

# COMPUTING RESEARCH NEWS

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## Science, Computing Research Fare Well in Obama FY11 Budget

By Peter Harsha

Rumors of an Administration pullback in its support for science proved unfounded, as President Barack Obama in early February released an FY 2011 budget request that continues three key science agencies on trajectories that would see their funding double by 2017. The news for federal support of computing research was even better, with computing research accounts in several agencies slated for even greater percentage increases.

Despite the Administration's plan to freeze many discretionary spending accounts in the budget beginning in FY 2011, Obama's budget makes exceptions for research funding at the National Science Foundation, Department of Energy's Office of Science, and the National Institute of Standards and Technology—three agencies that are at the core of the President's National Innovation Strategy. "Investment in science and basic research is critical to long-term

economic growth," the budget reads, providing justification for its \$61.6 billion in funding for civilian research and development, an increase of \$3.7 billion, or 6.4 percent more than the agencies received in FY 2010.

Under the President's plan, NSF would receive an 8 percent increase over its FY 2010 level, DOE's Office of Science a 4 percent increase, and NIST a 7.3 percent increase. All federal science agencies were not treated equally, however. Overall, the federal budget for research and development (military and civilian) would stay relatively flat at \$147.7 billion in FY 2011, an increase of just 0.2 percent over FY 2010.

"Embedded in a relatively flat overall R&D budget are some very healthy increases in areas that are most important for the nation's future," said Presidential Science Advisor John P. Holdren at the budget release on February 1.

Cuts fell on the Department of

Homeland Security's basic research efforts (down \$54 million, or 24 percent), applied research at the Department of Defense (\$21 million, essentially the same funding level as FY 2010), and the Administration announced it was halting NASA's return-to-the-moon program, Constellation.

The science community had grown anxious in December as reports surfaced that the White House Office of Management and Budget (OMB), the ultimate authority on agency budget requests, had balked at the funding levels required to keep the science agencies on the "doubling track." *Science Magazine* reported in a December 4, 2009, story that OMB planned to hold NSF's increase to just 2.9 percent in FY 2011 and DOE's Office of Science to just 1.6 percent.

In response, a number of science advocacy groups, including CRA, weighed in with OMB Director Peter Orszag to encourage support for the President's previous commitments to funding for NSF, DOE Science, and NIST. CRA joined with ACM's U.S. Public Policy Committee, IEEE-Computer Society, and IEEE-USA to make the computing community's case for support.

Because the Administration's

deliberations prior to the release of the budget are secret, it is not known whether the initial reports were erroneous or whether OMB's thinking changed, but the budget as released adopts the "doubling path" funding levels the President committed to with the release of his National Innovation Strategy in September 2009.

The President's plan would provide an 8 percent increase to NSF, \$552 million more than the agency's FY 2010 budget. Of that \$552 million, \$455 million would go to the foundation's research accounts (also an 8 percent increase over FY 10). And of those research accounts, no research directorate would see bigger increases in the President's plan than NSF's home for computing research: the Computing and Information Science and Engineering (CISE) Directorate.

The directorate does so well in large degree because its programs match well with the agency's priorities, said NSF Assistant Director for CISE Jeannette Wing, which in turn map well with the President's priorities. Part of the President's National Innovation Strategy for

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## CCC: The CRA in Action

CRA is all about ensuring that the future of computing research is even brighter than the past has been. The Computing Community Consortium (CCC) is one of CRA's prime mechanisms for doing so with the goal of creating such compelling research visions that researchers, funders, policy folks, students and the public become engaged. CCC is pursuing several strategies which are discussed in detail on its website [www.cra.org/ccc](http://www.cra.org/ccc). Here we'd like to provide some highlights with the goal of enticing you to explore more about CCC, and then to become engaged in its current activities or propose new ones.

CCC is a nimble activity, always ready to pounce on opportunity. Administration transitions provide a great opportunity to influence strategic directions, and CCC did just that by creating a set of "transition documents" which highlighted computing research areas that were ripe for impact (and funding). As typical in Washington, the request from OSTP was for documents that were brief and could be provided within a few days. Thus there was no possibility for a community-wide approach with vetting, etc. Instead, well-known research leaders were approached to contribute and they

did—generating 19 documents (<http://www.cra.org/ccc/initiatives.php>) that provided guidance for how the computing fields can help drive the Administration's innovation priorities forward. Did they have impact? We've been told that they did; perhaps the best measure is the ultimate Washington indicator—do they show up in the President's budget request? See CRA's Government Affairs blog (<http://www.cra.org/govaffairs/index.php>) for the good news.

CI Fellows represents a second example of quick response to conditions. At the start of 2009 it became clear that the economy was in bad shape, leading to a highly likely negative impact on faculty and researcher hiring. Discussions started in January, and by the end of February a team was organized to put together a proposal to NSF to fund post-doctoral positions for the most highly qualified new PhDs in order to keep them in the computing research field. But the team quickly decided that this program could have a very positive impact on a much broader range of institutions than typically participate by ensuring that no more than two researchers either came from or went to any one institution. In this way, broad participation and impact

was ensured—bridges would be built between diverse institutions.

A proposal was developed and submitted in March, funded in early May, and the selection process was completed by early July—seven months from concept to contracts! Nimble indeed. See <http://cifellows.org/> and [http://www.cra.org/resources/crn-archive-view-detail/the\\_computing\\_innovation\\_fellows\\_project\\_strengthening\\_the\\_field/](http://www.cra.org/resources/crn-archive-view-detail/the_computing_innovation_fellows_project_strengthening_the_field/).

One of the Administration's signature issues has been health care—and improving health care requires solving deep issues in computer science. Following the Administration's wishes, federal agencies are working together on this issue, and they asked CCC to organize a workshop to discuss the role of computing research in health care. Susan Graham took the lead on this responsibility and <http://www.cra.org/ccc/healthit.php> gives both the video record and the highlights of the results of the workshop. The workshop output has evolved into a funded research program <http://healthit.hhs.gov/portal/server.pt?open=512&objID=1436&mode=2>.

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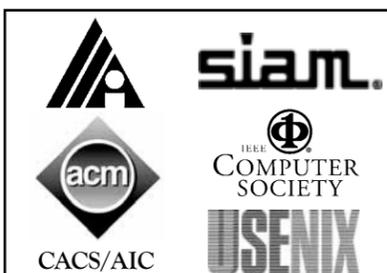
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## Expanding the Pipeline

# Engaging Introductory Computer Science Undergraduates through Peer-Led Team Learning

By Kristen Parton and Christian Murphy



ESP peer leader and CS major Sahar Hasan guides students in building a decision tree for the 9 coins problem.

### Introduction

As technology becomes ever more pervasive in everyday life and across many disciplines, one might expect that the study of Computer Science (CS) would become more appealing to more people, and to a broader spectrum of students. However, the number of undergraduate CS majors in 2009 is still much lower than it was during the dot-com boom of 2000, and the diversity of students majoring in CS has changed little over the same period, with about two-thirds of undergraduate CS students identified as white (according to the latest CRA Taulbee Survey). Over the longer term, gender diversity has even decreased—for instance, in 1985, 37% of CS degrees were earned by women, but 23 years later, the percentage was about half that (18% in 2008).

One effort to recruit and retain students, particularly under-represented students, in undergraduate introductory CS courses is Peer-Led Team Learning (PLTL). Since many students are not exposed to computer science in high school, introductory CS courses (hereafter referred to as CS1) are often a student's first experience with CS. Large, lecture-based classes and complex one-person programming assignments can be daunting to students with no CS background. Since CS1 necessarily focuses on basic algorithmic concepts and programming, it may be difficult for students to appreciate the wide range of areas to which CS can be applied in real life, from network systems to machine translation. This article discusses how PLTL addresses the problems related to attracting students to the CS major, how PLTL has been implemented successfully at other universities, and our own experiences of building a PLTL program in the Computer Science Department at Columbia University.

### The PLTL Paradigm

Peer-Led Team Learning supplements traditional science, technology, engineering and

mathematics (STEM) courses in that students meet in small groups (6 to 8 people) facilitated by another student who has recently completed the course. The peer leader presents problems to the group, and then guides students as they collectively brainstorm, discuss and analyze the problems to come to a solution.

The team-learning format encourages *active learning*, as opposed to the common paradigm of passively listening to lectures in an auditorium filled with hundreds of students. Using a trained peer leader allows students to participate more openly, without feeling ashamed for asking “stupid questions.” One Columbia student wrote that she liked having a peer leader because “a professor can be too intimidating.” Also, since the peer leader has just completed the course, she remembers what it was like to learn fundamental concepts from scratch, whereas these concepts are second nature to people who have been immersed in the field for years.

PLTL has long been applied successfully in other STEM disciplines—for instance, the PLTL Workshop Project at City College of New York has been using it in chemistry since the early 1990s. In CS, PLTL has been growing in popularity over the past five years due to the success of the Emerging Scholars Program in CS (ESP-CS) endeavor. Eight colleges and universities worked closely together to develop, implement, and evaluate a PLTL program for CS1 over three years. They have published detailed findings of their experiences and results (such as [Horwitz & Rodger 09]), as well as modules of course content, to assist other CS departments in starting similar PLTL programs.

In addition to using PLTL, ESP-CS uses targeted recruiting to attract students from under-represented groups. Students who may otherwise be turned off by the stereotype of computer scientists as lone programmers can discover through PLTL that CS is a collaborative discipline and encompasses much

more than just coding. Initial studies have shown that students, particularly students from under-represented groups, are much more likely to be drawn to STEM subjects when the material focuses on teamwork rather than on working alone.

### ESP at Columbia University

On the heels of the successful “PLTL in CS Workshop” at Duke University in 2007, the CS Department at Columbia University funded an ESP pilot program in spring 2008 to encourage more women to pursue CS beyond the introductory level and into the major. At Columbia, the CS1 course (COMS1004) is a large, lecture-style class with 150 to 200 students. About 40% are women—a much higher proportion than the CS department where in 2008 only 16% of majors were women.

During the pilot program, Professor Adam Cannon, PhD students Christian Murphy and Kristen Parton, and peer leader Kim Manis worked closely to come up with engaging problems from a variety of CS disciplines, including natural language processing, information retrieval, and social networking. The pilot was very successful. In the exit survey, all six students said they would recommend ESP to a friend. One student wrote, “These workshops gave me a better perspective of what computer science is. I have learned that it is extremely useful and pertains to problems and issues that are in our daily lives.” (Note: student quotes are taken from anonymous surveys.)

Thanks to a generous seed grant from the National Center for Women & Information Technology (NCWIT) and Microsoft Research, we were able to expand ESP to two sections in fall 2008, and have continued to hone and expand the workshop content over the past two years. In total, 43 undergraduates have completed ESP as students, and 10 have been peer leaders and/or assistants. In fall 2009, in preparation for expanding to even more students, we had one co-ed section and one women-only section.

An important aspect of ESP at Columbia is networking—meeting other students who are interested in CS. This is particularly important because many advanced courses require working in groups, and networking is crucial for finding out about internships and other opportunities. To that end, ESP hosts an ice cream social each semester for all current and previous ESP students. “It was extremely rewarding to participate in something in which I not only found academic value but

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## Message from the CISE AD

### FY10 and FY11 Funding Opportunities for the Computing Community

By Jeannette M. Wing, Assistant Director of NSF for CISE

Good news: Funding opportunities for the CISE community are plentiful. We are in the middle of fiscal year 2010, and last month the President presented his fiscal year 2011 budget to Congress. Taken together, the Administration is acting on its priorities, as outlined in my November 2009 CRN column. Here is a sketch of the relevant NSF programs to be on the lookout for in the coming months:

*Climate Change, Energy, Environment*  
→ *Sustainability*

Starting with the foundation-wide FY10 Climate Research Initiative (CRI) and evolving into the FY11 Science, Engineering and Education for Sustainable Well-being (SEES), NSF is putting its mark on sustainability, broadly construed to include climate change, energy, and the environment.

For CRI, NSF just released a new program solicitation seeking new approaches in computational modeling to handle the scale and complexity of modeling the Earth at decadal and regional scales, capturing the interactions among land, air, water, and living systems. While peta-scale and exa-scale hardware will play a major role in climate modeling, revolutionary new approaches will rely on our expertise in new computational abstractions—algorithms, languages, software interfaces, architectures, environments and tools—for more modular and compositional system models, to exploit data-intensive, not just compute-intensive applications, to provide visualization tools to scientists, and to help policymakers make science-based decisions. So please consider submitting a CRI

proposal, especially in collaboration with other scientists.

Looking ahead to FY11 and the research challenges in computing that SEES will highlight, we as a community will be able to contribute through advances in energy-efficient and energy-intelligent computing, as well as through computing advances that support sustainability in other sectors. SEES will provide our community with an opportunity to understand from first principles energy requirements inherent in computation and communication, and to design and build energy-aware hardware and software systems. Advances in computing will enable more efficient, reliable, trustworthy energy delivery in the Smart Grid and will help reduce energy consumption in the Smart Home. Smart sensing systems have the potential to save energy and reduce greenhouse gas emissions. Intelligent decision-making can help optimize energy usage and can help a community make data-driven policies about its energy usage and effects on the local environment. Stay posted for more information on SEES in the summer or fall of 2010.

#### Education and Learning

In FY10, CISE will evolve its education and workforce programs into a more broadly scoped effort on education in computing. Leveraging our successes in CPATH at the undergraduate level and our successes in the BPC alliances, we will be extending our reach into the pipeline to include middle school and high school students and teachers—and simultaneously to widen it to include early on diverse populations, including women, underrepresented

minorities, persons with disabilities, and the economically disadvantaged.

This effort will allow us to put front and center our support for innovative projects like 10K x 10K and our endorsement of revising the CS Advanced Placement course(s) and exam(s). With this plan, we intend to send the strong message that computing is for everyone, regardless of one's eventual career, regardless of gender, race, ethnicity, income, and so on. Of course, by promoting education and learning in computing at earlier stages in the pipeline, we hope that a direct benefit to our community will be increased interest in computing as a field of study. We hope to release our new program solicitation in the summer of 2010.

Cyberlearning Transforming Education (CTE) is NSF's FY11 foundation-wide initiative on cyberlearning. It recognizes that despite the revolution computing technology has had in science and engineering and in all aspects of our lives, we have not yet fully exploited its potential in the ways we teach and students learn.

CTE will focus on three themes: 1) *Anytime Anywhere Learning*, redistributing learning throughout waking hours and throughout a lifetime, not bound to formal classroom settings or traditional modes of instruction; 2) *Personalized Learning*, tailoring the learning experience to an individual and supporting new forms of learning as a collaborative and social activity; and 3) *(Cyber)Learning About (Cyber) Learning*, to advance our knowledge about learning, especially with cyber tools, and to advance next-generation

cyber tools for learning based on new understandings about learning. More information on CTE will be available this summer or fall.

#### Computing Core Activities

For FY10 and FY11, CISE's core programs and activities look strong and healthy.

CISE will continue to lead NSF in the Cyber-enabled Discovery and Innovation program, aka "Computational Thinking for Science and Engineering." We will continue to work with MPS, ENG, and OCI on the Science and Engineering Beyond Moore's Law, with a spotlight on quantum information science. In partnership with ENG, we will continue to support Cyber-Physical Systems, and are working vigorously to engage other agencies and the private sector to join our effort. We are working more closely with OCI to promote cloud computing as a new platform for scientists and engineers, especially for data-intensive applications (see CISE Bytes for an exciting update on this front).

Along with SBE, we plan to continue our support for socially intelligent computing through our joint Social-Computational Systems program. Thanks to additional funding from the Comprehensive National Cybersecurity Initiative, CISE continues to provide sustained, robust support for our Trustworthy Computing program, with specific emphases on foundations of trustworthy computing, privacy, and usability. As always, please visit our website for a complete list of programs and funding opportunities.

Remember: We want your great ideas—*be bold, be creative, be visionary!* ■

#### Expanding the Pipeline from Page 2

also social and recreational value," said one ESP student.

#### ESP Topics

At Columbia, we chose to focus workshop content on algorithmic thinking, since students do a great deal of programming in COMS 1004. One student preferred not to program in ESP because it taught her that "much is done before programming begins" like "simply thinking about how to solve the problems." Another agreed that the "thinking aspect [of CS] can get forgotten, lost, trampled over or almost done away with when programming."

Since ESP is only open to a subset of students in COMS1004, we felt it was unfair to have the workshops tied directly to topics studied in COMS1004. Instead, we tried to demonstrate the breadth and variety of fields within CS. The ESP workshop topics we developed

include: designing algorithms, encoding and encryption, machine translation, human-computer interaction, social network analysis, and hard (NP-complete) problems.

As in many other universities, students at Columbia must complete a number of required foundation courses before they can take advanced courses. Unfortunately, this means that students may not get exposed to different areas of CS until their junior or senior years. If a student finds she is passionate about something early on, it can give her extra motivation to get through the requirements. As one student wrote, "[ESP] provided a bright future for some dark moments in class."

#### PLTL Benefits

Perhaps not surprisingly, there is strong evidence that students who participate in ESP earn better grades than other students in CS1. The ESP-CS evaluation from other

universities demonstrated that more than 80% of ESP students earned grades of B or better, compared to 68% for students who did not participate in the program; the results were even better when considering only the targeted groups, specifically women and under-represented ethnic minorities.

The students who benefit most from ESP tend to be the peer leaders. The program provides tremendous opportunities for them to gain leadership experience and to build confidence in themselves as computer scientists and educators. Of the five students who have been ESP peer leaders at Columbia, one is currently a software engineer at Microsoft, and two others have used ESP as a stepping stone to further involvement in CS, participating in CRA-W Distributed Research Experiences for Undergraduates programs at top-tier research schools.

#### Resources

Thinking about starting a PLTL program in your department? Websites [pltl.org](http://pltl.org) and [pltcs.org](http://pltcs.org) provide excellent material on PLTL in general as well as CS content.

**Kristen Parton and Christian Murphy** are PhD students in the Computer Science Department at Columbia University.

**Notes:** [1] Horwitz, S. and Rodger, S., Using Peer-Led Team Learning to Increase Participation and Success of Under-represented Groups in Introductory Computer Science. *Fortieth ACM Technical Symposium on Computer Science Education (SIGCSE 2009)*. ■

# US CS New Majors, Enrollment Both Continue Increase in 2008-2009

by Betsy Bizot

CRA's Taulbee Survey of Ph.D.-granting Computer Science (CS) and Computer Engineering departments in North America has been conducted annually since 1974. Results from the most recent survey will be provided to participants and CRA members in early March. They will be published on CRA's website ([www.cra.org/statistics/](http://www.cra.org/statistics/)) and in *Computing Research News* in May. Due to widespread interest, CRA releases data on undergraduate degrees early.

This article reports on CS bachelor's degree enrollments and production among Ph.D.-granting departments in the United States since the late 1990s. Data are reported in both total numbers and medians per department as the latter helps limit the effect of variation in response rates. Results from the Taulbee Survey should be compared with data produced by the National Science Foundation (NSF), which surveys all institutions that grant CS degrees (whereas Taulbee is a survey of the doctorate-granting departments only). NSF's most recent data are from academic year 2006/2007.<sup>1</sup>

According to HERI/UCLA, the percentage of incoming undergraduates among all degree-granting institutions who indicated they would major in CS declined by 70 percent between fall 2000 and 2005.<sup>2</sup> Unsurprisingly, the number of students who declared their major in CS among the Ph.D.-granting departments surveyed by CRA also fell. After five years of declines, the number of new CS majors in fall 2005 was half of what it was in fall 2000 (15,958 versus 7,952). From 2005 to 2007, the number of new majors was nearly flat. In 2008, the first increase in new majors since 2000 was reported; in 2009, the upward trend continued with 9,380 new majors reported.

The stabilization in the number of new majors over the past several years has in turn halted the decline in the total enrollment in CS. Enrollments declined steadily from their peak in 2001-02 through 2006-07, but 2007-08 saw an uptick and 2008-09 an additional increase. If the number of new majors continues to rise, enrollment will follow.

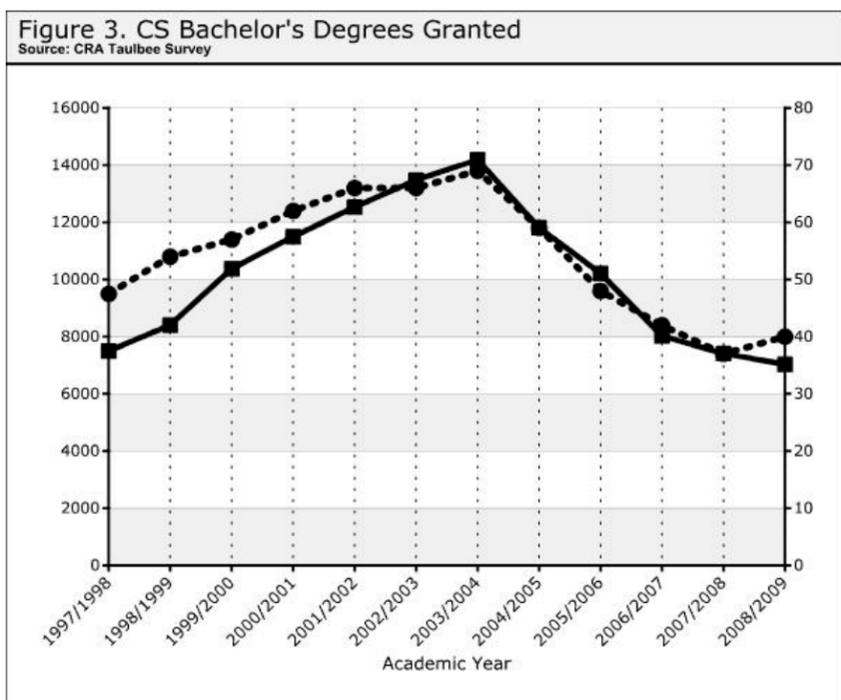
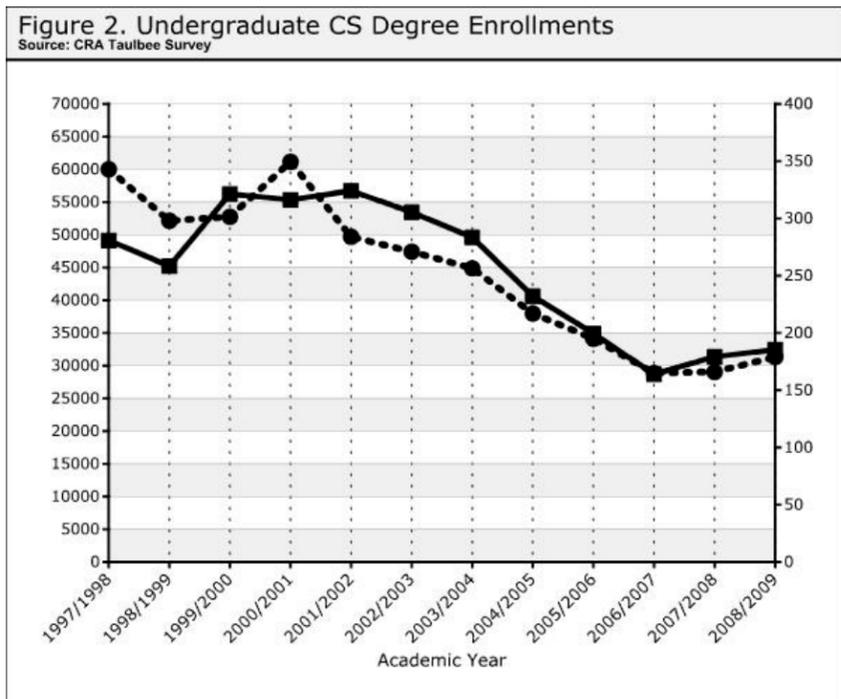
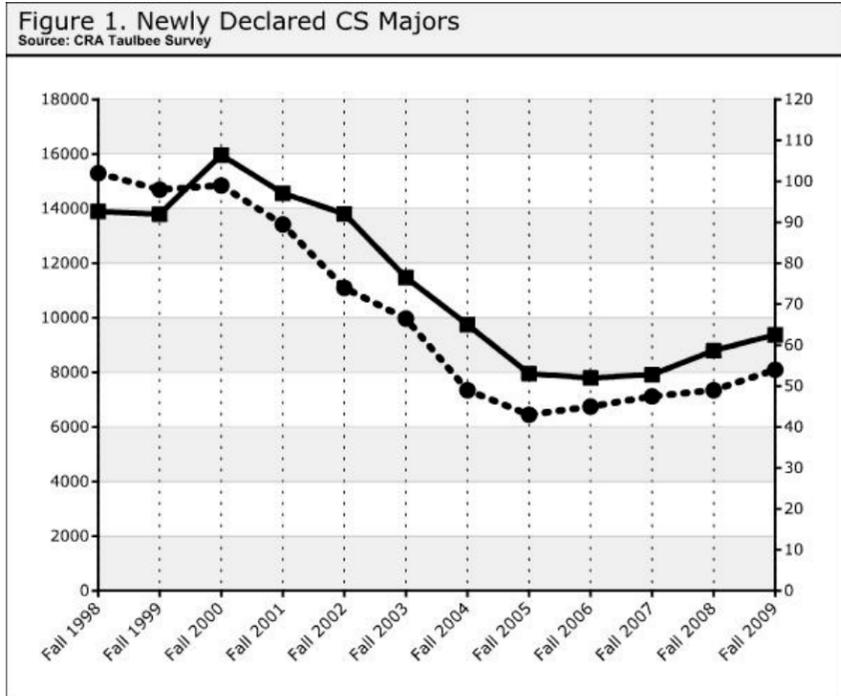
New majors take roughly three to five years to complete their degrees. We can expect, therefore, that the stabilization followed by an increase in new majors will take about that long to be seen in degree production. Not surprisingly, the number of degrees granted fell again in 2008-09 to 7,030, a decline of about 5% from 2007-08. This does, however, represent a gradual improvement after an 8% decline last year, preceded by several years of double-digit declines.

It is important to note that *fluctuations in degree production among CS departments have happened before*. According to NSF, between 1980 and 1986, undergraduate CS production nearly quadrupled to more than 42,000 degrees. This period was followed by a swift decline and leveling off during the 1990s, with several years in which the number of degrees granted hovered around 25,000. During the late 1990s, CS degree production again surged to more than 57,000 in 2004.<sup>3</sup> This more recent peak has also been followed by a decline and now a leveling off, and the current increase in new majors seems likely to be a leading indicator of future increases in degrees granted.

**Notes:**

- <sup>1</sup> See Appendix Table 2-1 at: <http://www.nsf.gov/statistics/seind10/>
- <sup>2</sup> HERI/UCLA's "CIRP Freshman Survey" is an annual survey of the characteristics of students attending colleges and universities as first-time, full-time freshmen: [www.gseis.ucla.edu/heri/cirpoverview.php](http://www.gseis.ucla.edu/heri/cirpoverview.php).
- <sup>3</sup> See: <http://archive.cra.org/info/education/us/bs.html>

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**Grace Hopper Celebration of Women in Computing**  
**"Collaborating Across Boundaries"**  
 Atlanta, Georgia  
 September 28 - October 2, 2010  
 Call for Participation Closes March 16, 2010  
 Online Scholarship Application Opens March 8  
 Registration Opens June 1, 2010  
<http://gracehopper.org/2010/>

# Computing Invisibility

By Dan Reed

Computer science, computer engineering, information technology, informatics, computing and a host of other terms: we have used them all to denote this wonderfully fascinating and diverse thing we do. We have debated connotation and denotation as we seek a clear and compelling exegesis of our field. In so doing, I suspect we have occasionally lost sight of one key aspect, namely the importance of invisibility. What follows is a serious but whimsical look at invisibility's power.

## Technological Innovation

If you have read any comic books or watched movies based on them, you know that each superhero has a backstory, a set of superpowers and a stylized routine. As our technologies have evolved, so too have expectations for our fantasy superheroes and their behaviors. After all, technology evolution affects your favorite superhero just as it does you, albeit with slight twists.

In a world of observation satellites, global positioning systems and MEMS-based sensors, it is extraordinarily difficult to maintain a secret hideout. Speech recognition and computer vision systems, along with deep data mining and machine learning, now compromise secret identities. One cannot even step into a nearby telephone booth for a superhero costume change.

Not only did the now ubiquitous cellular telephone render the pay telephone obsolete, it changed everyone's expectations for mobile accessibility. As an early adopter, I once drew a surprised and envious airport crowd when I opened my cell phone to rebook a flight after a cancellation. In years past, all of us would have sought a customer service agent or a pay phone to call the airline. Today, we expect wireless communication access almost anywhere the world. Such is the nature of exponential technological change and its cultural impact.

## Invisible Technologies

In any enumeration of fantasy superpowers, flight, invulnerability and superstrength rank high, along with invisibility. Like superheroes, successful technologies also become invisible. As technologies mature, market penetration rises, cultural expectations shift, and consumer knowledge of the underlying theory and practice generally decline.

No longer need one understand Maxwell's equations, the propagation properties of the Heaviside layer or superheterodyne receiver design to listen to the radio. Nor does one need a deep knowledge of thermodynamics, catalysis theory or electronic fuel injection to drive a car. (A wag might suggest that such a requirement would reduce traffic accidents by severely limiting the number of licensed driv-

ers. A technology realist would look forward to the commercial advent of autonomous navigation systems.)

Today, most computer users know nothing of the halting problem, superscalar pipeline design or object oriented programming. This is success, for it allows all but the technology experts to focus on the *raison d'être* for computing or any other technology—enabling and expanding the human experience, often in new and unexpected ways.

In that spirit, I humbly suggest that the word computing is often an intellectual blinder that limits our imagination of the possible. Ask anyone how many computers they own, and the instinctive answer is probably a small, positive integer. In truth, most of us own hundreds, if not thousands, of invisible computers. They are simply embedded in everyday devices—electronic thermostats, home appliances, portable music players, hearing aids and pacemakers, and even running shoes. You probably drive a mobile computing platform to work each day, replete with computer-controlled engine and antilock brakes, climate controls and communication system. Invisible computing makes these devices more flexible and adaptive.

## Empowering Experiences

Although our worldwide deployment of computing remains sadly and unequally distributed, we have crossed

a critical capacity threshold from paucity to plethora. Such a plethora of inexpensive and powerful computing devices, high-capacity storage systems, and ubiquitous wired and wireless communication brings new opportunities. Fully capitalizing on those opportunities likely requires a shift in psychological mindset, particularly for those of us who entered the field when cycles, bytes and bits were to be managed frugally.

It is time to free our imaginations and embrace computing invisibility as our technological superpower. We can be truly profligate and use invisible computing to enrich the human experience and empower creativity in new and novel ways, exploring the rich interplay of technological possibilities with social expectations and desires. Concomitantly, as computing becomes the critical infrastructure of the 21st century, we must also be aware of both the risks and the rewards. As one superhero famously remarked, "With great power comes great responsibility."

**Dan Reed**, former CRA Board Chair, is Microsoft's Corporate Vice President for Technology Policy and Strategy and Extreme Computing. Contact him at [Daniel.Reed@microsoft.com](mailto:Daniel.Reed@microsoft.com) or his blog at [www.hpcdan.org](http://www.hpcdan.org) ■

## NSF to Sponsor "Broader Impacts" Workshop

When asked to provide "the broader impacts resulting from the proposed activities" on a grant proposal, how do you respond? On June 21-23, NSF will host a workshop that will provide the tools to address this question.

The Broader Impacts for Research and Discovery Summit (BIRDS) is about putting the broader impacts in the forefront of our research efforts. The workshop will present examples of broad impacts from ongoing and recent projects, and provide opportunities for researchers to explore and expand on these criteria.

Participation will be by invitation, by application, and by webcast. It is expected to produce presentations of the exemplar projects and their impacts, and guidelines for the impact criteria, in several media, including text and video.

NSF's grant proposal guide indicates that the grant proposal project description "must describe as an integral part of the narrative, the broader impacts resulting from the proposed activities, addressing one or more of the following as appropriate for the project:

1. How the project will integrate research and education by advancing discovery and under-

standing while at the same time promoting teaching, training, and learning;

2. Ways in which the proposed activity will broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.);
3. How the project will enhance the infrastructure for research and/or education, such as facilities, instrumentation, networks, and partnerships;
4. How the results of the project will be disseminated broadly to enhance scientific and technological understanding; and
5. Potential benefits of the proposed activity to society at large."

The BIRDS Steering Committee includes: Tracy Camp, Colorado School of Mines, BIRDS Chair; Juan Gilbert, Clemson University, BIRDS Co-Chair; Judy Goldsmith, University of Kentucky; Kera Johnson, Albert Einstein Distinguished Educator Fellow, NSF; Samir Khuller, University of Maryland; and Camsie Matis, Albert Einstein Distinguished Educator Fellow, NSF.

A Call for Participation will be posted soon under events at: <http://www.bpcportal.org>. ■

### Advance Announcement: CAPP Advanced Career Mentoring Workshop

CRA-W is pleased to announce the 2010 CAPP Professional Development workshop, which will be held June 25-26 in Providence, Rhode Island. The goal of the workshop is to increase the percentage of Computer Science and Engineering women faculty members and researchers who reach the top of their respective career tracks: faculty members, by being promoted to full professor; and researchers in industrial or governmental labs, by being promoted to the top of their institution's technical ladder or by entering research management.

As with previous years, the cornerstone of the CAPP workshop will be the involvement of senior women, appointed as CRA-W Distinguished Professors or Researchers, who will actively participate in the program as role models, mentors, and advisers to the cohort. The project will build a community of associate professors and senior labs researchers, providing them with mentoring, leadership training, encouragement, and ongoing peer-support activities. The highly interactive workshop will include a Professional Development Workshop, a series of smaller meetings in conjunction with technical conferences/seminars, and ongoing electronically based support activities.

Application and travel support information will be available before April 15 at the CRA-W CAPP website: <http://www.cra-w.org/>

Science, Computing Research Fare Well in Obama FY11 Budget from Page 1

FY 2011 includes a focus on energy technologies, understanding and mitigating climate change, and promoting green jobs. Under the President's plan, CISE would participate in two foundation-wide programs that meet this focus:

**1. Science, Engineering, and Education for Sustainability (SEES)**—A \$765.5 million program aimed at integrating NSF's work in climate and energy science to generate the discoveries and tools needed to "inform societal actions that lead to environmental and economic sustainability."

CISE's \$29.3 million role in the program would focus on work with direct impact, like energy-intelligent computing; indirectly, with advances in computing to reduce energy consumption in other sectors (e.g., Smart Grid, Smart Home, Smart Transportation); and foundational, understanding how energy contributes to algorithmic complexity and system performance (i.e., can we develop more energy-efficient algorithms?).

**2. Cyberlearning for Transforming Education (CTE)**—CISE's \$15 million share of this \$41 million program would be used to fund research about

"Anytime, Anywhere Learning," "Personalized Learning," and understanding all four permutations of: "(Cyber) Learning about (Cyber) Learning." A goal is to develop fundamental knowledge about learning to inform new cyber tools and techniques.

In addition to these two new areas, CISE would continue its participation in two other foundation-wide efforts. Cyber-enabled Discovery and Innovation (CDI) would receive \$105.5 million in the agency's plan, of which \$50 million would be shared by CISE. CDI is the agency's "Computational Thinking for Science and Engineering" program.

The other foundation-wide priority with CISE participation is the Science and Engineering Beyond Moore's Law program, a \$70.2 million program aimed at figuring out where we go when current silicon technologies reach the limits of Moore's law. CISE would contribute \$15 million to the effort, funding research on new computing technologies (including quantum information science), approaches, and models.

Other highlights include a \$70 million increase to the directorate's Trusted Computing efforts, continued work with the Engineering

directorate on the Cyber Physical Systems program, significant increases in the CAREER program (7.1 percent increase to \$54.6 million in FY 2011), and a Graduate Research Fellowships (GRF) program that has grown to \$2.55 million in FY 2011. Wing strongly encouraged more GRF proposals from the computing community.

One program not fully addressed in the budget documentation is the status of the Broadening Participation in Computing (BPC) program within CISE. As part of the FY 2011 budget, NSF announced a new "Comprehensive Broadening Participation of Undergraduates in STEM," a \$100.3 million effort to "realign and build on existing programs and activities" and break down "programmatically stovepipes." It is unclear how BPC fits into the new foundation-wide effort, if at all, and at press time Wing would only say that it was under discussion.

The NSF's Office of Cyberinfrastructure would also see an increase in FY 2011 under the President's plan. The agency requested \$228 million for FY11, an increase of \$13.8 million, or 6.4 percent over FY 2010.

Overall, the agency would increase IT research and development funding throughout the agency by 7 percent next year. The agency's

total contribution to the federal Networking and Information Technology Research and Development (NITRD) program would rise to \$1.17 billion in FY 11, an increase of \$79.6 million from FY 10.

Computing flourishes in the President's request, according to Wing, because computing inherently speaks about innovation (which means jobs), and because "all the Administration's priorities are well addressed by our technologies."

Computing also fares well at the Department of Energy. Overall, the Office of Science, the home of the majority of the agency's basic research and computing research efforts, would receive a 4 percent increase over FY 2010, bringing the research budget to \$5.1 billion. Within the Office of Science, the Advanced Scientific Computing Research program would receive an 8.1 percent increase in FY 2011, to a total of \$426 million. Basic energy science would see an increase of 12 percent, for a total of \$1.8 billion in FY 2011.

For a complete breakdown of computing research in agency budgets, as always, check CRA's Computing Research Policy Blog at <http://cra.org/blog>. ■

**NSF Directorate-by-Directorate FY 2011 Funding Request (in millions)**

NSF Directorates	FY10 Est	FY11 Req	\$ change	% change
Biology	\$714.5	\$767.8	\$53.2	7.5%
Computer and Information Science and Engineering	\$618.8	\$684.5	\$65.7	10.6%
Engineering (-SBIR/STTR)	\$618.2	\$682.8	\$64.7	10.5%
Geosciences	\$889.6	\$955.3	\$65.7	7.4%
Mathematics and Physical Science	\$1,351.8	\$1,409.9	\$58.1	4.3%
Social, Behavioral and Economic	\$255.3	\$268.8	\$13.5	5.3%

NSF FY 2011 Funding Request, by Directorate. Engineering does not include funding requested for the agency's contribution to the Small Business Innovation Research or Small Business Technology Transfer Research programs.

**NAE Announces New Members**

The National Academy of Engineering announced the Members of the Class of 2010 on February 17. Congratulations to all!

New members in CS&E include:

- Andrei Broder*, Yahoo!
- Irene Greif*, IBM
- Bill Gropp*, UIUC
- Laura Haas*, IBM
- Mike Jordan*, UC Berkeley
- Brewster Kahle*, Internet Archive
- Tom Mitchell*, CMU
- Larry Peterson*, Princeton
- Ben Shneiderman*, University of Maryland
- Mark Wegman*, IBM
- N.R. Narayana Murthy*, Infosys (Foreign Associate)

Details: <http://www.nae.edu>

## CCC Update from Page 1

Each of these three activities has the same key characteristic—none was on the horizon even a few months before it showed up. Reacting quickly takes an existing infrastructure, and CRA is providing that infrastructure through CCC.

But it's not all about reacting, it's also about creating. CCC has engaged in two main creative thrusts. The first is supporting research communities in asking "What questions shape our intellectual future? What are the key questions in your research domain and how should researchers go about answering them? To date, CCC has supported 11 visioning activities. Some are just under way; others have progressed beyond developing

blueprints for a research future and are, with CCC support, actively seeking funding to enable that future. All are covered at <http://www.cra.org/ccc/activities.php>, along with the call for you to develop new visioning activities <http://www.cra.org/ccc/vision.php>.

To build support for additional research funding, it is imperative that we engage funders and staffers in our visions. "Computing Research That Changed the World" was designed to do just that. This one-day symposium, held in the Members Room of the Library of Congress, featured 13 talks by research leaders in key areas of computing research, research that impacts the lives of

people everywhere. And each talk highlights the enormous possibilities as we continue to explore these areas. The talks were videoed and are available on YouTube and (in higher quality) on the website <http://www.cra.org/ccc/locsymposium.php>, along with summaries of each talk. Permission is given to freely make use of each talk (for non-commercial purposes) so they are good to go in the classroom, for recruiting, for explaining to family and friends exactly what it is you do, for ...

As CCC begins its third year of activity, we wish to thank those who have served on the governing Council and who have now rotated off: Greg Andrews, Dick Karp, Peter

Lee, Andrew McCallum, Karen Sutherland, David Tennenhouse and Dave Waltz. And we welcome those who joined the Council in January: Randy Bryant, Lance Fortnow, Hank Korth, Eric Horvitz, and Margo Seltzer. These folks are working to create futures from which all computing researchers will benefit! ■

## CISE Bytes

By Jeannette M. Wing, Assistant Director of NSF for CISE

### Personnel Updates

CISE is pleased to announce the appointment of Dr. Suzi Iacono as Deputy Division Director for IIS and Dr. Anita LaSalle as Acting Deputy Division Director for CCF. We rely on our Deputy Division Directors for the smooth scientific operation of our Divisions, and are grateful to Suzi and Anita for taking on these new roles. Suzi also continues to serve CISE as Senior Science Advisor.

We welcome Dr. Carl Landwehr as a Program Director for the Trustworthy Computing Program. Carl's academic affiliation is with the University of Maryland. He brings a wealth of experience in cybersecurity research and program management to CISE.

We also said "goodbye" to two program directors in CCF: Dr. Lenore Mullin, who oversaw numerical and symbolic computing in the Algorithmic Foundations Program, and Dr. Tatsuya Suda,

who oversaw biological-inspired computing in the Software and Hardware Foundations Program and helped bridge ties to the Biological Sciences Directorate.

The big news, of course, is that Dr. Arden Bement, Director of NSF, will be stepping down on June 1 to return to Purdue University to head its new Global Policy Research Institute. Dr. Bement built up an energetic team of ADs and ODs who work extremely well together and he will be sorely missed.

### Cloud Computing

On February 4, 2010, Microsoft and NSF jointly announced that NSF will provide funding to academic researchers to access for free Microsoft's Windows Azure platform. This platform provides a very different programming model to the user than the open source Hadoop ("MapReduce") model. A Windows Azure program consists

of one or more "Web roles," which are standard web service processes, and "worker roles," which are computational and data management processes; roles communicate via message passing. Azure provides five different kinds of data storage, including support for blobs (binary large objects), tables, and queues. We invite the community to check it out! The Microsoft platform complements the cloud computing infrastructure CISE has provided for the community since spring 2008, starting with the Google+IBM cluster

and later the HP+Intel+Yahoo cluster housed at the University of Illinois, Urbana-Champaign. Please see the CISE website for the press release on the Microsoft and NSF partnership, an FAQ on the Windows Azure resources provided to the NSF community, and details on how to get NSF funding to do research on this platform.

## Computing Research News

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### Computing Research News

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**Change of Address:** Note that a change of address must include the old and new addresses with ZIP+4. Please include a street address or PO Box number.

**Postmaster:** Send address changes to: CRA, 1100 17th Street, NW, Suite 507, Washington, DC 20036-4632. Postage paid at Washington, DC.

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## Collaborative Research Experiences for Undergraduates (CREU)

Application Deadline: May 1, 2010

Sponsored by CRA's Committee on the Status of Women in Computing Research (CRA-W) and the Coalition to Diversify Computing (CDC), the CREU program is aimed toward increasing the number of women and underrepresented minorities who go on to CS&E graduate programs.

Students have the opportunity to conduct undergraduate research with a small team (two to four students) at their home institution during the academic year and optionally the following summer. Formerly administered as two separate programs—CREU and MRO-W—the program includes not only computer science and engineering research, but also collaborative, multidisciplinary research creating and using cyber-infrastructure.

Each student from an underrepresented group receives a \$3,000 stipend for work in the academic year and \$4,000 for the optional summer extension. Each team can also request an extra \$1,500 to be used for supporting materials and activities.

See: <http://www.cra-w.org/creu>

## Professional Opportunities

### CRN Advertising Policy

See <http://www.cra.org/main/cra.jobshow.html>

#### Columbia University

Computer Science Department  
*Research Associate in Computer Graphics and Software Development*

For full description and to apply, visit:  
<https://academicjobs.columbia.edu>

Job Title: Staff Associate, Computer Science Department, Posting ID: 0001056

EEO Statement: Columbia University is an Equal Opportunity/Affirmative Action employer.

NCAA Statement As a member of the National Collegiate Athletic Association (NCAA) and the Council of Ivy Group Presidents (Ivy League), it is imperative that members of the Columbia University community, in all matters related to the intercollegiate athletics program, exhibit the highest professional standards and ethical behavior with regard to adherence to NCAA, Conference, University, and Department of Intercollegiate Athletics and Physical Education rules and regulations.

#### Emory University - Atlanta, Georgia

Department of Mathematics and Computer Science  
*Lecturer in Computer Science*

The Department of Mathematics and Computer Science of Emory University invites applications for a non-tenure-track position in Computer Science at the rank of Lecturer, beginning Fall 2010.

Responsibilities include teaching primarily undergraduate courses in Computer Science as well as department service activities such as curriculum development and major advising. In addition, Lecturers are expected to contribute to the life of the college through faculty committees and other forms of academic service.

Candidates should have a PhD in Computer Science and must demonstrate potential for excellence in teaching. Initial appointment will be for a period of three years with further renewals and promotions within the lecturer-track possible. Emory policies concerning lecture-track faculty can be found at Appointment and review of Lecturers and Senior Lecturers (<http://college.emory.edu/about/faculty/lecturers.html>).

Women and underrepresented minorities are especially encouraged to apply. Applications consisting of a cover letter, CV, a statement of career goals and teaching philosophy, evidence of teaching excellence, and three letters of recommendation directly from recommenders should be submitted via [Mathjobs.org](http://mathjobs.org). Informal inquiries are also invited by email ([cs@mathcs.emory.edu](mailto:cs@mathcs.emory.edu)). Screening begins February 26, 2010 and will continue until the position is filled.

Emory University is an Affirmative Action/Equal Opportunity Employer and welcomes applications from women and members of minority groups.

#### FX Palo Alto Laboratory, Inc.

*Research Scientist*  
 FX Palo Alto Laboratory, Inc. (FXPAL) provides multimedia and collaboration technology research for Fuji Xerox Co., Ltd., a joint venture between Xerox

Corporation of America and FujiFilm of Japan.

We have an immediate opening for a Research Scientist eager to embrace new challenges in cloud computing and distributed applications. Applications include social networks, large scale data mining, document management, media processing, 3D mixed reality worlds, and distributed collaboration. The preferred applicants will have extensive experience with scalable internet systems, database management systems, distributed programming tools, or computer networks.

Candidates should be interested in working on practical applications in a collaborative setting and be able to perform leading edge original research. This position requires a Ph.D. in Computer Science or related field, strong programming skills, and an excellent publication record.

For more information about FXPAL, please visit our website at [www.fxpal.com](http://www.fxpal.com).

To apply send resume to [fxpalresumes@fxpal.com](mailto:fxpalresumes@fxpal.com). Please reference job code CRN-5

#### George Mason University

Department of Computer Science  
*Non-Tenure Track Instructional Faculty Position*

The Department of Computer Science in the Volgenau School of IT & Engineering at the Fairfax, VA campus of George Mason University invites applications for a non-tenure track instructional faculty position at the rank of Assistant Professor beginning Fall 2010.

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, research and/or industrial experience in information security and assurance, and a commitment to high quality teaching.

The department has over 40 faculty members with wide-ranging research interests. Security research at George Mason is conducted in access control methods and models, authentication, network security, intrusion detection and prevention, database security, operating systems security, vulnerability analysis, malware analysis and defense, anonymity and privacy, security theory, and security policy. For more information on the department, visit our web site: <http://cs.gmu.edu/>.

For full consideration please submit application and application materials on-line at <http://jobs.gmu.edu> (position number F93352). 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 continue until the position is filled.

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



#### CUNY Cyberinfrastructure Initiative

#### Open Rank, Tenure-track Faculty Position

#### High Performance Computing and Bioinformatics

Hunter College of the City University of New York seeks candidates for a tenure-track faculty position with expertise in the development, adaptation and implementation of HPC algorithms applied to such data-intensive biological areas as (but not limited to) next-generation sequencing, biomedical ontologies, and systems biology.

The successful candidate will be appointed to the doctoral faculty at the CUNY Graduate Center and will participate actively in Hunter's NIH-funded Quantitative Biology (QuBi) Project.

The anticipated start date is Fall 2010. The appointment will be made in the Department of Computer Science or the Department of Biological Sciences depending on qualifications. Preference will be given to mid-career candidates, but exceptional junior candidates will also be considered. Evaluation is ongoing and will continue until the position is filled.

Hunter's computing and biomedical research community, is supported by extensive funding from NIH and NSF. Hunter College is strategically located in Manhattan near other major biomedical research centers and universities and attracts an engaging and diverse student body.

For information on how to apply, visit:

<http://www.hunter.cuny.edu/qubi/>

Questions may be emailed to:

[bioinformatics@hunter.cuny.edu](mailto:bioinformatics@hunter.cuny.edu)

#### Helsinki Institute for Information Technology HIIT

Aalto University, Department of Information and Computer Science  
*Postdoctoral and Senior Researcher Positions in Computing Research*

Helsinki Institute for Information Technology HIIT and the Aalto University Department of Information and Computer Science in Helsinki, Finland, are inviting applications for postdoctoral and senior researcher positions in several areas of computing research including: machine learning and data analysis; computational methods for networks, interaction and economics; large constraint models; nanoscale self-assembly; enhancement of internet infrastructure; human-centric ubiquitous IT.

The closing date for applications is 15 March 2010. The positions will be filled for three years maximum starting at the earliest 1 August 2010.

Further details of the posts and the application procedure are available at: <http://www.hiit.fi/jobs> (3 positions) <http://ics.tkk.fi/en/vacancies/> (4 positions)

#### Kyungwon University

Department of Software Design and Management  
*Faculty Positions*

The Department of Software Design and Management at Kyungwon University

in South Korea invites applications for a tenure-track position at the assistant professor or associate professor level.

Kyungwon University is located at Seongnam near Seoul. Further information about the university can be obtained at <http://www.kyungwon.ac.kr/> english.

The Department of Software Design and Management is a new department within the IT College. It is to launch in March 2010. It aims to become one of the world's top institutes for undergraduate software education. Dr. Won Kim, a world-renown pioneer in object-oriented and object-relational database technology, has joined Kyungwon University as IT Vice President and a lifetime professor to create, launch and grow the Department.

The Department seeks qualified candidates in one or more of the following areas:

- software engineering and architecture
- intelligent multimedia processing
- computer networking and communication

Applicant should have a strong passion for teaching, a Ph.D. degree in computer science from a reputable U.S. university, experience in teaching undergraduate computer science courses, and strong publication records.

How to Apply: Send a resume and cover letter, along with three letters of reference to [affairs@kyungwon.ac.kr](mailto:affairs@kyungwon.ac.kr).

## Professional Opportunities

### Montclair State University Computer Science Department Chair, Computer Science Department

Position Announcement is subject to available funding.

The Department of Computer Science invites applications for the tenure track Department chair position. The Department's 14 faculty members support the BS in Computer Science with an ABET CAC accredited track, the BS in Information Technology, the BS/MS and MS in Computer Science. The chair is expected to provide visionary and transformative collegiate leadership in research/funding, teaching/learning, and curriculum development, e.g., continued progress in development of a new PhD in Computational Science. This forward looking leadership includes implementing and modifying the Department Strategic Plan and working with academic standards and procedures of accrediting agencies such as ABET. The Department expects the new chair, while on a reduced teaching load, to contribute to teaching of undergraduate and graduate courses.

The position requires a Ph.D. in Computer Science or a related field. Candidates must have administrative experience such as that of a department chair, coordinator of a major program or director of personnel working in computer science and an established record of scholarship and teaching allowing appointment as an Associate or Full Professor. We expect familiarity with curriculum development, practice in accreditation or assessment, and demonstrated ability to mentor junior faculty. All faculty members are expected to have an ongoing research program,

to actively foster student learning, to be involved in professional activities, and to develop external funding support for their scholarship.

Salary Range: Salary and rank is dependent upon qualifications.

Starting Date: September 1, 2010

Send Letter and Resume:

Send hard copy that includes C.V., at least three professional references, a statement of research interests, teaching philosophy, and professional goals to:

Search Committee V-F35

Department of Computer Science

Montclair State University

Montclair, NJ 07043

Apply By: Screening begins immediately and continues until the position is filled.

Montclair State University is New Jersey's second largest and fastest growing university offering a rich array of programs to approximately 16,000 undergraduate and post-baccalaureate students. Montclair State offers the advantages of a large university – a comprehensive undergraduate curriculum with a global focus, a broad variety of superior graduate programs through the doctoral level, and a diverse faculty and student body – combined with a small college's attention to students. Characterized by a distinguished cadre of teacher-scholars, and a deep commitment to the values of multicultural diversity, Montclair State University is located 14 miles west of New York City on a beautiful 200-acre suburban campus.

Additional information can be found on the MSU website at:  
<http://www.montclair.edu>

### National University of Singapore Tenure-Track Positions

Applications are invited for tenure-track positions at the Assistant/Associate/Full Professor level. We are seeking outstanding candidates who are looking for new opportunities to advance their careers in the following areas:

- Computer Security
- Computer Graphics
- Games & Entertainment Technologies
- Computer Systems
- Networking
- Algorithms

NUS is a highly ranked research university with low teaching loads, excellent facilities, and intensive international collaboration. The Singapore government has recently earmarked over S\$500 million for research and industrial projects focused on Digital Media and related areas. Significant funding opportunities abound for strong candidates. The School of Computing consists of active and talented faculty members working in a variety of areas, and attracts the best students (both undergraduate and graduate) in the region.

NUS offers highly competitive salaries, as well as generous benefits for housing and education. Singapore offers a vibrant international environment with low-taxes.

Review of applications will be immediate and will continue until June 30, 2010. Interested candidates are requested to send the following materials to [csrec@comp.nus.edu.sg](mailto:csrec@comp.nus.edu.sg):

- Curriculum Vitae
- Research Statement
- Names of at least five references

### NEC Laboratories America, Inc. Research Staff Member – Large-Scale 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. We strongly believe 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 system modeling and analysis. The candidate must have a PhD in CS/CE with strong publication records in related areas. He/she is expected to develop advanced system management solutions by utilizing the mathematical skills, especially in data mining and machine learning, as well as the knowledge about system architecture and design. Specifically the candidate

will analyze the vast amount of system measurement data to model and infer the system operational behavior. The qualified person must have research experiences that cover the following topics:

- Distributed systems and data center
- Statistical data mining, optimization, and information theory
- Virtualization and resource provisioning
- Performance, reliability, dependability and security
- Autonomic computing

For consideration, please forward your resume and a research statement to [recruit@nec-labs.com](mailto:recruit@nec-labs.com) and reference "ASDS-RSM" in the subject line.

EOE/AA/MFDV

### Palo Alto Research Center (PARC)

#### Intelligent Systems Laboratory Manager, Knowledge, Language and Interaction Area

The Intelligent Systems Laboratory at PARC is looking for a dynamic and experienced research manager to lead a group doing pioneering research in support of the development of intelligent assistants for enterprise and consumer applications. These intelligent assistants provide decision support through summarization and visualization, question answering and intelligent prediction.

Responsibilities include research vision and leadership, contract acquisition and relationship management, and group, project and team management. Substantial relevant experience is required. For more information see <http://www.parc.com/about/careers/>.

The Intelligent Systems Lab does scientific research and develops and delivers core technologies that help people perceive, reason, and interact in a complex world. A subsidiary of Xerox, PARC is supported by contracts with corporate clients and government agencies, as well as through licensing. PARC provides both opportunities and support for bringing visionary ideas to commercial realization.

PARC is an Equal Employment Opportunity company committed to workforce diversity, provides excellent benefits, and offers flexible working arrangements for employees.

How to apply: Please send a CV, cover letter, and research statement via <http://www.parc.com/about/careers/>.

### Portland State University Computer Science Department Faculty Position

The Computer Science Department at Portland State University invites applications for a junior tenure-track faculty position to begin Fall 2010. Specific areas of computer science under consideration include: artificial intelligence and machine learning; multi-core architectures and parallel programming; visualization and graphics; security and cryptography. Exceptional applicants in other areas or at other ranks will also be considered.

The department currently has twenty-five tenure-track faculty, including four NSF CAREER Award winners and two ACM Fellows. The department offers an ABET accredited B.S., an M.S., and

Professional Opportunities  
Continued on Page 10



INDIANA UNIVERSITY  
PERVASIVE TECHNOLOGY INSTITUTE

## POSTDOCTORAL FELLOWS

The Digital Science Center of the Pervasive Technology Institute (PTI) at Indiana University invites applications for Postdoctoral Fellowship positions in Multicore, Cloud Computing, and Grid-related technologies.

For Cloud and Grid applicants, experience researching Web Services, REST services, scientific workflows, and distributed Web applications on Unix/Linux/Mac OS X and/or Windows is required. Important experience includes applications on Grids using software such as Globus or Condor; Cloud applications using Amazon Web Services, Microsoft Azure, Google AppEngine, and related systems; data-parallel scientific, machine learning, and/or information retrieval algorithms using systems such as Apache Hadoop and Microsoft Dryad.

For Multicore applicants, demonstrated knowledge of state-of-the-art threading software and its performance is required.

The ideal candidate will be comfortable working in a team setting, have strong leadership skills and an excellent publication record. Applicants must have demonstrated (through peer-reviewed publications and software products) a primary research focus on one or more of Multicore, Cloud Computing, and Grid systems.

The initial appointment will be for two years with potential for renewal for an additional year. Applications are accepted on a continuing basis until the positions are filled.

Indiana University's Pervasive Technology Institute (<http://www.pervasive technology labs.iu.edu/>) has just won a five year extension to its core funding from the Lilly Endowment, following a highly successful initial seven years (as the Pervasive Technologies Laboratories, or PTI). To date, the PTI laboratories have published more than 880 peer-reviewed papers, have won over \$180,000,000 in grants over and above their core funding, and have released and maintained numerous open source software packages. PTI researchers work closely with Indiana University's Research Technology group (<http://racinfo.indiana.edu/cyberinfrastructure/>), who maintain IU's world class cyber infrastructure (PTI leads a major new NSF funded project FutureGrid developing a testbed linked to TeraGrid for innovative new approaches for large scale scientific computing (<http://uitspress.iu.edu/news/page/normal/11841.html>))

PTI is located in the new Indiana University Innovation Center, the anchor for the campus' new technology corridor. Bloomington is identified as one of the most cultural and livable small cities in the U.S. and only one hour from the Indianapolis airport.

Send curriculum vita and contact information for three references to: **Gary Miksik, Pervasive Technology Institute, 2719 E. 10th St., Bloomington, IN. 47408, Phone: 812-856-0484; e-mail: [gmiksik@indiana.edu](mailto:gmiksik@indiana.edu).**

*Indiana University is an equal opportunity/affirmative action employer.  
Women and minorities are encouraged to apply.*

## Professional Opportunities



### Department of Computer and Information Sciences Temple University

#### Tenure Track Faculty

Applications are invited for a tenure-track, open rank, faculty position in the Department of Computer and Information Sciences at Temple University.

Areas of interest include, but are not limited to

- Computer Systems,
- Wired and Wireless Networks, and
- Trustworthy and Reliable Computing.

For senior rank candidates, applications should include curriculum vitae, a statement of recent achievements, and research, and teaching goals, up to three representative publications, and names and addresses of at least three references. Junior candidates should have three reference letters sent directly. Please submit applications online at <http://academicjobsonline.org>. For further information check <http://www.cis.temple.edu>. Review of candidates will begin on February 1, 2010 and will continue until the position is filled. Temple University is an equal opportunity, equal access, affirmative action employer.

a Ph.D. in Computer Science. Our teaching loads give faculty time to maintain funded research programs and to collaborate with local industry. The department currently serves approximately 400 undergraduates and 120 graduate students. Further information about the department is available at <http://www.cs.pdx.edu>.

Portland State University is located in downtown Portland, Oregon. Portland's "Silicon Forest" is one of the major software/hardware development centers in the country. The Portland metropolitan area has over 200 hardware and software organizations, including Intel, the Open Source Development Lab, Tektronix, InFocus, Mentor Graphics, IBM and many software start-ups. The University is approximately one hour from magnificent beaches and year-round outdoor activities. Portland has been ranked highly for quality of life, including the #1 greenest city, the #1 cleanest city, and the #1 cycling city. Applicants are expected to hold or be near completion of a Ph.D. degree in Computer Science or a closely related field. All applicants are expected to show great potential for future external research support and a demonstrated record of research excellence.

The faculty member will maintain scholarly activity in funded research and publications; teach undergraduate and graduate classes; provide professionally related public service; advise students, and support University activities through committee service.

For more information and application procedure, please visit <http://cs.pdx.edu>. For inquiries about this position, please contact [cssearch@cs.pdx.edu](mailto:cssearch@cs.pdx.edu). Review of applications will begin immediately and will continue until finalists are identified.

Portland State University is an Affirmative Action, Equal Opportunity Institution and welcomes applications from diverse candidates and candidates who support diversity.

#### Purdue University The Cyber Center Managing Director

The Cyber Center at Purdue (<http://www.purdue.edu/dp/cyber/>) engages in innovative research to enable discovery in science and engineering using computing, communication and information

infrastructure. The Center has been widely successful in obtaining funding for large scale cyber infrastructure projects on the Purdue campus from several federal agencies.

We are looking for an individual with leadership, organizational and technical skills to help the director of the center to manage the interface with the Purdue faculty, to identify funding opportunities and organize teams that would respond to RFPs, to oversee the day-to-day activities of the center, to oversee recruitment and management of facility staff, to interface and act as a spokesperson for the center, to generate periodic reports when required by the higher administration or funding agencies and finally to facilitate collaborations with other centers in Discovery Park (<http://www.purdue.edu/dp/>). The incumbent helps coordinate administrative/clerical staff, provides leadership and supervision in organizing and managing special events, and devises and implements plans for development, marketing, and communication.

The successful applicant MUST have at least an MS degree in a technology related field with five or more years of professional experience, an extensive experience in a managerial role with preference to those with experience in a research funding environment. A preference will be given to someone with a Ph.D., knowledge of fiscal planning/budgeting, experience with academic (faculty) environment and the federal funding environment.

Apply online job number 0901144: [www.purdue.edu/hr/Employment](http://www.purdue.edu/hr/Employment) Purdue University is an equal access/equal opportunity/affirmative action employer full committed to achieving a diverse workforce.

#### United States Naval Academy The Center for Cyber Security Studies Director

The Center for Cyber Security Studies encompasses support for all programs that contribute to knowledge, study, research and practice of cyber warfare and information dominance at the U.S. Naval Academy. The Director of the Center for Cyber Security Studies will develop, manage and nurture a comprehensive institution-wide program in cyber warfare by coordinating curriculum development, facilitating the sharing of expertise

and perspectives in cyber warfare from across the Academy and enhancing inter-disciplinary research and practical exercises in cyber warfare. The Director will take a leadership role in defining the future directions of the Center through the development of new resources, the coordination of joint interdisciplinary research efforts between the Naval Academy and other institutions and agencies, and through the development of goals and strategic annual and long-range plans for the Center.

The successful candidate will have an outstanding record of teaching accomplishments and program building, and a demonstrated ability to manage and lead a diverse team of students, faculty, technical professionals and administrative staff. The minimum requirements for this position are:

- An earned Ph.D. in Computer Science, Information Technology or a closely related discipline is preferred, but candidates with an M.S. and significant relevant experience will also be considered.
- Demonstrated success at grant writing and procurement of outside support.
- Significant record of teaching excellence at the undergraduate level within the academic field of expertise.
- U.S. citizenship.
- The Director is expected to serve as an innovative leader in program support and new program development, and thus the following attributes are highly desirable but not required:
- Demonstrated ability to perform effective outreach and to form and nurture partnerships with external stake holders.
- Strong record of securing significant external financial support.
- Proven record of building and sustaining academic programs with an emphasis on launching innovative interdisciplinary programs among schools and departments.

A tenure-eligible faculty appointment is possible depending on qualifications.

To apply, electronically submit a cover letter, curriculum vitae, statement of vision for the center as well as three letters of recommendation to:

[cyber@usna.edu](mailto:cyber@usna.edu)

Applications will be reviewed as they are received with a rolling application process.

#### University of British Columbia Department of Computer Science Tenure-Track Faculty Position

The Department of Computer Science at the University of British Columbia is recruiting for a tenure-track faculty position at the Assistant Professor level for the 2010/2011 academic year.

The responsibilities of the position include teaching at the undergraduate and graduate levels, supervising graduate students, and developing and maintaining an active research program. The department is seeking outstanding candidates with a research focus in one of the following areas:

(a) programming languages and software engineering and (b) algorithms and complexity. A PhD in Computer Science or a related area is required. The anticipated start date is July 1, 2010.

The successful candidate must have an

exceptional research record, as judged by the strength of the application materials including the portfolio of publications and other research artefacts developed during his or her Ph.D. program, and post Ph.D. career, if applicable.

The application materials must also demonstrate that the candidate shows promise as an excellent teacher and has potential to become an innovative and independent researcher and a leader in his or her field. The ability of an applicant's research program to complement and extend the existing research strengths of the department will be an important factor in selection.

Applicants for the position must submit a CV, 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. If you wish to apply, please follow the instructions at:

<http://www.cs.ubc.ca/career/faculty.shtml>

The website will remain open for submissions through the end of the day on March 14, 2010. The website may remain open past that date at the discretion of the Recruiting Committee. All applications submitted while the above website is open will be considered.

UBC hires on the basis of merit and is committed to employment equity. All qualified candidates are encouraged to apply; however, Canadian citizens and permanent residents will be given priority.

Our department strives to maintain a collegial and supportive atmosphere. We strongly encourage candidates with diverse backgrounds and experiences based on, for example, gender, race, ethnicity, religion, sexual orientation, and disability status to apply.

If you have questions about the application process, please contact the Recruiting Committee Chair, Bob Woodham, at the email or postal address below.

Bob Woodham ([recruit@cs.ubc.ca](mailto:recruit@cs.ubc.ca))  
Chair, Recruiting Committee  
Department of Computer Science  
University of British Columbia  
Vancouver BC V6T 1Z4

#### University of the District of Columbia

School of Engineering and Applied  
Sciences

#### Tenure-Track Positions

The University of the District of Columbia is America's Urban Land-Grant University which is statutorily classified as a Historically Black College and University. It is among only 13 HBCUs nationally accredited by ABET. The School offers BS degree programs in Civil, Electrical and Mechanical Engineering, Computer Science and Information Technology, Architecture, and MS programs in computer science and electrical engineering. New programs in bioengineering and renewable energy are proposed. For each position, salary and rank will be commensurate with qualifications and professional experience. Nominations and applications are invited for the following tenure-track positions:

Assistant/Associate Professor of Information Technology (2 Positions)  
Candidates must have a PhD in computer science or information technology or closely-related field with specialization in human computer interaction (HCI)

## Professional Opportunities

or information assurance and systems (IAS). For the HCI, we are seeking a candidate with a strong interest in concepts, algorithms, and tools in human centered man-machine interaction problems. Other related areas such as graphical or multimodal user interfaces and novel HCI concepts in regards to social networking and ubiquitous/mobile computing are also of interest. For the IAS, we are seeking a candidate with a strong practical interest in concepts, technology, and practice in availability, integrity, authentication, confidentiality, and non-repudiation of information systems and incorporating protection, detection, and reaction capabilities into information systems. Practical knowledge and competitive research records in the administration and security problems of operating systems, databases, and networking are expected. Cloud computing or mobile computing emphasis will be a plus. The IAS faculty member will be expected to collaborate closely with the department's IA team. The primary duty will be to enhance the department's IT program, to teach undergraduate and graduate courses, to develop externally-funded research projects, to develop curricula and labs, and to perform academic duties, university and professional service.

Candidates should send, in electronic format, a cover letter attesting to their qualifications for the position, a current CV, and names and contacts for at least three professional references to Dr Byungyu Yu, CSIT Chair at [byu@udc.edu](mailto:byu@udc.edu).

The University of the District of Columbia is an equal opportunity employer. This and other faculty positions are also available at <http://www.udc.edu/hr/jobs.htm>.

### University of Kentucky Departments of Computer Science and Veterinary Science Postdoctoral Scholar

A collaborative and growing interdisciplinary research team in Lexington, Kentucky is looking for an innovative and enthusiastic Ph.D. graduate to join our group as a postdoctoral scholar. This position offers the opportunity to integrate discovery research in computational and biological sciences to address major biomedical health questions. The position will be renewed annually and can be extended for 3 years. We offer a competitive salary and benefits package in a stimulating and interactive learning environment.

This postdoctoral educational opportunity centers on computational, statistical, and biological aspects of mRNA transcriptome analyses. Deep sequencing technologies are being applied to the mRNA transcriptome to identify and differentiate all mRNA variants in a sample, quantitate steady state expression levels, link individual mRNA transcripts to genomic DNA haplotypes, and predict translational parameters. Computational and analytical methods are being developed to record, analyze, and compare mRNA transcriptomes using RNA sequencing technologies. The position will provide opportunities for mentorship of graduate and undergraduate students working on related projects.

Faculty mentors

- Jinze Liu, PhD. ([liuj@netlab.uky.edu](mailto:liuj@netlab.uky.edu); <http://www.cs.uky.edu/~liuj>)

- James N. MacLeod, VMD, PhD. ([jnmacleod@uky.edu](mailto:jnmacleod@uky.edu); <http://www.ca.uky.edu/gluck/MacLeodJN.asp>)
  - Qualifications
  - Ph.D. in computer science, statistics, genetics, or biology
  - Strong background in machine learning and data mining
  - Strong programming experience in Python/C/C++
  - Basic understanding of molecular and cellular biology is preferred
  - Scientific writing experience
- Please apply online at:  
<https://ukjobs.uky.edu/applicants/Central?quickFind=216457>

The University of Kentucky is an equal opportunity university.

### The University of Texas at Dallas Department of Computer Science Tenure-System Faculty Positions in Computer Science

The Department of Computer Science at The University of Texas at Dallas invites applications from outstanding applicants for tenure-system positions in computer science. Preference will be given to senior candidates in the areas of software engineering, computer networks, and semantic technologies; however exceptional candidates in all areas will be considered. Candidates must hold a PhD in Computer Science, Software Engineering, Computer Engineering, or the equivalent. Candidates for senior positions must have a distinguished research and publication record and demonstrated leadership ability in developing and expanding funded research programs. A significant start-up package has been budgeted. An endowed chair position may be available for highly qualified senior candidates; junior candidates must show outstanding promise.

The Department offers the BS, MS, and PhD degrees both in Computer Science and Software Engineering, as well as in the interdisciplinary fields of Telecom Engineering and Computer Engineering. Currently, 44 tenure-system faculty and nine senior lecturers comprise the faculty. Housed in a spacious 150,000 square feet facility with excellent computing equipment and support, the department hosts a number of centers in areas as diverse as embedded software, cyber security, and human-language technology.

UT Dallas is located in the attractive northern suburbs of the Dallas metropolitan area and enjoys close proximity to hundreds of high-tech and telecommunications companies, including Texas Instruments, Alcatel, Ericsson, Hewlett-Packard, Nokia, Fujitsu, Raytheon, Rockwell Collins, and Cisco, to name but a few. Opportunities for joint university-industry research projects are excellent, and the State of Texas and UT Dallas continue to make considerable investment in commercialization of technologies developed in university labs. The Jonsson School has experienced very rapid growth in recent years, and the University and the State of Texas are investing significant resources to reach Tier One status. Interested individuals may learn more about the program at <http://cs.utdallas.edu>. Review of applications will begin immediately with starting dates available either summer or fall 2010.

The University of Texas at Dallas uses an online application system

that provides applicants a quick, safe, and easy method of applying and monitoring uploaded documents. Interested individuals should submit their current curriculum vitae, a letter of interest (including qualifications for the position and prior accomplishments), and letters of recommendation from (or the names and contact information for) at least five professional references via the online application form, available at <http://go.utdallas.edu/pcw091216>, where they will submit their preferred email address to receive instructions to access a personalized application profile website. School hiring officials will receive notification when application materials are posted and are available for review. All available faculty positions are posted at: <http://provost.utdallas.edu/facultyjobs>.

The University of Texas at Dallas is an Equal Opportunity / Affirmative Action employer. All qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, disability, age, citizenship status, Vietnam era or special disabled veteran's status, or sexual orientation.

### University of Utah School of Computing Faculty Positions in Digital Media

The School of Computing at the University of Utah seeks multiple hires in the field of Digital Media.

We seek two outstanding faculty members in digital media (computer graphics, animation, computer games, computational photography, or other related area). One tenured position at the rank of associate or full professor and one tenure track position at the rank of assistant professor. Since the 1960s when pioneering graphics research became a core focus at Utah, there has been a vibrant congenial community supporting this activity. Being one of the oldest and most successful graphics programs in the nation, Utah and its alums have played a prominent role in the birth and explosive development of computer graphics. Our program includes large, multi-investigator efforts addressing large-scale problems of significant impact, as well as a number of individual investigator research activities. Currently, computer graphics research has strong programs in scientific visualization, physical simulation for computer animation, geometry processing, modeling/manufacturing, and perception. We wish to build upon these successful areas with dynamic researchers seeking to develop a strong synergistic program in digital media with strong collaboration with faculty in the College of Fine Arts.

These new hires will work with Digital Media faculty in the Film Studies Division in the College of Fine Arts and Digital Media Faculty in the School of Computing in the College of Engineering. These positions are part of the Utah Science, Technology and Research Initiative (USTAR) which was funded by the Utah State Legislature to attract focused teams of outstanding researchers who have the potential of helping build major research programs and creating new technology that can ultimately lead to commercial products and/or new industries for Utah. For more information about USTAR, visit: <http://ustar.utah.gov/>

The School of Computing offers a specialized M.S. and Ph.D. Computing

Degree graduate track in Computer Graphics and Visualization and has an Entertainment Arts and Engineering program at the undergraduate level that spans art and computer science. Applicants should have earned a Ph.D. in Computer Science or a closely related field.

The University of Utah is located in Salt Lake City, the hub of a large metropolitan area with excellent cultural offerings and unsurpassed opportunities for outdoor recreation only a few minutes' drive away. Additional information about the School of Computing can be found at [www.cs.utah.edu](http://www.cs.utah.edu).

Please send curriculum vitae, a research goals statement, a teaching goals statement, and names and addresses of at least four references via email in PDF format to:

USTAR Faculty Recruiting Committee  
c/o Mr. Chris Coleman  
[coleman@cs.utah.edu](mailto:coleman@cs.utah.edu)

The University of Utah is an Equal Opportunity, Affirmative Action Employer and encourages nominations and applications from women and minorities, and provides reasonable accommodation to the known disabilities of applicants and employees.

The University of Utah values candidates who have experience working in settings with students from diverse backgrounds, and possess a strong commitment to improving access to higher education for historically underrepresented students. The University of Utah is sensitive and responsive to 'two-body problems' and has a positive history of assisting with opportunities in the Salt Lake City area.

### UW Milwaukee Department of Health Sciences NLP Research Faculty

Recruiting a NLP research faculty in information retrieval, summarization, machine learning or question answering. Send CV and two publications to Hong Yu [hongyu@uwm.edu](mailto:hongyu@uwm.edu).

The position is available immediately, and remains open until it is filled.

### Utah State University Department of Computer Science Assistant Professor

Applications are invited for a tenure track assistant professor position beginning Fall, 2010. Applicants must have completed a PhD in computer science by the time of appointment. The position requires demonstrated research success, a significant potential for attracting external research funding, excellence in teaching both undergraduate and graduate courses, the ability to supervise student research, and excellent communication skills. The department is interested in strengthening its focus in one or more of the following areas: software security, informatics, software engineering, or database systems.

Women, minority, veteran and candidates with disabilities are encouraged to apply. USU is sensitive to the needs of dual-career couples. Utah State University is an affirmative action/equal opportunity employer, committed to increasing diversity among students, faculty, and all participants in university life.

Applications must be submitted using USU's online job-opportunity system at [jobs.usu.edu](http://jobs.usu.edu). The review of applications will begin on January 15, 2010 and continue until the position is filled.

**CRA CONFERENCE AT SNOWBIRD 2010 ♦ JULY 18 – 20, 2010 ♦ SNOWBIRD, UTAH**

The flagship conference for chairs of Ph.D.-granting departments of CS and CE and leaders from U.S. industrial and government computing research laboratories and centers interested in computing research issues.

**Preliminary Program**

**Sunday, July 18**

CRA Board of Directors Meeting (begins Saturday 6PM) **8:30AM - 2:45PM**  
**Conference Registration** **2:00PM - 7:30PM**  
**Workshop for New Department Chairs** **3:00PM - 5:45PM**  
*Chair:* Mike Gennert (Worcester Polytechnic Institute)  
*Co-Chairs:* Barbara Ryder (Virginia Tech); Darrell Whitley (Colorado State)  
**Speakers:** TBD  
**Welcome Reception** **6:00PM - 7:00PM**  
**Dinner** **7:00PM - 9:00PM**  
**Speaker:** Yoky Matsuoka, Torode Family Endowed Career Development Professor of Computer Science and Engineering (University of Washington)  
**Title:** "Move Better with a Robot"  
**Introduction:** David Notkin (University of Washington)

**Monday, July 19**

**Breakfast Buffet** **7:00AM - 8:30AM**  
**Registration** **7:30AM - 6:00PM**  
**Welcome** **8:30AM - 8:40AM**  
**Speakers:**  
 Mary Fernandez, AT&T Labs – Research (Labs/Centers Co-Chair)  
 David Notkin, University of Washington (Academic Co-Chair)  
**PLENARY SESSION I** **8:40AM - 10:00AM**  
**Why Can't Teaching Be More Like Research?**  
*Chair:* Lynn Andrea Stein (Olin College of Engineering)  
**Speaker:** Sally Fincher (University of Kent)  
**Break** **10:00AM - 10:30AM**  
**Workshop I (two parallel sessions)** **10:30AM - Noon**  
**The CS/10K Project**  
*Chair:* Jan Cuny (National Science Foundation)  
**Panelists:**  
 Owen Astrachan (Duke University)  
 Jan Cuny (National Science Foundation)  
 Larry Snyder (University of Washington)  
**CCC Workshop on Discovery and Innovation in Health IT**  
*Chair:* Susan Graham (UC Berkeley)  
**Panel:** TBA  
**Luncheon** **Noon - 1:30PM**  
**PLENARY SESSION II** **1:30PM - 3:00PM**  
**Peer Review in Computing Research**  
*Chair:* H.V. Jagadish (University of Michigan)  
 Panel Moderator: Moshe Y. Vardi (Rice University)  
**Panelists:**  
 Rich Baranuik (Rice University)  
 Lance Fortnow (Northwestern University)  
 Jeffrey Mogul (HP Labs)  
 Jeannette Wing (NSF)  
**Break** **3:00PM - 3:30PM**  
**Workshop II (two parallel sessions)** **3:30PM - 5:00PM**  
**Education in the Magic Circle: The Promise of Games**  
*Co-Chairs and Speakers:*  
 Michael Mateas (UC Santa Cruz)  
 John Nordlinger (Microsoft)  
**Speaker:** Michael Zyda (University of Southern California)  
**The Computing Innovation Fellows (CIFellows) Program**  
**Speaker:** Peter Lee (DARPA)  
**Dinner and State of the CRA Address** **6:30PM - 9:00PM**  
*Presentations:*  
 CRA's Distinguished Service Award by CRA Board Chair  
 CRA's Habermann Award by CRA Executive Director  
**Speakers:**  
 Eric Grimson (CRA Board Chair)  
 Andrew Bernat (CRA Executive Director)

**Tuesday, July 20**

**Breakfast Buffet** **7:00AM - 8:30AM**  
**PLENARY SESSION III** **8:30AM - 10:00AM**  
**Making a Federal Case for Computing**  
*Chair:* Fred Schneider (Cornell University)  
**Speaker:** Peter Harsha (CRA)  
**Break** **10:00AM - 10:30AM**  
**Workshop III (three parallel sessions)** **10:30AM - Noon**  
**CRA-E Report on Basic Computing Knowledge**  
*Chair:* Mary Fernandez (AT&T Labs Research)  
**Speaker:** Andries van Dam (Brown University)  
**Guidelines for Enhancing Faculty Recruitment**  
*Chair:* Jeffrey Vitter (Texas A&M University)  
**Panelists:**  
 Eric Grimson (MIT)  
 Debra Richardson (UC Irvine)  
 Eva Tardos (Cornell)  
**Communicating Computer Science: The Hot Under the Cool**  
*Chair:* Judith Bishop (Microsoft)  
**Panelists:**  
 Shyno Chacko Pandeya (New Image of Computing Initiative)  
 Virginia Gold (ACM)  
 Jon Kleinberg (Cornell)  
**Luncheon** **Noon - 1:30PM**  
**PLENARY SESSION IV** **1:30PM - 3:00PM**  
**Foresight and Flexibility**  
*Chair:* Peter Lee (DARPA)  
**Speaker:** Regina Dugan (Director, DARPA)  
**Workshop IV (three parallel sessions)** **3:30PM - 5:00PM**  
**Enriching Undergraduate Learning through Apprenticeships**  
*Chair:* Frank Tompa (University of Waterloo)  
**Panelists:**  
 Arnie Dyck (University of Waterloo)  
 Ran Libeskind-Hadas (Harvey Mudd College)  
 David Porush (MentorNet)  
**Ratings/Rankings of Graduate Programs and Research**  
*Chair and Panelist:* Jim Kurose (University of Massachusetts)  
**Panelists:**  
 Charlotte Kuh (National Research Council)  
 Valerie Taylor (Texas A&M University)  
 Jeffrey Vitter (Texas A&M University)  
**Computer Science and Global Development: A New High-Impact Research Area**  
**Speakers:** Tapan Parikh (University of California, Berkeley)  
 Lakshmi Subramanian (New York University)  
**Managing Up – Partnering with your Dean** **5:00PM - 6:00PM**  
**Chairs & Participants:**  
 Martha E. Pollack (Dean, School of Information, University of Michigan)  
 Bobby Schnabel (Dean, School of Informatics, Indiana University)  
**Participant Deans:**  
 Peter Bloniarz (College of Computing and Information, SUNY Albany)  
 Randy Bryant (School of Computer Science, CMU)  
 Rich DeMillo (College of Computing, Georgia Tech, former Dean)  
 Dan Huttenlocher (Computing and Information Science, Cornell University)  
 Ron Larsen (School of Information Sciences, University of Pittsburgh)  
 Debra Richardson (Donald Bren School of Information and Computer Sciences, UC Irvine)  
**Reception/Dinner** **6:30PM - 7:30PM**  
**CRA-Deans Meeting** **4:00PM - 9:00PM**  
*Chair:* Debra Richardson (UC Irvine)  
**Wednesday, July 21** **8:30AM - Noon**

Program and Registration Information  
<http://www.cra.org/snowbird>

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**Organizing Committee**

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 David Notkin (University of Washington) Academic Co-Chair  
 Mary Fernandez (ATT Labs - Research) Labs/Centers Co-Chair

**Members**

Sarita Adve (University of Illinois at Urbana-Champaign); Judith Bishop (Microsoft Research); Ed Fox (Virginia Tech); H.V. Jagadish (University of Michigan); Renee McCauley (College of Charleston); Bobby Schnabel (Indiana University); Fred Schneider (Cornell University); Mark Segal (National Security Agency); Lynn Andrea Stein (Olin College); and Frank Tompa (University of Waterloo).