September 2009 issue of CRN[1], and we provided an update on the first cohort of CIFellows in the March 2010 CRN[2].)

The new call for 2010 CIFellows was announced to the community via the CIFellows Project website[3] in mid-April, with applications due by mid-May. A total of 218 applications from 78 U.S.-based Ph.D.-granting colleges and universities were submitted, and the applicants listed prospective mentors from 105 organizations, including a diverse range of industry affiliations. Under the leadership of Dr. Greg Andrews, PI of the new award, a 25-person Selection Committee was assembled and rigorously reviewed all applications over a four-week period. A separate 9-person Steering Committee affirmed the Selection Committee's recommendations. Applicants were notified of their status in early July, and we expect

to be able to announce our 2010 CIFellows by early October after all arrangements are finalized.

As with last year's application and review process, we sought to ensure that the 2010 CIFellows Project would be broad-based. Awards are being made to CIFellow/mentor pairs; each candidate was allowed to specify between one and three potential mentors, each of whom had to provide a specific mentoring plan for the candidate. This process worked well for the 2009 CIFellows, ensuring highly productive experiences for both CIFellows and their mentors.

In addition, to ensure broad participation and to build bridges between diverse institutions via the CIFellows, no more than two awardees earned their Ph.D.s from the same university, and no more than two awardees were assigned to the same host organization. Diversity of other forms—including research areas and individuals, etc.—was also encouraged. About 36 percent of the 2010 CIFellows are women.

Meanwhile, the 2009 CIFellows have continued to enjoy rewarding experiences, achieving tremendous successes over the first year of their CIFellowships. Of the 60 who started last fall, 17 have found other opportunities—including tenure-track faculty positions and permanent jobs at industrial research labs—and will not be continuing in the project for a second year. Among them, three were offered positions by their host organizations. In several of these cases, the postdoctoral experiences clearly benefited the CIFellows, markedly enhancing their skills, credentials, and already stellar resumes. For example, one CIFellow demonstrated his capabilities through the development of a novel algorithm later featured in *The Los Angeles Times*[4]; the algorithm uses

Twitter to gauge real-time interest in movies and accurately predict how they will perform at the box office on opening weekend. In another case, the chair of a faculty search committee wrote, "As the hiring officer for this [tenure-track] position, I can attest that [the CIFellow's] postdoctoral experience … enhanced [the candidate's] attractiveness to us."

Three CIFellows—**Drs. Miriah Meyer (Harvard University), Andrew McPherson (Drexel University),** and **Antonina Mitrofanova (Columbia University)**—shared their experiences at CRA's biennial Conference at Snowbird in mid-July.

Meyer, a Ph.D. from the University of Utah, described how the CIFellows Project enabled her to obtain funds to pursue a new research area for which she would have been unlikely to obtain grant support, given the initial stage of the project. Meyer is developing new ways to visualize genomics data that do not have any inherent spatial or temporal characteristics. For example, she has implemented "Pathline," which simultaneously overlays gene expression data on multiple molecular pathways and across multiple species.[5]

Andrew McPherson, a Ph.D. from the University of Pennsylvania, shared his work on bringing a computational approach to issues of creative expression, enabling new knowledge about human-computer interactions for computer scientists and new tools that go beyond any existing instrument for musical performers and composers.

Mitrofanova, a Ph.D. from New York University, presented her research on assembling and mining noisy, poorly annotated regulatory networks for prostate cancer. All three described how the CIFellows

Project offered them a unique level of independence and autonomy, as compared to other postdoctoral positions. "Because I write the proposal, the [CIFellowship] gives me a tremendous amount of flexibility to define my own research," McPherson said.

Meyer, McPherson, and Mitrofanova are among 43 current CIFellows who have accepted a second year of support, bringing the total number of CIFellows to be funded in 2010-11 to 90.

Dr. Erwin Gianchandani *is the Director of the Computing Community Consortium (CCC) and the Computing Innovation Fellows Project. E-mail: erwin@cra.org; Phone: (202) 266-2936; Fax: (202) 667-1066.*

Notes:
[1]http://www.cra.org/resources/crn-archive-view-detail/the_computing_innovation_fellows_project_strengthening_the_field/.
[2]http://www.cra.org/resources/crn-online-view/successful_start_for_inaugural_computing_innovation_fellows/.
[3]http://www.cifellows.org/.
[4]http://articles.latimes.com/2010/apr/02/business/la-fi-ct-twitter3-2010apr03.
[5]Meyer, M., et al. 2010. *Pathline: A tool for comparative functional genomics.* Eurographics/IEEE-VGTC Symposium on Visualization 2010. ∎

The response to this book club has been extremely positive: More than 20 students participated each time, and found the experience very beneficial to their graduate experience. Having peers who can relate to common challenges and help navigate solutions is extremely important to our women graduate students.

In addition to community building, we encourage our Ph.D. students to become faculty members by giving them opportunities to hear from current SEAS faculty through panel discussions, such as "What it's like to be a faculty member in engineering." We have offered this program yearly, and it is highly valued by our students.

Conclusions

Much of the success of AWE has been due to our ability to hire a full-time staff member as director, catalyzing and centralizing a number of outreach efforts across SEAS. We have found that AWE is a big attractor for prospective students and a great source of support once they arrive at the university. When asked about their experience with AWE, one student said, "AWE has provided me with a community and support system within the engineering school in which I feel my voice is heard and my ideas really do matter. I feel privileged to be part of such an outstanding group of women who are continuously "breaking the glass ceiling" that still (unfortunately)

exists in the twenty-first century." Giving students access to information and support has allowed us the opportunity to encourage them to continue on—and to feel fulfilled—in their studies of engineering and computer science.

For more information about AWE and its programs, please visit: www.seas.upenn.edu/awe.

Susan Davidson *is the Weiss Professor and Chair of Computer and Information Science and the Chair of the Advancing Women in Engineering Program at the University of Pennsylvania.* **Michele Grab** *is the Director of the Advancing Women in Engineering Program at the University of Pennsylvania.* **Rita Powell**
is the Associate Director of the Computer and Information Science Department at the University of Pennsylvania. ∎

Congress Appears Bullish on NSF, NIST from Page 1

appropriations subcommittee in July, however. House appropriators approved a budget of $4.9 billion for the office in FY 2011, essentially flat compared to FY 2010 and $221 million less than the President requested. Also funded in the bill is DOE's Advanced Research Projects Agency (ARPA-E), which would receive $220 million in FY 2011, its first regular appropriation. (The agency was originally funded with $400 million in the FY 2009 American Recovery and Reinvestment Act.) There is some hope that the Senate numbers will be slightly higher, because the Senate appropriations committee has allocated more money to spend in the Senate version of the Energy and Water appropriations bill. But even with a higher allocation, there are other issues that may put science funding within the bill at risk.

Additionally, the Defense Advanced Research Projects Agency (DARPA) may see big increases requested by the President trimmed by appropriators to fund other projects throughout DOD. The House and Senate Armed Services Committees approved Defense Authorizations for FY 2011 that would trim $140 million from increases requested for various research accounts at the agency, including increases requested for the Defense Research Sciences account and the agency's Cognitive Computing efforts. The reductions would still leave these accounts with increases in FY 2011 compared with FY 2010, but far below the level requested by the President. The authorizers defended the reductions by noting that DARPA has, in recent history, had difficulties executing its budget—that is, spending all its money—in a timely way, and that the committee had doubts that the agency could spend such a large increase

within the fiscal year. More likely the authorizers used the reductions in the DARPA accounts to offset increases in other programs throughout the bill.

While it is not clear how the reductions to the DARPA request will play out in the appropriations process, staff on both the House and Senate appropriations committees have indicated they may be amenable to giving the DARPA Director full discretion in making the reductions—a move that would likely save the increases for the Defense Research Sciences and computing accounts. We will have more details on this at the Computing Research Policy Blog as the appropriations process moves forward.

In a move as important for its symbolism as it is for its policy impact, both the House and Senate have versions of a reauthorization of the America COMPETES Act. The COMPETES Act was originally passed in 2007 and marked the culmination of several years of effort to convince Congress and the Administration of the importance of increasing the federal investment in basic research in the physical sciences. The original 2007 Act authorized a doubling of NSF, NIST and the Department of Energy's Office of Science over seven years, and provided authorizations for a number of programs aimed at increasing the participation of U.S. students in STEM fields. The 2007 Act authorizations expire this year, so both chambers are attempting to reauthorize the bill to keep those federal science agencies on a "doubling path."

The reauthorization bills in each chamber have some significant differences, however. The House-passed bill contains five years of increasing budget authorizations versus the Senate bill's three. The House bill also contains a number

of new programs to help enable "industrial innovation" that the Senate bill doesn't contain, along with two other formerly freestanding bills: the Networking and Information Technology R&D Act[2] and the National Nanotechnology Initiative Act. The Senate bill is much leaner and also contains some additional cyber security R&D language taken from a much larger comprehensive cyber security bill introduced by Senators Rockefeller and Snowe (S. 773).

The House version of the bill has already received passage by the full House, though not without quite a bit of controversy. The Republican minority successfully derailed the initial consideration of the bill on the House floor by crafting a motion that both gutted the original bill and added language that would have prohibited federal agencies from paying the salaries of any federal employees who had been disciplined for having viewed pornography on their federal computers. A sufficient number of Democrats were fearful of being cast as "pro-pornography" should they oppose the motion and voted instead to adopt it. This set in motion two weeks of political maneuvering and parliamentary one-upmanship that threatened to derail the bill completely, but ultimately resulted in a party-line vote for passage.[3]

It is not clear how the differences in the two bills will get resolved in conference. It is also possible that Congress will run out of legislative days before adjourning to finish their negotiations on the bill.

It is also not clear how the appropriations process will finally resolve either, though it is very clear that the vast majority of bills will not be finished by November's election. It is more likely that Congress will decide to put aside consideration

of the bills until after the election, at which time it will consider them en masse as one giant omnibus bill. But whether that vote comes in November, December or next February under the new Congress is anybody's guess at this time. Until then, federal agencies will operate under what is called a "continuing resolution"—essentially an order that keeps them funded at some specified rate, usually a continuation of the current fiscal year pace. This can have significant consequences for federal science agencies as it can delay or cancel new program starts and, in some cases, prevent them from hiring new personnel. In the case of an agency like ARPA-E, which has a special appropriation, it could shut the agency down until appropriations are resolved.

In any case, we will have all the latest information at the Computing Research Policy Blog (http://cra.org/blog).

Notes:
[1] See "AAAS Report Finds NSF Alliance Initiative Boosts Computing Degrees; Minority Participation" at: http://www.aaas.org/news/releases/2010/0728computing.shtml
[2] You can read more about the NITRD Act at: http://www.cra.org/govaffairs/blog/2010/05/competes-reauthorization-on-floor-today-cra-endorses-bill/
[3] For more on the derailment, see: http://www.cra.org/govaffairs/blog/2010/05/competes-gets-derailed-temporarily/ ∎

January 28 Deadline for CRA Service Award Nominations

The Computing Research Association invites nominations for the CRA Distinguished Service Award and the A. Nico Habermann Award for 2011.

Distinguished Service Award
CRA makes an award, usually annually, to a person who has made an outstanding service contribution to the computing research community. This award recognizes service in the areas of government affairs, professional societies, publications or conferences, and leadership that has a major impact on computing research. See "Guidelines for Nominators" at: http://www.cra.org/Activities/awards/service/guidelines.html

A. Nico Habermann Award
CRA makes an award, usually annually, to a person who has made outstanding contributions aimed at increasing the numbers and/or successes of underrepresented groups in the computing research community. This award recognizes work in areas of government affairs, educational programs, professional societies, public awareness, and leadership that has a major impact on advancing these groups in the computing research community. Recognized contributions can be focused directly at the research level or at its immediate precursors, namely students at the undergraduate or graduate levels. See "Guidelines for Nominators" at: http://www.cra.

org/Activities/awards/habermann/guidelines.html
For a list of previous recipients of these two awards, see: http://www.cra.org/main/cra.awards.html

Nomination Process
Send a nomination letter (no longer than *two pages*) that *describes the contributions* on which the nomination is based to awards@cra.org. Refer to the appropriate "Guidelines for Nominators" for the award. Include the candidate's current curriculum vitae. Questions or comments may be addressed to awards@cra.org.
Nominators are responsible for collating the nomination materials *before e-mailing the complete package to*: awards@cra.org. The

deadline for receipt of nominations is January 28, 2011.
Current members of the CRA Board of Directors (http://www.cra.org/main/cra.people.board.html) are not eligible for these awards, nor can they submit nominations or letters of support for nominees. ∎

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Naval Postgraduate School (CS)
New Mexico State University (CS)
New York University (CS)

North Carolina State University (CS)
North Dakota State University (CSOR)
Northeastern University (CIS)
Northwestern University (EECS)
Nova Southeastern University (CS)
Oakland University (CSE)
Ohio State University (CSE)
Ohio University (EECS)
Oklahoma State University (CS)
Oregon State University (EECS)
Pace University (CSIS)
Pennsylvania State University (CSE)
Pennsylvania State University (IST)
Polytechnic University (CIS)
Pomona College (MCS)
Portland State University (CS)
Princeton University (CS)
Purdue University (CS)
Purdue University (ECE)
Regis University (CIS)
Rensselaer Polytechnic Institute (CS)
Rice University (CS)
Rochester Institute of Technology (CS)
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University of Colorado, Boulder (CS)

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University of Hawaii (ICS)
University of Houston (CS)
University of Idaho (CS)
University of Illinois, Chicago (CS)
University of Illinois, Urbana Champaign (CS)
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University of Kansas (EECS)
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University of North Texas (CS)
University of Notre Dame (CSE)
University of Oklahoma (CS)
University of Oregon (CIS)
University of Pennsylvania (CIS)
University of Pittsburgh (CS)
University of Pittsburgh (IS)
University of Puget Sound (MCS)

University of Rochester (CS)
University of South Alabama (CIS)
University of South Carolina (CSE)
University of South Florida (CSE)
University of Southern California (CS)
University of Southern California (EES)
University of Texas, Austin (CS)
University of Texas, Austin (ECE)
University of Texas, Brownsville (CIS)
University of Texas, Dallas (CS)
University of Texas, El Paso (CS)
University of Toronto (CS)
University of Utah (CS)
University of Virginia (CS)
University of Washington (CSE)
University of Washington (I)
University of Washington, Bothell (CS)
University of Washington, Tacoma (CSS)
University of Waterloo (CS)
University of Wisconsin, Madison (CS)
University of Wisconsin, Milwaukee (EECS)
University of Wyoming (CS)
Utah State University (CS)
Vanderbilt University (EECS)
Villanova University (CS)
Virginia Tech (CS)
Wake Forest University (CS)
Washington State University (EECS)
Washington University in St. Louis (CSE)
Wayne State University (CS)
Western Michigan University (CS)
Williams College (CS)
Worcester Polytechnic Institute (CS)
Wright State University (CSE)
Yale University (CS)
York University (CSE)

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Indicates new member in 2009-2010

Professional Opportunities

Accenture
Technology Lab
Technology Researcher

Accenture is a global management consulting, technology services and outsourcing company with offices and operations in more than 200 cities in 52 countries. Our clients span the full range of industries around the world and include 96 of the Fortune Global 100 and three-quarters of the Fortune Global 500.

Accenture Technology Labs does R&D; exploring advances in technology and inventing new solutions that will shape the future of Accenture and its clients; it is a great place for researchers interested in working at the intersection of technology and business. We investigate fundamental problems in areas such as software engineering; hardware, software, and system architecture; large-scale data management; human-computer interaction; analytics; and cyber security.

We currently have multiple openings for Researchers with a Ph.D. in computer science or a related field, capable of defining and executing strong research programs in areas like those outlined above.

For more information and to formally apply for this position, please visit the following website: http://careers3. accenture.com/jobs/jobs.html. Enter job code 99785

Arizona State University
Engineering Faculty opening in Human Activity Capture and Analysis

The School of Arts, Media and Engineering (AME) and the School of Electrical, Computer and Energy Engineering (ECEE) at Arizona State University are seeking a jointly appointed faculty member. Of particular interest is the area of Human Activity Capture and Analysis with emphasis on health, education or cultural applications. Candidates are sought at the assistant, associate or full professor level.

The School of Arts, Media and Engineering (AME–http://ame.asu.edu), at the Herberger Institute for Design and the Arts and the Ira Fulton Schools of Engineering, is a leading transdisciplinary program in media arts and sciences. It offers PhD, Masters and undergraduate degrees in new media in collaboration with 12 partner units spanning arts, design, sciences and engineering. Significant federal, private foundation and industry support along with clinical, education and cultural partnerships contribute to the development and deployment of innovative media systems. The School of Electrical, Computer and Energy Engineering leads academic programs with more than 50 faculty members, 500 undergraduates and 700 graduate students. The school's programs include extramural research funding of more $20M and BSE, MSE, MS and Ph.D. degree programs. Both Schools are strongly committed to interdisciplinary research and education.

Application deadline: November 1, 2010. For complete position details and application process, please visit:
http://ame.asu.edu/about/employment.php

Auburn University
Department of Computer Science and Software Engineering
Assistant/Associate Professor

The Department of Computer Science and Software Engineering (CSSE) invites applications for a tenure-track faculty position at the Assistant/Associate Professor level to begin Spring 2011 or Fall 2011. We encourage candidates from all areas of computer science and software engineering to apply. We are especially interested in candidates specializing in software engineering and cyber security. Candidates selected for these positions must be able to meet eligibility requirements to work in the United States at the time appointment is scheduled to begin and continue working legally for the proposed term of employment; excellent communication skills required.

Applicants should submit a current curriculum vitae, research vision, teaching philosophy, and the names and addresses of three references to Kai H. Chang, Professor and Chair, kchang@eng.auburn.edu (with copy to bjl0002@auburn.edu).

The applicant review process will begin October 15, 2010. Detailed announcement of this position can be found at:
http://www.eng.auburn.edu/csse/
Auburn University is an Affirmative Action/Equal Opportunity Employer. Women and minorities are encouraged to apply.

Cal Poly State University
Computer Science Department
Tenure Track Position–Forbes Professor of Computer Engineering

The Computer Science Department and Computer Engineering Program at Cal Poly, San Luis Obispo, invite applications for a full-time, academic year tenure- track Computer Engineering faculty position at the Assistant or Associate Professor rank, beginning no later than Fall 2011. The appointment will be designated as the "Forbes Professor of Computer Engineering". Duties include teaching core undergraduate courses, and upper-division and master's level courses in a specialty area; performing research in an area of computer engineering; and service to the department, the university, and the community.

Applicants from all mainstream areas of computer engineering are encouraged to apply. A doctorate in Computer Engineering, Computer Science, Electrical Engineering, or a closely related field is required. Salary is commensurate with qualifications and experience.

Candidates in the areas of: Computer Security, Parallel and Distributed Computing, Autonomous Systems, Biomedical Applications, and Sustainable Computing are strongly encouraged to apply. Industrial experience and willingness to teach in multiple areas of the undergraduate curriculum are desirable. Candidates must have a strong commitment to teaching excellence and laboratory-based instruction; dedication to continued professional development and scholarship; and a broad-based knowledge of computer engineering. Demonstrated ability in written and oral use of the English language is required.

Cal Poly offers Bachelor's Degrees in Computer Engineering, Computer Science, Software Engineering and Electrical Engineering, and Master's Degrees in Computer Science and Electrical Engineering. Computer Engineering is a joint program between the Departments of Computer Science and Electrical Engineering. Cal Poly emphasizes "learn by doing" which involves extensive lab work and projects in support of theoretical knowledge. The available computing facilities for instructional and faculty support are modern and extensive.

To apply, please visit www.calpolyjobs. org and complete a required online faculty application, and apply to Requisition #102122. Review of applications will begin January 7, 2011; applications received after that date may be considered. For questions, contact Cindy Bitto at (805) 756-7229 or email: cbitto@calpoly.edu. Please include requisition number in all correspondence.

For further information about the department and its programs, see www.csc.calpoly.edu and www.cpe.calpoly.edu. Cal Poly is strongly committed to achieving excellence through cultural diversity. The university actively encourages applications and nominations of all qualified individuals. EEO

Cal Poly, San Luis Obispo
Electrical and Computer Engineering
Tenure Track Faculty Positions

Electrical & Computer Engineering–Tenure track faculty positions in Electrical and Computer Engineering at Cal Poly, San Luis Obispo, California, beginning September 2011. For details, qualifications, and application instructions (online application required), visit www.calpolyjobs.org and apply to requisition #102119.

Application review begins January 1, 2011. EEO.

Cornell University
Computer Science Department
Multiple Faculty Positions

Multiple faculty positions are available at Cornell's Department of Computer Science. Candidates are invited to apply at all levels including tenured, tenure-track, or lecturer. We are interested in applications from any area of computer science, including artificial intelligence, computational biology, cryptography, databases, game design, graphics, machine learning, networking, programming languages, robotics, security, scientific computing, systems, and theory of computation. To ensure full consideration, applications should be received by December 1, 2010, but will be accepted until all positions are filled. Applicants should submit a curriculum vitae, brief statements of research and teaching interests through the web at http://www.cs.cornell.edu/apply and arrange to have at least three references uploaded on the Web.

Cornell University is an Affirmative Action/Equal Opportunity Employer and Educator.

Furman University
Department of Computer Science
Assistant Professor of Computer Science

The Department of Computer Science invites applications for a tenure track position at the Assistant Professor level to begin in the fall of 2011. Candidates must have a Ph.D. in Computer Science or a closely related field. The position requires teaching excellence, effective institutional service, and an ability to work with colleagues across disciplines. An ability to develop a program of scholarly and professional activity involving undergraduates is a priority. Research specialty areas being sought include (but are not limited to) high performance computing, computational science, mathematical modeling, and bioinformatics. Of particular interest are candidates willing to engage in collaborative research that bridges the computational and medical sciences. The position will be initially funded by and is expected to contribute to a major multi-disciplinary and multi-organizational state-wide initiative aimed at biofabrication of tissues and organs.

Furman is a highly selective, independent, top 40 undergraduate liberal arts institution with an enrollment of approximately 2600 students. The university is located in the vibrant and beautiful upstate region of South Carolina, offers generous benefits to fulltime faculty, and subscribes to a problem-solving, project-oriented, experience-based approach to education that is referred to as Engaged Learning. The Department of Computer Science confers the B.S. degree with majors in Computer Science, Information Technology, and Computer Science/Mathematics. The successful candidate will have the opportunity to teach in Furman's First Year Seminar program.

Furman University is an equal-opportunity employer. Women and underrepresented minorities are strongly encouraged to apply. For the complete ad, please visit http://cs.furman.edu.

Applicants should submit a curriculum vitae, statement of teaching philosophy, description of research interests, an official copy of most recent transcripts, and have three letters of recommendation sent separately. Please send all materials to:
Dr. Kevin Treu, Chair
Department of Computer Science
Furman University
3300 Poinsett Hwy
Greenville, SC 29613
Materials may also be send in PDF format to:
kevin.treu@furman.edu
Review of applications will continue until the position is filled.

George Mason University
Department of Computer Science
Faculty Position

The Department of Computer Science in the Volgenau School of Information Technology & Engineering at George Mason University invites applications for a faculty position at the rank of Full, Associate, or Assistant Professor beginning in Spring 2011 or until the position is filled.

The faculty position is in information security and assurance. Minimum qualifications for the position include a Ph.D. in Computer Science or a related field, demonstrated potential for excellence and productivity in research, and a commitment to high quality teaching. Applicants for a senior position need a well-established track record of substantial research contributions to their field, externally funded research, and leadership.

For full consideration please submit application and application materials on-line at http://jobs.gmu.edu (position number F9349Z). To apply, you will need a statement of professional goals including your perspective on teaching and research, a complete C.V. with publications, and the names of three references. The review of applications will begin immediately and will continue until the positions are filled. For more information on the department, visit our Web site: http://cs.gmu.edu/.

GMU is an equal opportunity/affirmative action employer. Women and minorities strongly encouraged.

Masdar Institute of Science and Technology, Abu Dhabi
Computing and Information Science
Faculty Positions

Masdar Institute of Science and Technology, located in Abu Dhabi, U.A.E., is a private, not-for-profit, independent, graduate-level, research-driven institute developed with the support and cooperation of the Massachusetts Institute of Technology (MIT). The goal of the Institute is to develop, over a period of years, indigenous R&D capacity in Abu Dhabi, addressing issues of importance to the region in critical areas such as: renewable energy, sustainability, environment, water resources and microelectronics. The Institute offers graduate degree programs in science and engineering disciplines with a focus on advanced energy and sustainable technologies (www.masdar.ac.ae and http://web.mit.edu/mit-tdp/www/).

Job description: The successful candidate is expected to develop and teach graduate courses and will be required to teach, as well as to supervise, students at the master's and Ph.D. levels, develop a research program, seek external funding

Professional Opportunities

for such research, and participate in the Institute's service and outreach activities.

Qualifications: The Computing and Information Science program at the Masdar Institute has full-time, open-rank (i.e., Full, Associate, or Assistant Professor) faculty positions in the area of applied computer science. Successful candidates will have demonstrated research and teaching capability in one or more computer science discipline. While we encourage applications from candidates with background in any area of computer science, preference will be given to: algorithms, networking, cryptography, computer security, and human-computer interaction. Candidates must also have an interest in applying their research to areas related to advanced energy and sustainability. Examples of relevant research applications include software support for green buildings, standards for intelligent physical infrastructure, intelligent transportation systems, smart power grids, large-scale scientific databases, etc. The applicants must be fluent in English. A doctoral degree in computer science or a related field is required, and post-doctoral or industrial research experience is a plus.

Application submittal information: The Massachusetts Institute of Technology is assisting Masdar Institute in the search. Initial screening of applications will begin immediately and the positions will remain open until filled. Application materials should include applicant name and contact information, a curriculum vitae, statements of research and teaching interests, an application letter describing the applicant's current position and how his/her experience matches the position requirements, and e-mail contact information for at least three references.

Materials must be submitted electronically to: masdar-faculty-applic@mit.edu

NEC Laboratories America, Inc.
(http://www.nec-labs.com)
Research Staff Member–Distributed Systems

NEC Laboratories America, Inc. (http://www.nec-labs.com) conducts research in support of NEC U.S. and global businesses. The research program covers many areas–reflecting the breadth of NEC business–and maintains a balanced mix of fundamental and applied research.

The Large-Scale Distributed Systems group conducts advanced research in the area of design, analysis, modeling and evaluation of distributed systems. Our current focus is to create innovative technologies to build next generation large-scale computing platforms and to simplify and automate the management of complex IT systems and services. Our researchers have expertise in networking, statistics, modeling, distributed systems, and operating systems. Our group has many ongoing projects, especially in the emerging Cloud Computing area. The group strongly believes in publishing our research and advancing the state-of-the-art. We also build technologies that solve real world problems and ultimately help industry business needs. Many of our research results have been/will be transferred into industry products.

The group is seeking a member to work in the area of distributed systems. The candidate must have deep knowledge and extensive experience in system architecture design and implementation. He/she must have a PhD in CS/CE with strong publication records in the following areas: distributed systems, operating systems virtualization, resource provisioning performance, reliability, dependability and security data centers and cloud computing.

For consideration, please forward your resume and a research statement to recruit@nec-labs.com and reference "ASDS-RSM" in the subject line.
EOE/AA/MFDV

NEC Laboratories America
Research Staff Positions
Systems Architecture

NEC Laboratories America, a premier research facility of NEC Corporation, has multiple openings in the Systems Architecture Department located in Princeton, NJ. We invite applications from exceptional candidates (senior-level or junior-level) for research staff (RSM) and associate research staff (ARSM) positions. The Systems Architecture department's mission is to innovate, design, evaluate and deliver parallel systems for high-performance, energy-efficient enterprise computing.

Candidates for the RSM position must have a PhD in CS, CE, or EE, strong research record and excellent credentials in the international research community. Applicants must be able to propose and execute innovative research projects, including prototyping effort that leads to demonstration in an industry environment. Applicants must demonstrate competency in one or more parallel computing research areas like heterogeneous cluster architectures, parallel programming models and runtimes, and key technologies to accelerate performance and lower power consumption of enterprise applications on heterogeneous clusters. Knowledge of parallel systems, experience in designing parallel software on shared and distributed memory models, and exposure to enterprise workloads and cloud computing is desirable. The current focus is on accelerating enterprise workloads on computing clusters that include various types of heterogeneity in computing, interconnects, networking and storage units.

Candidates for the ARSM position must have at least a MS in CS, CE, or EE, with a strong motivation and skill set to prototype/transfer innovative research results into industry practice. Expertise in one or more of the above parallel computing areas is desirable. Strong interest and aptitude for research is necessary.

NEC Laboratories America Inc. is a US-based facility that is part of NEC Corporation's global network of research laboratories. For more information, please visit http://www.nec-labs.com and http://www.nec.com. Interested applicants should send their resume and a short description of research interests to recruit@nec-labs.com and reference "Systems Architecture" in the subject line.
EOE/AA/MFDV

National Institutes of Health
Department of Health and Human Services
Scientific Executive

Associate Director for Health Information Programs Development
National Library of Medicine
The National Library of Medicine (NLM), a major component of the National Institutes of Health (NIH), is seeking exceptional candidates for the position of Associate Director for Health Information Programs Development. The NLM is responsible for collecting, preserving, and promoting the dissemination of information important to the progress of medicine and public health, both nationally and internationally. The NLM is the world's largest medical library, and it supports and conducts research in a wide range of biomedical communication modalities with programs and activities in areas such as biomedical informatics, genomics, toxicology and environmental health, HIV/AIDS, consumer health informatics,

international programs, and outreach to underrepresented minority communities and special populations. The Associate Director for Health Information Programs Development, who reports to the NLM Director, serves as principal advisor to the Director for all matters concerning scientific research evaluation projects dealing with large-scale information technology intervention studies, science policy issues, and planning and evaluation of the Library's research and service initiatives, especially those relating to information technology advances; development of new national outreach programming; and management of NLM's international programs. The Associate Director is the principal official leading the Library's long range planning function on behalf of the NLM Board of Regents; the principal NLM liaison with the 20-member network of International Medlars Centers; and the NLM principal leading the Library's outreach and consumer health programs along with implementation of its Health Disparities Plan by corporate NLM and the 6,000-member National Network of Libraries of Medicine (NN/LM). A solid program of creative research underlies the planning and execution of all initiatives and impacts the field broadly at multiple levels in government, academia, and the private sector.

Qualifications required: Applicants must possess a Ph.D., M.D., or equivalent degree in a scientific discipline related to communication research, evaluation research, information science, informatics research, behavioral and social sciences or related field. Applicants must have responsible professional and managerial experience at the senior level that demonstrates the following:

1. Scientific knowledge and expertise in the scientific discipline of communication research, evaluation research, information science, informatics research, behavioral and social sciences or related field, as well as a deep understanding of current information handling and dissemination methods.

2. Ability to provide leadership, administration, and broad vision to a planning and evaluation, outreach, and international program with extensive managerial and executive level responsibility (i.e., training, resources, strategic planning, evaluation, budgeting, and human resource management) in a diverse organization.

3. Skill in leading, enabling, and defending change on complex scientific topics through effective written communication formats for a diverse scientific and non-scientific audience.

4. Ability to advise senior and executive-level staff within and outside of the organization on complex scientific topics.

5. Skill in the leadership of long range planning activities that guide resource allocation and program direction for a major institution in the health or medical sciences.

Salary: This position is an excepted service position (Title 42). The salary level is commensurate with the background of the selectee depending on qualifications and experience. Full Federal benefits are available including retirement, health and life insurance, long-term care insurance, leave, and savings plan (401K equivalent).

Please submit a cover letter that discusses your interest in and vision for the position, a statement of two pages or less that addresses the five qualifications for the position, and a curriculum vitae (including a list of publications) to:
Meredith A. Sevi
Office of Human Resources
National Institutes of Health

2115 East Jefferson Street
Room # 1-G102
Rockville, MD 20852
Applications may also be sent via e-mail to: sevim@mail.nih.gov or faxed to 301-480-1392. Any questions, please call 301-402-7521.

Applications must be postmarked or transmission received by September 13, 2010.

DHHS and NIH are an Equal Opportunity Employer

Old Dominion University
Tenure Track Faculty, Computer Engineering
Assistant/Associate Professor

The Department of Electrical and Computer Engineering at Old Dominion University invites applications for a tenure track position at the assistant/associate professor level. The successful candidate is expected to have a strong committent to teaching undergraduate and graduate courses in core areas of computer engineering. Additionally, candidates are expected to develop an externally funded research program. A Ph.D. degree in electrical engineering, computer engineering, or a related area is required. The expected start date is January 10, 2011.

For more information on the Electrical and Computer Engineering Department, visit http://www.ece.odu.edu. Interested candidates should send a letter of application, a CV, contact information for at least 4 technical references and a statement of teaching philosophy to rsamson@odu.edu.

For further information please contact Dr. Lee Belfore, Search Chair, at lbelfore@odu.edu. Review of applications will begin on July 15, 2010 and continue until the position is filled.

Old Dominion University is an affirmative action equal opportunity institution and requires compliance with the Immigration Reform and Control Act of 1986.

Princeton University
Computer Science Department
Assistant Professor, Tenure-Track Positions

The Department of Computer Science at Princeton University invites applications for faculty positions at the Assistant Professor level. We are accepting applications in all areas of Computer Science.

Applicants must demonstrate superior research and scholarship potential as well as teaching ability. A PhD in Computer Science or a related area is required.

Successful candidates are expected to pursue an active research program and to contribute significantly to the teaching programs of the department. Applicants should include a resume contact information for at least three people who can comment on the applicant's professional qualifications.

There is no deadline, but review of applications will start in December 2010; the review of applicants in the field of theoretical computer science will begin as early as October 2010.

Princeton University is an equal opportunity employer and complies with applicable EEO and affirmative action regulations. You may apply online at: http://www.cs.princeton.edu/jobs
Requisition Number: 1000520

Purdue University
Department of Computer Science
Science of Information STC Managing Director

The Managing Director for the Science of information STC (SOI STC) reports to the Director and is responsible for the day-to-day management of all non-research related aspects of running a

Professional Opportunities

Professional Opportunities

large, 5-year (with possible extension to 10-year), National Science Foundation-sponsored, multi-million dollar university research center. The ideal Managing Director will be able to manage all the details inherent to a university research center, while maintaining a bigger picture perspective. The Managing Director is part of the managerial leadership team that implements the vision for the research focus areas of the center and works with the Technical Director and the SOI STC faculty to achieve their long-term goals. The incumbent oversees the development of project summaries, progress reports and annual reports; serves as an operational liaison to the Center's executive committee, advisory committees, affiliated faculty, external sponsors, internal business and academic units, and institutional and programmatic partners; develops annual budgets, monitors finances, expenditures and cost-share reporting.

Qualifications

Required:

Masters Degree in Electrical Engineering, Computer Science, Mathematics, Statistics, Engineering, Science, Business or allied fields.

Four or more years of professional experience.

Significant experience serving in a management role.

Preferred:

PhD degree.

Experience with academic (faculty) environment.

Experience managing large multi-disciplinary research projects.

For consideration submit resume and apply online at: http://www.purdue.edu/hr/Employment/

Select Staff Positions and reference Job Number 1000172

Purdue University is an equal opportunity/equal access/affirmative action employer fully committed to achieving a diverse workforce.

Rensselaer Polytechnic Institute
Tetherless World Constellation
Software Engineer

The Tetherless World Constellation at Rensselaer Polytechnic Institute seeks applications for professional staff to enable Principal Investigators and research staff to conduct research projects in the emerging areas of "Web Science/ Data Science and Semantic eScience," focusing on the World Wide Web and its future use. http://tw.rpi.edu

Software Engineer/ Programmer (Junior)

The Software Engineer is responsible for a variety of software development and maintenance duties related to the data science and semantic escience: distribution and analysis of data produced from science and applications across many disciplines.

Minimum qualifications would consist of a bachelor's degree in computer science, information technology, natural sciences, engineering, mathematics or related field and ~ 2 years of work experience in a comparable position. The ideal candidate would have application experience with C/C++, web architectures and object-oriented software design and technologies.

The candidate would have knowledge of computer science principles, software designs methodologies and implementation techniques and have the ability to manage small software projects and participates in medium software projects. Additionally, the following attributes are desirable; knowledge of multi-tier architectures, distributed computing design principles and practice; familiarity in programming Java; database techniques, methods and formats (sql, netCDF, hdf, etc.) and shell scripts (perl, python, etc.); semantic technologies

and associated languages, tools, and infrastructure. web related services, languages, protocols and procedures, apache, html, tomcat, xml, SSL, HTTP, and cgi.

Qualified applicants must visit https://rpijobs.rpi.edu, and complete an on-line application, with cover letter, CV, and three (3) references for job number 20090374.

Rensselaer Polytechnic Institute, the oldest technological institute in the English speaking world, is a private, research university in Troy, New York. Rensselaer is currently undergoing unprecedented growth in both faculty and research activities. Rensselaer employees are rewarded through a competitive compensation package, an exceptional benefits plan, professional growth and development, and a technologically advanced work environment.

Rutgers University
Department of Computer Science
Tenure-Track Position

The Department of Computer Science at Rutgers University invites applications for faculty positions at all ranks, with appointments starting in September 2011. The search focuses on theoretical and applied cryptography, although all candidates whose research deals with security will be considered.

Applicants for this position must have completed or be in the process of completing a dissertation in Computer Science or a closely related field, and should show evidence of exceptional research promise, potential for developing an externally funded research program, and commitment to quality advising and teaching at the graduate and undergraduate levels. A hired candidate who has not defended his or her Ph.D. by September will be hired at the rank of Instructor, and must complete the Ph.D. by December 31, 2011 to be eligible for tenure-track title retroactive to start date.

Applicants should go to http://www.cs.rutgers.edu/employment/ to apply. Required materials are a curriculum vitae, a research statement addressing both past work and future plans, a teaching statement, and three references.

Applications should be received by November 15, 2010 for full consideration.

Rutgers values academic diversity and encourages applications from individuals with a variety of experiences, perspectives, and backgrounds. Females, minorities, dual-career couples, and persons with disabilities are encouraged to apply.

Rutgers is an affirmative action/equal opportunity employer.

Texas A&M University
The Parasol Laboratory
Postdoc: Parallel Programming and C++ Libraries

The Parasol Laboratory (parasol.tamu.edu) at Texas A&M seeks a postdoc in parallel processing and C++ Libraries. The postdoc will join a large, NSF and DOE-funded project developing production quality parallel C++ libraries and run-time systems for small to extreme-scale architectures. Required qualifications include a relevant PhD and proficiency in C++ and parallel programming.

Competitive salary includes full benefits. Position is renewable subject to yearly evaluation.

To apply, send CV to Kay Jones (kay@cse.tamu.edu).

The Institute for Defense Analyses
Center for Computing Sciences
Research Staff Positions

The Institute for Defense Analyses Center for Computing Sciences is looking for outstanding Ph.D. level scientists, mathematicians and engineers

to address problems in high-performance computing, cryptography and network security. IDA/CCS is an independent research center sponsored by the National Security Agency. IDA/CCS scientists and engineers work on difficult scientific problems, problems vital to the nation's security. Stable funding provides for a vibrant research environment and an atmosphere of intellectual inquiry free of administrative burdens.

Research at IDA/CCS emphasizes computer science, computer architecture, electrical engineering, information theory and all branches of mathematics. Because CCS research staff work on complex topics often engaging multidisciplinary teams, candidates should demonstrate depth in a particular field as well as a broad understanding of computational science and technology.

Developing imaginative computational solutions employing novel digital technology is one of several long-term themes of work at CCS. The Center is equipped with a very large variety of hardware and software. The latest developments in high-end computing are heavily used and projects routinely challenge the capability of the most advanced architectures. IDA/CCS offers a competitive salary, an excellent benefits package and a superior professional working environment. IDA/CCS is located in a modern research park in the Maryland suburbs of Washington, DC. U.S. citizenship and a DoD TS//SI clearance are required. CCS will sponsor this clearance for those selected.

The Institute for Defense Analyses is proud to be an equal opportunity employer.

Please send responses or inquiries to:
Dawn Porter
Administrative Manager
IDA Center for Computing Sciences
17100 Science Drive
Bowie, MD 20715-4300
dawn@super.org
(301) 805-7528

The University of Alabama at Birmingham
Department of Computer and Information Sciences
Research Assistant Professor

The Department of Computer & Information Sciences at the University of Alabama at Birmingham (UAB) is seeking candidates for a non-tenure-track faculty position at the Research Assistant Professor level beginning November 1, 2010 or until job is filled. Candidates with expertise in Bioinformatics, Artificial Intelligence, and Data Mining who could interact with existing research groups in the School of Medicine and CIS to apply these techniques to the study of genetic diseases (in particular cystic fibrosis) are of interest. Also potential for multidisciplinary collaboration with research groups working in the areas of SNP analysis and the function of introns would be advantageous. The ideal candidate would also have a graduate degree in microbiology, biochemistry or genetics and actual laboratory experience. Experience as an internal consultant in artificial intelligence/bioinformatics in either industry or academia would be a plus. For additional information about the department please visit http://www.cis.uab.edu.

Applicants should have demonstrated the potential to excel in one of these areas and in teaching at all levels of instruction. They should also be committed to professional service including departmental service. A Ph.D. in Computer Science or closely related field is required.

Applications should include a complete curriculum vitae with a publication list,

a statement of future research plans, a statement on teaching experience and philosophy, and minimally two letters of reference with at least one letter addressing teaching experience and ability. Applications and all other materials may be submitted via email to facapp@cis.uab.edu or via regular mail to:

Search Committee
Department of Computer and Information Sciences
115A Campbell Hall
1300 University Blvd
Birmingham, AL 35294-1170

Interviewing for the position will begin as soon as qualified candidates are identified, and will continue until the position is filled.

The department and university are committed to building a culturally diverse workforce and strongly encourage applications from women and individuals from underrepresented groups. UAB has an active NSF-supported ADVANCE program and a Spouse Relocation Program to assist in the needs of dual career couples. UAB is an Affirmative Action/Equal Employment Opportunity employer.

Toyota Technological Institute at Chicago (TTIC)
Computer Science
Faculty Positions at All Levels

Toyota Technological Institute at Chicago (TTIC) is a philanthropically endowed degree-granting institute for computer science located on the University of Chicago campus. The Institute is expected to reach a steady-state of 12 traditional faculty (tenure and tenure track), and 12 limited term faculty. Applications are being accepted in all areas, but we are particularly interested in

Theoretical computer science
Machine learning
Computer vision
Scientific computing
Speech processing
Computational linguistics
Computational biology

Positions are available at all ranks, and we have a large number of limited term positions currently available.

For all positions we require a Ph.D. Degree or Ph.D. candidacy, with the degree conferred prior to date of hire. Submit your application electronically at:
http://ttic.uchicago.edu/facapp/

Toyota Technological Institute at Chicago is an Equal Opportunity Employer

University of Chicago
Department of Computer Science
Faculty Positions

The Department of Computer Science at the University of Chicago invites applications from exceptionally qualified candidates in all areas of Computer Science for faculty positions at the ranks of Professor, Associate Professor, Assistant Professor, and Instructor. The University of Chicago has the highest standards for scholarship and faculty quality, and encourages collaboration across disciplines.

The Chicago metropolitan area provides a diverse and exciting environment. The local economy is vigorous, with international stature in banking, trade, commerce, manufacturing, and transportation, while the cultural scene includes diverse cultures, vibrant theater, world-renowned symphony, opera, jazz, and blues. The University is located in Hyde Park, a pleasant Chicago neighborhood on the Lake Michigan shore.

All applicants must apply through the University's Academic Jobs website, academiccareers.uchicago.edu/applicants/Central?quickFind=51071. A cover letter, curriculum vitae including a list of

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publications, a statement describing past and current research accomplishments and outlining future research plans, a description of teaching experience, and a list of references must be uploaded to be considered as an applicant. Candidates may also post a representative set of publications, to this website. The reference letters can be sent by mail or e-mail to:

Chair, Department of Computer Science
The University of Chicago
1100 E. 58th Street, Ryerson Hall
Chicago, IL. 60637-1581
Or to: recommend-51071@mailman.cs.uchicago.edu (attachments can be in pdf, postscript or Microsoft Word).

Please note that at least three reference letters need to be mailed or e-mailed to the above addresses and one of them must address the candidate's teaching ability. Applicants must have completed all requirements for the PhD except the dissertation at time of application, and must have completed all requirements for the PhD at time of appointment. The PhD should be in Computer Science or a related field such as Mathematics or Statistics. To ensure full consideration of your application all materials [and letters] must be received by November 19. Screening will continue until all available positions are filled. The University of Chicago is an Affirmative Action/Equal Opportunity Employer.

University of North Dakota
Department of Computer Science
Tenure-Track Position

The Department of Computer Science at the University of North Dakota is recruiting for a tenure-track position at the Assistant or Associate Professor level with an anticipated start date of January 1, 2011. The position requires a Ph.D. in Computer Science or a related field. The department is seeking outstanding candidates with a research focus in one of the following areas:

(a) simulation and modeling or (b) high-performance computing.

The responsibilities include teaching at the undergraduate and graduate levels, supervising graduate students (MS and PhD), and developing and maintaining an active research program. Associate Professor candidates should have a good publication and funding record, proven ability to establish an independent research program, and be open to participation in interdisciplinary programs of study. Industry experience and/or post-doctoral experience will be considered an asset.

Our department strives to maintain a collegial and supportive atmosphere. UND hires on the basis of merit and is committed to employment equity. We strongly encourage candidates with diverse backgrounds and experiences to apply.

Applicants for the position must submit their curriculum vitae, a teaching statement, a research statement, and the names of at least three references. The teaching statement should include a record of teaching interests and experience. Screening begins immediately and continues until the position is filled. Applications may be sent electronically in PDF format to:

Ronald Marsh, Ph.D., Associate Professor and Chair
Department of Computer Science
University of North Dakota
Grand Forks, ND, USA
www.cs.und.edu
If you have questions about the application process, please contact Ronald Marsh at: rmarsh@cs.und.edu
The University of North Dakota is an AAEO Employer.

University of Oregon
Computer and Information Science Department
Instructor

The Computer and Information Science Department is seeking to fill one faculty position at the instructor level. This position is for nine months, fixed term and renewable based on performance.

Depending upon future funding, the position will be eligible for promotion to Senior Instructor.

Employment Beginning: December 16, 2010.

Description: The CIS Department seeks a dynamic individual to teach courses in our Computational Thinking series for non-majors, including computer fluency, media computation, web programming, and the science of computing. We especially welcome candidates who can propose new courses for this introductory series in areas such as mobile technologies or new approaches to programming using 'agile' languages such as Alice, Greenfoot, Scratch and Python. The candidate should be knowledgeable about national curriculum trends in computer science education, and be interested in collaboration with our faculty in the development of curriculum innovation.

Qualifications: Minimal requirement is a Masters degree in computer science or a closely related field, with a Doctoral degree strongly preferred. A record of excellence in teaching is expected.

Application Procedure: Applications will be accepted electronically through the department's web site (only). Application information can be found at http://www.cs.uoregon.edu/Employment/. Submit letter of interest, curriculum vitae, statement of teaching interests, evidence of teaching performance, and names of three references. Review of applications will begin September 1, 2010 and will continue until this position is filled. Please address any questions to faculty.search@cs.uoregon.edu. Candidates who promote and enhance diversity are strongly desired.

The University of Oregon is an equal opportunity, affirmative action institution committed to cultural diversity and compliance with the Americans with Disabilities Act.

York University, Toronto
Department of Computer Science and Engineering
Faculty Position

York University, Toronto, Canada: The Department of Computer Science and Engineering in collaboration with the Departments of Biology, and Science and Technology Studies invite faculty applications in the following areas: (i) Visual Neuroscience or Computational Neuroscience of Vision, and; (ii) Digital Media (Computer Graphics) and Technoscience–both at the Assistant Professor level in the tenure track stream. The deadline for the applications is November 30, 2010 with a start date of July 1, 2011.

For detailed information, please visit http://yorku.ca/acadjobs.

York University is an Affirmative Action Employer.

Tenure-Track Faculty Position
Focus on Software Engineering
Department of Computer Science
The University of Alabama

THE UNIVERSITY OF ALABAMA ENGINEERING

The Department of Computer Science at the University of Alabama invites applications for a new tenure-track Assistant Professor position to begin August 2011. The general area of interest is in software engineering, with a high priority area in model-driven engineering.

Candidates must have an earned Ph.D. in computer science or a related field, with solid evidence of superior research and scholarly accomplishments that are appropriate for the desired level of appointment, as well as quality teaching abilities. Applicants who specialize in software engineering are encouraged to apply. A high priority area for this search is model-driven engineering and software language engineering (e.g., domain-specific modeling and languages, metamodeling, model transformation, application of model engineering to software product lines and mobile software development).

About the University, College, and Department:

The University of Alabama, located in Tuscaloosa, is considered the Capstone of higher education in Alabama and is also the largest institution in the State. The University is listed by US News and World Report as one of the top-50 public universities in the United States. The Department of Computer Science, housed in the College of Engineering, currently has twenty-three faculty members (16 tenured/tenure track faculty, 6 of whom have interests in software engineering), roughly 200 undergraduates in an ABET accredited B.S. degree program, and approximately 60 M.S. and Ph.D. students. Beginning Fall 2010, two postdocs in software engineering will be supported in the Department.

The Department and College of Engineering are undergoing a period of growth. The Department is housed in a new (opened August 2009) state-of-the art complex. Within a ten-year period, the University will complete construction of the science and engineering complex. The four buildings under construction are focused on the expansion of research in engineering and the sciences. Over 3000 square feet of new research space has been constructed to support the efforts of the software engineering faculty.

The software engineering faculty in the Department are responsible for $3.25M in active funding. Current sponsors include Google, NSF, US Department of Homeland Security, and the National Highway Traffic Safety Administration. Past sponsors include Microsoft Research, IBM, DARPA, US Army Research Laboratory, and NASA.

Application Information:

Details regarding the procedure for applying for this position will be announced in early Fall 2010 and will be available from the department web site. For additional information about the Department and future application information, please visit *http://cs.ua.edu*. For information about the future position, please contact the Search Committee at *faculty.search@cs.ua.edu*.

Review of applications will begin late-Fall 2010 and will continue until the position is filled. The University of Alabama is an equal opportunity/affirmative action employer. Women and minority applicants are particularly encouraged to apply.

University Awards from NEC Labs Data Management
Call for Proposals

The Data Management Department of NEC Labs America is calling for research proposals. NEC Labs conducts high-impact research and development by building upon NEC's long history of innovation. The purpose of this program is to identify and support world-class research projects at universities and facilitate strong research collaborations. The awards through this selective program are typically for one year in the range of $40,000-$75,000 and in the form of unrestricted grants. For detailed information please go to:
http://www.nec-labs.com/research/Call_for_proposal_DM.php