

# COMPUTING RESEARCH NEWS

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## GENI Moves Forward

By Chip Elliott and Ellen Witte Zegura

In late May, the National Science Foundation, through its directorate on Computer and Information Science and Engineering (CISE), and BBN Technologies announced a cooperative agreement for BBN to operate the GENI Project Office. This announcement came a few months after the announcement of the GENI Science Council (operating under the auspices of the CRA's Computing Community Consortium). Together the announcements represent a significant step forward in the GENI's evolution from an idea to reality. In this article we briefly summarize the current state of GENI activities and their expected evolution over the coming year.

### What is GENI?

The Global Environment for Network Innovation (GENI) is an experimental facility intended to support research in a wide variety of areas including communications, networking, distributed systems, cyber-security, networked services and networked applications. The goal of GENI is to enable researchers to experiment with radical network and system designs in a way that is far more realistic than any alternative available today.

GENI seeks to serve researchers in as wide a range of disciplines as possible. People with research needs that GENI could address should feel free to contact either of the authors (ewz@cc.gatech.edu or celliott@bbn.com).

### What is the GENI Project Office (GPO)?

The NSF regularly provides funding not simply for research but also for scientific infrastructure. Infrastructure requiring large investments from NSF falls under the auspices of the Major Research and Equipment Facilities Construction (MREFC) account.

Under the current plans, GENI will be built as an MREFC project. MREFC projects all go through a number of steps to show that the concept for the facility is sound, mature, properly engineered and likely to produce innovative science results. One of the early steps in the process is creating a Project Office, which works closely with NSF to shepherd the facility's design and engineering plans through MREFC funding qualification steps. Thus, creating the GPO means that GENI is starting to move from a detailed concept to a nuts and bolts (or in this case, bits and photons) piece of research infrastructure.

The main job of the GPO over the next few years is engineering and risk reduction. The GPO is responsible for assembling a complete engineering plan for how to build GENI. Among other things, the plan must include detailed costing, a discussion of which technologies will be used, and a detailed demonstration that the infrastructure built will support the intended research. Because many parts of GENI will be novel or one-of-a-kind technologies, creating a credible engineering plan means driving down construction risks. To that end, the GPO will be awarding approximately \$7.5M per year in risk-reduction projects to academic and industrial teams whose job it is to propose and test design alternatives, to show that key parts of GENI can be built, and to show how different versions of GENI will meet researchers' needs.

Specification and design of the GENI facility will take place collaboratively within several working groups. This intense activity is open to anyone interested in developing or using the technologies or services provided by the GENI experimental platform. The GPO is committed to an open design and evaluation process, where working group recommendations come about

through the rough consensus developed over the course of on-line and in-person discussions. Working group participants will be collaborating in areas such as: network substrate; resource control framework; experiment workflow and services; end-user opt-in; and operations, management, security and integration. New working groups may be created or old ones dissolved as the GENI design advances. The GPO is actively seeking working group participants and chairs. Some financial support may be available for these positions. (For information on participating in a working group, contact Aaron Falk of the GPO at falk@geni.net).

The GPO will be hosting engineering conferences three times a year where progress on GENI's design will be reported, the working groups will meet, and progress and results from the GPO-funded risk reduction efforts will be reported. Participation at the conferences is open to anyone who wishes to attend.

Another important GPO role is outreach. GENI should enable groundbreaking research, and it is important to ensure that the chance to do that research, and to learn from and build

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### Note to Department Chairs

**Taulbee Survey 2006-07  
Coming Soon!**

## Key Appropriations, Authorizations on Track

*But Veto Threat Could Put Science Funding in Doubt*

By Peter Harsha

Congress continues to stay on track to honor commitments from the House and Senate Leadership to bolster funding at three key science agencies, but a veto threat from President Bush could derail the annual appropriations process, putting gains for science in doubt.

At the same time, House and Senate Leaders have also approved a mammoth omnibus innovation and competitiveness bill that would "ensure our nation's competitive position in the world through improvements to math and science education and a strong commitment to research," according to the bill's sponsors.

This apparent rollercoaster of good and bad fortune for federal science agencies is evidence of both Congress's continued strong support for the physical sciences (including math, computing and engineering) and of science continuing to fall victim to larger political concerns in the annual

appropriations process despite its strong support.

Like last year, Congress appears to be on a path to continue to approve significant increases for the three agencies that are the focus of the President's *American Competitiveness Initiative* and the Democratic *Innovation Agenda*: The National Science Foundation (NSF), the National Institute of Standards and Technology (NIST) and the Department of Energy's Office of Science (DOE Sci). At each milestone along the appropriations path, the congressional leadership has taken steps to ensure that the appropriators would have sufficient budget room to include increases for the agencies in their respective appropriations bills. In May, the leadership approved a budget resolution that added nearly \$2 billion over FY 2007 to the General Science, Space and Technology account, which includes the budgets of NSF, NIST, DOE Sci, as well as NASA and NOAA. That, in

turn, allowed the appropriations committee chairs to approve so-called "302(b) allocations" to each of their subcommittees that also provided sufficient space for increases for science.

The initial bills reported out of the appropriations committees further demonstrated this commitment. The House Appropriations Subcommittee on Energy and Water approved its version of the FY 2008 Energy and Water appropriations bill, which includes funding for DOE Sci, in early June, and the Senate followed in late June. Both chambers included increases to DOE Sci of slightly more than 18 percent versus the FY 2007 level, increasing the agency's funding by \$700 million to \$4.5 billion in FY 2008. Within the Office of Science, the Advanced Scientific Computing Research (ASCR) program would receive an 18 percent increase in the Senate bill, and a 20

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## Expanding the Pipeline

# Fifteen Years Later, Caregivers Still an Issue for Conference Attendees

By Sarita V. Adve

In January 1993, Elaine Weyuker wrote an article for this column in CRN titled "Childcare an Issue for Conference Attendees," making a powerful case for support for childcare at conferences (see: <http://www.cra.org/CRN/online.html>; [September 2007, Vol. 19/No. 4]). Almost fifteen years later, that article remains relevant. The original article focused on on-site childcare, but similar observations apply for caregiver support for other needs, such as those of the physically disabled.

Unfortunately, not much has changed on this issue over the past 15 years. In most cases, a researcher who must take a child to a conference (because he is a single parent or because his partner also needs to attend the same conference or because she is nursing an infant) still faces experiences similar to those in the 1993 article. In the best case, a caregiver is available and the researcher attends the meeting at a hefty out-of-pocket expense. The 1993 article discusses such expenses, which can run into a thousand or more dollars per trip, and are especially impractical for junior researchers. Often, however, it is simply not possible to go because it is not possible to find a caregiver. Again, see the 1993 article for the travails a parent must go through to find on-site childcare, summarized by the author as being "not for the faint-hearted." It is easy to see that this issue can be a major detriment to the career of junior researchers who most need the connections and visibility provided through travel.

Addressing the caregiver problem in its entirety is certainly challenging, but we cannot wait another 15 years. Our funding agencies, universities, companies, and professional organizations today are deeply committed to broadening participation in computer science from all members of society. Achieving this goal in a meaningful way requires solving the caregiver problem—although the problem can affect anyone, it is a critical issue for a disproportionate fraction of women and physically disabled researchers. For nursing mothers of young infants, often the only practical way to travel is to take the infant and a caregiver along. As the children grow older, the most common childcare backup (partner) is often not available to the many women married to other professionals who may have conflicting travel schedules. For researchers with certain physical disabilities, travel without a caregiver is simply impossible.

An effective solution to this problem requires support for both defraying expenses and finding on-site caregivers. With a concerted effort, our funding agencies, universities, professional organizations, and community leadership can collectively solve this problem. A few organizations have already started to take steps towards these solutions, and provide valuable guidance for wider adoption.

### Caregiver Expenses: A Call to Funding Agencies and Universities

For academic researchers, funding agencies can have the widest impact on expenses by allowing them in travel budgets of grants. NSERC, the

Canadian funding agency, already allows charging for childcare expenses while a nursing mother or single parent is traveling<sup>1</sup>. U.S. federal agencies would presumably need to revise appropriate regulations to allow such expenses, and this will not happen immediately. Nevertheless, a concerted effort needs to begin if we are to truly accomplish the goal of broadening participation in computing, as stated by agencies such as NSF.

Universities must play a lead role in supplementing the funding agencies. Junior faculty, in particular, are often tight on grant funds. University-supported awards for caregiver expenses can help such researchers. Princeton currently has such a dependent care grant program<sup>2</sup>. Universities can also proactively seek private donors and allow such expenses to be charged to gift funds.

Companies and professional organizations such as ACM and IEEE can also contribute by broadening their travel grant programs to include such expenses. For example, ACM's SIGARCH provides airfare for a travel companion for nursing mothers and disabled researchers<sup>3</sup>.

Establishing such programs requires working out several details, especially whom and what expenses to support. SIGARCH chose to restrict support to nursing mothers of infants and physically disabled researchers as a first step. A more comprehensive program would provide support for single parents (as NSERC does) and when both parents need to travel to the same meeting. The 1993 article lists legitimate expenses when the caregiver is found at the meeting site. In the case of younger children and the disabled, a caregiver may accompany them from home, incurring travel costs. Some parents may leave their children at home, incurring overnight care costs. Some disabilities require other on-site assistance such as sign language interpreters. Some limits will obviously be needed; for example, childcare support may be provided only for elementary-grade or younger children or only for junior researchers.

A possible concern is that this uses limited funds for a small part of the community; however, this is consistent with other programs for increasing diversity. The expenses are a relatively small fraction of overall research expenses, and each organization could set a limit for the absolute amount to be used.

### Finding Caregivers: A Call to Professional Societies

Our major professional societies, such as ACM and IEEE, can have the largest impact on the issue of finding reliable caregivers. First, these organizations can adopt the policy that (major) conferences be held at hotels that provide childcare facilities.

Second, they can contract with agencies that provide caregiver support across wide regions (e.g.,<sup>4</sup>). This will allow caregiver access at a discounted price for conferences in the supported regions.

Third, they can establish a set of best practices to which conference committee members are expected to adhere (some examples follow

below). Check boxes in the conference budget forms would remind committees of these practices (e.g., publicity for the availability of caregiver support), making such considerations part of standard conference planning.

Liability is an obvious concern here. It is therefore encouraging that some organizations have successfully dealt with this concern and provide a model to emulate. For example, the upcoming Grace Hopper Conference will provide subsidized childcare through an independent childcare service and sponsored by a company<sup>5</sup>, and several universities now use agencies to provide backup dependent care for their employees (e.g., Princeton<sup>6</sup>, UIUC<sup>7</sup>). The liability issue is one reason why it may be best to tackle this problem through our larger professional organizations.

### The Role of the Research Community Leadership

The research community leadership must also play a major role. First, we need to make clear our acknowledgment of the problem and the willingness to help. For example, a conference Call for Participation may include a statement to the effect that the local arrangements chair can enable people with childcare needs to get in touch with each other, or better still, provide pointers to local childcare resources. Currently, many junior researchers will not even ask for help lest they appear unprofessional.

Ideally, the conference committee member would easily obtain this information by working with the professional organization sponsoring the conference. Even otherwise, the committee member can make a difference with a little bit of effort. Many universities today have a range of resources for caregivers, including listings of childcare providers that take drop-ins, contracts with providers for backup care, and electronic student job boards for advertisements for babysitting. Making such information from local universities available to conference attendees would be helpful. The expectation here is not to provide childcare, but to provide a local point of contact for information.

Conference committee members can also contribute by proactively including this cause when seeking company sponsorships for conference events. Individual researchers can also affect policy at lower levels; for example, by lobbying their SIGs to adopt some variation of the SIGARCH companion travel grants.

In summary, if we are to broaden participation in computing, the caregiver problem must (and can) be addressed through complementary efforts of our funding agencies, universities, companies, and professional organizations.

### References

- [http://www.nserc.gc.ca/professors\\_e.asp?nav=profnav&lbi=f3](http://www.nserc.gc.ca/professors_e.asp?nav=profnav&lbi=f3).
- [http://www.princeton.edu/dof/policies\\_procedures/family\\_friendly/family\\_friendly/#comp000045ddf0990000002bc799b](http://www.princeton.edu/dof/policies_procedures/family_friendly/family_friendly/#comp000045ddf0990000002bc799b)

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# Musings from the Chair

## Computing: All Our Constants Are Variables

By Dan Reed, CRA Board Chair



We humans are not particularly good predictors of change, particularly exponential change. We tend to extrapolate tomorrow from today—geometrically, two points

do define a straight line, after all. In the near term, that is a safe and reasonable expedient. However, we, of all disciplines, know that the pace of change is accelerating, with ever greater global connections and greater social, economic and scientific interdependence. In turn, this has profound implications for computing education, research, employment and societal engagement.

I find it exciting that the complexity of today's problems is catalyzing a return to multidisciplinary inquiry, after more than a century of increasing specialization. Natural philosophy, the precursor of science, began as the study of nature in all its aspects. Physics, chemistry, astronomy, biology and mathematics: they were once all one, aspects of a common study, all part of the quest for coherent understanding.

We tend to forget that science is, after all, simply an Anglicization of *scientia*, the Latin word for knowledge. By analogy, computing science and engineering is about knowledge and its applications, driven by information technology in all its disparate forms,

making it timely to reassess the state of computing research.

Over the past year, I've been privileged to co-chair a review of the U.S. Networking and IT Research and Development (NITRD) activities. NITRD is the interagency program that funds almost all computing research in the United States, including that at NSF, DoD and DOE. This review, conducted by the President's Council of Advisors on Science and Technology (PCAST), is the first program-wide assessment since the seminal 1999 report, *Information Technology Research: Investing in Our Future*. That report led to a dramatic increase in research funding for information technology, and emphasized the critical importance of IT to the nation's economic and research competitiveness and its national security.

As I write this, the PCAST assessment of NITRD is in press, and it may well be available on the National Coordination Office's web site ([www.nitrd.gov](http://www.nitrd.gov)) by the time you read this column. Succinctly, the report, *Leadership Under Challenge: Information Technology R&D in a Competitive World*, notes the enormous contributions of computing research to our society and makes several observations about opportunities and needs.

1. *The number of people completing NIT education programs and the usefulness of that education fall short of current and projected needs.* We must modify curricula to be more relevant to current needs

and attract more students, both by offering more graduate fellowships and easing visa processes for international students who receive degrees from accredited U.S. graduate programs.

2. *The Federal NIT R&D portfolio is currently imbalanced in favor of low-risk projects; too many are small-scale and short-term efforts.* The number of large-scale, multidisciplinary activities with long time horizons is limited and visionary projects are few. This was also a key observation of the 1999 PITAC report, which proposed transformative *Expeditions to the 21st Century*.
3. *As new funding becomes available, four topics should receive disproportionately larger increases* because they address issues for which progress will have both the greatest effect on important applications and the highest leverage in advancing capabilities. These are networked IT systems connected with the physical world, software, digital data and networking. However, high-end computing, cybersecurity, human-computer interaction and NIT and the social sciences must remain priorities.
4. *While the NITRD Program has effectively balanced agency needs with national needs and priorities, the current nature and scale of NITRD program coordination processes are*

*inadequate to meet anticipated needs and to maintain leadership in an era of global NIT competitiveness. The NITRD program should develop a strategic interagency plan and roadmaps.*

All of these observations and recommendations complement the activities of the nascent Computing Community Consortium (CCC), which is working to empower community research visions and the multiplicity of competitiveness initiatives in the U.S. Congress, which promise to greatly increase funding for computing research and NSF and DOE.

Computing has had a transformative effect on our lives, and the best is yet to be. In a world where some of our capabilities can and do change rapidly, being nimble and adaptive is key to exploiting emerging opportunities. This is an exciting time, filled with opportunity — all our constants are variables. In a changing world, success accrues to those who surf the wave of change. Grab your boards, the surf's up!

**Dan Reed**, CRA's Board Chair, is the Chancellor's Eminent Professor and Senior Advisor for Strategy and Innovation at the University of North Carolina at Chapel Hill. He also directs the interdisciplinary Renaissance Computing Institute (RENCI). Contact him at [reed@renci.org](mailto:reed@renci.org). ■

### GENI Moves Forward from Page 1

upon that research, is shared throughout the research and education community and society. To that end, the GPO has a vigorous outreach program that seeks to bring various communities in contact with GENI, and enables people at all levels of the education system (from elementary school to graduate school) and from all backgrounds (geographic and ethnic) to participate. Much of this effort involves personal visits to conferences, campuses, and industry. There is also an active effort to encourage participation via internships at the GPO and with GPO contractors, through travel grants to the GENI Engineering Conference, and by using tools such as electronic newsletters.

Chip Elliott leads the GPO. Chip is Chief Engineer for Network Systems at BBN Technologies and Project Director for the GPO. He has nearly 30 years of experience leading large and technically challenging projects. His forte is taking exciting, often nascent, concepts and building them up to working practice. Most recently, Chip led the effort to build the first operational quantum key distribution network.

Assisting Chip is a team of roughly half a dozen senior people, including Heidi Picher Dempsey (Operations and Integration Manager), Aaron Falk (Interim Architect), Roscoe Giles of Boston University (Outreach Consultant), Craig Partridge (Outreach Director), Kristin Rauschenbach (Optics and Substrate Manager) and Henry Yeh (Project Manager). The team has over a hundred years of experience in research in communications systems and operations of experimental networks.

### The GENI Science Council (GSC)

The GSC's primary mission is to articulate a compelling rationale for GENI in the form of a comprehensive Research and Education Plan. This will describe the scientific and engineering research questions that GENI will make it possible to address and the educational opportunities that GENI will afford. The GSC represents the interests of the national GENI-relevant research and education community in the GENI facility, serves as the community's interface to the GPO and, together with the GPO, ensures that all stakeholders have clear and accurate information regarding all aspects of the GENI project. The work of the GSC is

carried out in a set of working committees that include Research and Education Plan, Outreach, Industrial Interaction, and Facility Architecture. GSC committee members come from both inside and outside the GSC.

Scott Shenker and Ellen Zegura co-chair the GSC. Scott is a Professor of Computer Science at UC Berkeley. He is also head of the Networking Group at the International Computer Science Institute (ICSI). Prior to joining ICSI, Scott spent 14 years at Xerox PARC. He is a past recipient of the ACM SIGCOMM Award, which recognizes lifetime achievement in the area of communication networks. Ellen is a Professor and Chair of Computer Science at Georgia Tech, where she has been on the faculty for 14 years. She is a past Editor-in-Chief of *IEEE/ACM Transactions on Networking*.

The current GSC membership (<http://www.cra.org/ccc/participants.html#gsc>) includes fifteen people from industry, research labs and academia, spanning fields ranging from technology policy to optical networking to distributed systems.

### The Coming Year

So what's up for GENI in the coming year?

The first GENI Engineering Conference will be held October 9-11 at the University of Minnesota in Minneapolis.

The first GPO solicitation is expected to come out in late 2007, with contracts awarded in early 2008. The expectation is that by the GENI Engineering Conference in the summer of 2008, we'll begin to see the early fruits of those efforts.

The GPO expects to begin recruiting interns for the summer of 2008 shortly.

More information about the GENI Science Council and the GENI Project Office is available on the GENI web site ([www.geni.net](http://www.geni.net)). This website is also where details about the conference, GPO solicitations and internships will appear.

**Chip Elliott**, Director of the GENI Project Office, is Chief Engineer for Network Systems at BBN Technologies. **Ellen Zegura**, who co-chairs the GENI Science Council, is a Professor and Chair of Computer Science at Georgia Tech.

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## February 1 Deadline for CRA Service Award Nominations

The Computing Research Association invites nominations for the CRA Distinguished Service Award and the A. Nico Habermann Award for 2008.

### Distinguished Service Award

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

### A. Nico Habermann Award

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

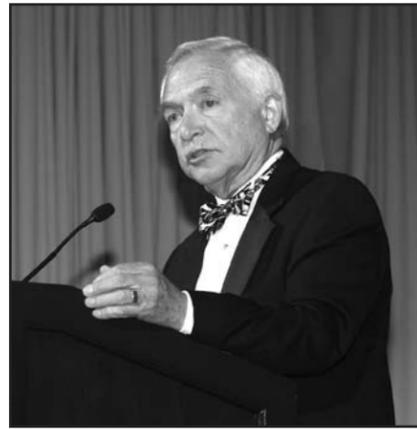
For a list of previous recipients of these two awards, see: <http://www.cra.org/main/cra.projects.html>.

### Nomination Procedures (for both awards)

Send a nomination letter (no longer than *two pages*) that describes the contributions on which the nomination is based to [awards@cra.org](mailto:awards@cra.org). Refer to the appropriate "Guidelines for Nominators" for the award. Include the candidate's current curriculum vitae. Questions or comments may be addressed to [awards@cra.org](mailto:awards@cra.org).

The deadline for receipt of nominations is **February 1, 2008**. Nominators are responsible for collating the nomination materials before e-mailing the complete package to: [awards@cra.org](mailto:awards@cra.org).

Current members of the CRA Board of Directors are not eligible to be nominated for these awards, nor can they submit nominations or letters of support for nominees. ■



**Peter Freeman**, Director, Washington Advisory Group, received a 2007 CRA Distinguished Service award at the ACM Awards Banquet in San Diego. **John Hopcroft**, the IBM Professor of Engineering and Applied Mathematics in Computer Science at Cornell University, was also a recipient of a Distinguished Service Award 2007, but was unable to attend the presentation.



Former CRA board members, **Jan Cuny** (NSF and University of Oregon) and **Dave Patterson** (UC Berkeley), at the ACM Awards Banquet in San Diego where Jan received CRA's 2007 Habermann Award.

### The computing research community thanks the following non-board members and former board members who served on CRA committees in 2006-07.

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 Rose van Thater Braan (Silver Buffalo Consulting and Native American Academy)  
 Elaine Weyuker\*\* (AT&T)  
 Telle Whitney (Institute for Women in Technology)  
 Pamela Williams (Sandia National Laboratory)  
 Stu Zweben\*\* (Ohio State University)

\*\*Former CRA board members

### I Invent the Future

Grace Hopper Celebration of Women in Computing  
 2007 Conference  
 October 17-20, 2007—Orlando, Florida  
 Details: <http://gracehopper.org/2007/>

### New CRA Academic Members

College of Charleston (CS)  
 Indiana University (CS)  
 Iowa State University (ECE)

# An Update on Trends in Degree Production

By Jay Vegso

With plans under way for CRA's next Taulbee Survey of PhD-granting CS/CE departments in the fall, it is a good time to mention that CRA's website offers trend data from both the Taulbee reports and from the National Science Foundation. The two sources complement each other: Taulbee data are more current and focused on CS/CE (the NSF groups information science with computer science), while NSF data provide longer trends, an opportunity to compare CS/CE with other fields, and include all degree-granting institutions.

The following is a brief summary of some of the information that you can find on the website. It focuses on the relative popularity of CS and trends in degree production by gender, ethnicity and citizenship. Basic employment information about doctorate recipients also is touched on.

## Bachelor's Degrees

The most recent data reported by the NSF are from 2004, when degree production peaked. Between 1998 and 2004, the number of degrees awarded more than doubled to over 57,000. Likewise, the CS share of all undergraduate degrees granted rose from about 2 percent to 4 percent. Interestingly, this equals the share enjoyed by CS during the production boom of the early 1980s. When NSF data appear for the period 2004 through 2006, they are likely to reflect the Taulbee Survey's findings that production dropped significantly (28% among Taulbee's PhD-granting departments).

Between 1984 and 2004, the share of CS bachelor's degrees awarded to women fell from 37 percent to 25 percent. Taulbee data from 2005 and 2006 suggest that upcoming NSF studies will report that the share of degrees granted to women continued to fall in those years.

Since 1991, the biggest trend in the ethnic background of U.S. citizens who received bachelor's degrees in CS has been a decrease in the share of degrees granted to non-Hispanic whites. In 2004, whites received 64 percent of CS bachelor's degrees, down from 77 percent in 1991. Small gains were made by other groups, particularly Asian/Pacific Islanders, who saw their representation grow from 9 percent to 17 percent by 2001.

Regarding the citizenship of undergraduate degree recipients, the NSF reported that only 8 percent of degrees in CS were awarded to foreigners. This percentage has not changed significantly since 1991.

## Master's Degrees

As with bachelor's degree information, the NSF's most recent data end in 2004. As a result, they do not reflect the decline that the Taulbee Survey has found for the years since then. What they do show is that production nearly doubled between 1997 and 2004 to 19,853. During this buildup, CS reached its highest share of all degrees granted: 3.8 percent in 2003. As was the case at the undergraduate level, however, the popularity of CS dropped slightly in 2004.

Although the number of master's degrees granted to women continued

to grow over the years, it did not grow faster than the number granted to men between the early 1980s and the late 1990s. As a result, the share of master's degrees granted to women during that period hovered between 25 percent and 30 percent. It climbed to 33 percent between 2000 and 2002, before declining to 31 percent in 2004.

As seen at the bachelor's degree level, the share of master's degrees granted to whites among U.S. citizens has fallen over the past several years. In 1994, 76 percent of master's degrees in CS were granted to whites; in 2004, the number was 60 percent. Blacks, Hispanics and American Indians/Alaskan Natives all saw their share of degrees double, though they started from a small base and none has broken 10 percent. In 2000, the share of degrees granted to Asians also grew to 27 percent from 17 percent in 1994.

Unlike what is seen at the undergraduate level, a large portion of master's degrees are granted to foreigners. In 2004, temporary visa holders received 44 percent of CS master's degrees. This number has been relatively stable since 2000 (and was only 30 percent in 1991).

## Doctoral Degrees

The NSF has released data on doctorates up to 2005. Between 2002 and 2005, CS doctoral degrees granted increased 40 percent, to 1,136. During this period, CS enjoyed the fastest growth rate among all science and engineering (S&E) fields. In addition, it reached its highest share of PhDs awarded among both S&E fields (4%) and all fields (2.6%). Taulbee Survey data from 2006 suggest that the NSF will find that CS doctoral production will surge another 25 percent that year.

However, declines in the number of students passing qualifiers, new students and total enrollments all indicate that PhD production should peak in the next few years.

The share of CS doctoral degrees awarded to women has increased slowly over time. Nevertheless, between 2002 and 2005 the figure hovered at a little over 20 percent. It is difficult to see how significant growth in women's share of CS doctorates can be achieved without improvements at the undergraduate and master's levels.

In contrast to the declining share of bachelor's and master's degrees granted to whites, a relatively consistent 70 percent to 75 percent of doctorates were granted to them between 1993 and 2005. The share granted to Asians varied between 15 percent and 20 percent, while blacks, Hispanics and American Indians each received less than 5 percent of degrees.

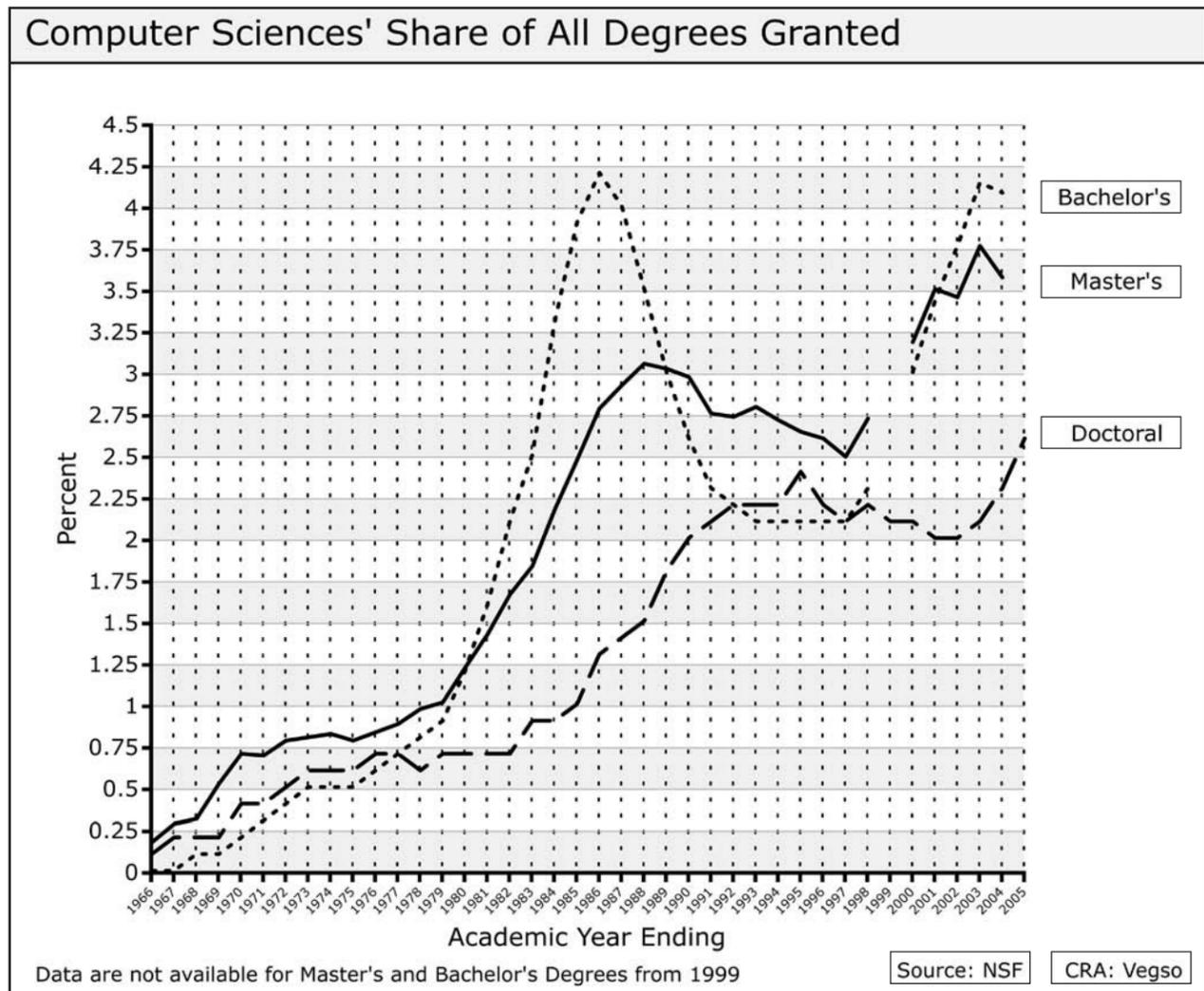
The biggest trend in the citizenship of doctorate recipients in the past decade has been the growth in the portion granted to non-U.S. citizens on temporary visas. Between 1993 and 2003, about 50 percent to 53 percent of doctorates were foreigners. This figure increased in 2004 and 2005, to slightly over 60 percent. The growth of temporary visa holders among these doctorate recipients has been steady. In 1994, 75 percent of non-U.S. citizens held temporary visas. This had risen to 90 percent in 2005. Taulbee Survey responses for enrollments suggest that these figures are unlikely to change significantly in the next few years.

The Taulbee Survey also collects information on what doctorate recipients were doing the first year after they received their degrees. One way of

grouping the results is by categories of academia (with most working in PhD-granting departments), non-academia (most in industry, and single-digit portions in government or self-employed), and work outside the United States and Canada. Between 1985 and 1990, more doctorates worked in academia (50%) than outside it (40%). After this, however, employment in industry dominated, rising to nearly 60 percent in 1997. Since 2001, however, there have been two dramatic reversals. Between 2001 and 2003, the share of doctorates going into academia jumped from 44 percent to 64 percent, with a concomitant drop in the share working in industry from 52 percent to 32 percent. As the fortunes of the IT industry recovered, so did doctoral employment in the sector. By 2006, industry claimed 54 percent of doctorates while academia had slipped to 33 percent. During all of this, the share of doctorates working outside the United States and Canada varied between 10 percent and 18 percent from the mid-1980s until the mid-1990s, and then dropped to about 5 percent until 2004. Since then, the share working abroad has returned to 13 percent.

## Additional Information

There are three places on the CRA website to find degree information: the CRA Bulletin ([www.cra.org/bulletin](http://www.cra.org/bulletin)), the Taulbee Survey home page ([www.cra.org/statistics](http://www.cra.org/statistics)), and the compilation of NSF data at [www.cra.org/info/education/us/](http://www.cra.org/info/education/us/). ■



## New CRA Staff Member



CRA is pleased to welcome Kapil Patnaik to the staff as its IT Manager/Webmaster.

Kapil has a Bachelor of Technology degree from the Regional Engineering College in Rourkela, India, and an M.S. from George Washington University with a concentration in electrical engineering, networks, and communication. He comes to CRA from the American Public Human Service Association where he served as Web Manager. Prior to that, he was a Web Operations Specialist at Interactive Multimedia Applications Group.

Kapil brings with him more than six years of experience in Web Development/Design Processes, and we look forward to the contributions he will make in strengthening CRA's website and upgrading its IT services. ■

## 2008 CRA Outstanding Undergraduate Awards Deadline October 15

The Computing Research Association is pleased to announce the 14th annual CRA Outstanding Undergraduate Awards Program, which recognizes undergraduate students in North American universities who show outstanding research potential in an area of computing research.

Nominees must attend a university or college located in North America, and must be nominated by two faculty members and recommended by the chair of their home department. No more than two male and two female candidates can be recommended by the same department chair in the same year.

The awards committee looks for demonstrated excellence of computing research ability. The type of department in which the student is majoring and the area of computing in which the student has demonstrated ability are immaterial. What is important is the quality of the research work done by the student. The awards committee also considers the student's academic record and service to the community. Preference is given to students in their senior year (or the equivalent).

A cash prize of \$1,000 will be awarded to each of two undergraduate students, one female and one male. A small number of other outstanding candidates will be recognized as Runners-Up and Finalists. All nominees whose work is considered to be exemplary are recognized with Honorable Mentions.

The awards are presented at one of the major computing research conferences sponsored by CRA, ACM, the IEEE Computer Society, SIAM, AAAI, or USENIX. The two first-prize winners will receive financial assistance from CRA toward their travel to the conference. CRA will also sponsor a departmental reception for the two winners at their home institutions.

CRA gratefully acknowledges the support of Microsoft Research and Mitsubishi Electric Research Labs (MERL) who sponsor the Outstanding Undergraduate Awards Program in alternate years. MERL is the 2008 sponsor.

Additional information about the nomination procedure and criteria for selection are available on the CRA website: <http://www.cra.org>. All nominations must reach CRA by **October 15, 2007**. ■

## Transitions and Awards

The Anita Borg Institute presented Women of Vision Awards to **Leah Jamieson** (Purdue University), **Deborah Estrin** (UC Los Angeles), and **Duy-Loan Le** (Texas Instruments) at a gala reception in San Jose on May 3, 2007. They were honored for their accomplishments and contributions as women in technology in the categories of Innovation, Social Impact, and Leadership (respectively).

CRA board member, **Martha E. Pollack**, was named Dean of the School of Information at the University of Michigan, effective August 1. She was previously Professor of Electrical Engineering and Computer Science at the university, and served as Associate Chair for CS&E since 2004.

In May it was announced that the IEEE had named **Randal E. Bryant**, University Professor and Dean of the School of Computer Science at Carnegie Mellon University, as the recipient of its 2007 Emanuel R. Piore Award in recognition of his contributions to the simulation and verification of electronic systems. Congratulations Randy!

**Jan Cuny** was recently honored by Women in Technology (WIT) with one of their Leadership Awards for her contributions in the field of government. Cuny, Professor of Computer and Information Science at the University of Oregon, currently directs the Broadening Participation in Computing (BPC) program in CISE at the National Science Foundation. WIT is a non-profit organization that contributes to the success of professional women in the Washington technology community.

Carnegie Mellon University has named CRA board member, **Peter Lee**, the head of its CS Department in the School of Computer Science. Lee was previously professor and vice provost for research at CMU.

Congratulations to **Shankar Sastry** who was recently appointed dean of the College of Engineering at UC-Berkeley.

Harvard University has named **Michael D. Smith** its new dean of the Faculty of Arts and Sciences. Smith, who assumed his new position in July, was previously associate dean for computer science and engineering at Harvard.

Congratulations to CRA board member, **Anne Condon**, Professor of Computer Science at the University of British Columbia, who has recently been promoted to Associate Dean for Faculty Affairs and Strategic Initiatives.

**Stu Feldman** has been named Vice President, Engineering, East Coast, at Google. He was formerly Vice President for Computer Science at IBM Research.

Former CRA board chair, **Jim Foley**, the Stephen Fleming Chair in Telecommunications at the College of Computing at Georgia Tech, was honored by ACM's Computer Human Interaction Special Interest Group (SIGCHI) with a Lifetime Achievement Award, its most prestigious award. It was presented at ACM's Computer/Human Interaction 2007 Conference in San Jose, California.

**Bobby Schnabel** has recently assumed his new position as dean of the School of Informatics at the University of Indiana. A CRA board member, Schnabel was previously vice provost/associate vice chancellor for Academic and Campus Technology and professor of computer science at the University of Colorado at Boulder. ■

## In Memoriam

Friends and colleagues are mourning the sudden death of **Stephen Mahaney**, a Senior Advisor in the Computer and Information Science and Engineering Directorate at the National Science Foundation, on June 26, 2007.

We are sorry to report the death of **Ray von Dran**, Syracuse University, on July 23. Dr. von Dran was about to step down as dean of the School of Information Studies at Syracuse. He was an active member of the IT Deans Group whose meetings are collocated with CRA board meetings, and he will be greatly missed by his many friends and colleagues in the community. ■

## Undergraduate Awards Presented

CRA's Undergraduate Awards were presented at two venues this year.

The female winner, Stephanie Rosenthal from Carnegie Mellon University, received her award at the SIGCHI Awards Dinner in San Jose on April 29. Jim Foley (Georgia Tech), former CRA board chair, made the presentation.

On April 17, CRA sponsored a reception for students and faculty of the CS program at Princeton University to honor Lester Mackey, the male winner of this year's award, and David Weiss, who received Honorable Mention in the 2007 competition. Jen Rexford, Princeton faculty member and a CRA board member, made the presentations. ■



Photo credit: Frank Wojciechowski Photography



Photo by Ben Shneiderman

Stephanie Rosenthal and Jim Foley at the SIGCHI Awards Dinner on April 29.

Pictured at Princeton (l to r): Dean of the Faculty, David Dobkin; Lester Mackey; Jen Rexford; David Weiss; and Vince Poor, Dean of the School of Engineering and Applied Science.

## Nominees Sought for CRA Board

The Computing Research Association seeks your help in suggesting nominations for its Board of Directors. The deadline for receipt of nominations is **November 30, 2007**.

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

- **On January 8, 2008**, from the nominations received, the Elections Committee will announce its candidates for the ballot.
- **On February 8, 2008**, nominations are due for candidates nominated by petition signed by the heads of at least 10 Constituent Member Organizations that are current in dues payment.

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

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

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

Additional information on CRA and its activities is available on the Web at <http://www.cra.org> or by e-mailing [elections@cra.org](mailto:elections@cra.org).

Please contact the person you are nominating before submitting his or her name to ensure that the nominee is willing to stand for election to the board. Those who are nominated are required to write a brief statement (not to exceed 100 words) supporting their nominations.

To receive a nomination form, send an e-mail request to [elections@cra.org](mailto:elections@cra.org). **Nominations must reach CRA by November 30, 2007.** ■

## CRA Participates in CNSF Exhibit

The Coalition for National Science Funding held its annual Science Exposition on Capitol Hill in late June. The event, a science fair for Congress and staff, had 35 booths manned by researchers representing universities and scientific societies featuring some of the important research funded by NSF. This year CRA was represented by Lydia Kavradi, a computer science professor from Rice University, whose research into using computational tools to solve problems in a range of areas such as biology was a hit with all those who stopped at the booth. Kavradi is pictured chatting with Rep. Dan Lipinski (D-IL). There were also a number of NSF staff members and a large contingent of Congressional staff, particularly from the House Science and Technology Committee, in attendance. ■



### \*\*\* SNOWBIRD 2008 ALERT \*\*\*

Department Chairs and Directors of Labs/Centers

*Mark your calendars now for CRA's Conference at Snowbird 2008!*

*July 13-15*

### CRA Academic Careers Workshop

for  
New Faculty and Advanced Graduate Students  
in  
Computing-Related Disciplines

**February 25-26, 2008 – Washington, DC**

See: <http://www.cra.org>

## CRA Welcomes New Board Members



Pictured above at CRA's summer board meeting at the Microsoft Conference Center are (l to r): Board Chair Dan Reed (UNC), IEEE CS rep Marie desJardins (UMBC), Fred Schneider (Columbia), Laura Haas (IBM Almaden Research Center), Martha Pollack (UMichigan), and Andy Bernat (CRA Executive Director).

## Keeping Up on the News? Check out these CRA Sites

**CRA Bulletin** [www.cra.org/bulletin](http://www.cra.org/bulletin)

Subscribe to its RSS feed or sign up for a digest version sent out by e-mail.

**Sample Headlines:**

Changes in Employment and Wages for Computer Specialists  
Sharp Drop in Extended Mass Layoffs in IT Industries Since 2001  
CCC Talks and an RFP at FCRC  
Record Growth in PhD Production  
How Companies Decide Where to Locate R&D  
NYTimes Article on Women and CS

**CRA Policy Blog** <http://cra.org/blog>

All the latest in computing research policy news.

**Sample Headlines:**

Women and IT in BizTech  
President Will Sign COMPETES Act  
Competitiveness Bills Wrapping Up?  
President's Remarks on Research and Innovation  
Appropriations Update  
NSF Reports on Research Publishing

**Sign up for CRA Announcements:** Receive e-mail messages about CRA projects and events on a regular basis. To subscribe, see details at <http://www.cra.org>.

## 2006-07 Computing Research Association Members

Arizona State University - CSE  
 Auburn University - CSSE  
 Binghamton University, SUNY - CS  
 Boston College - CS  
 Boston University - CS  
 Bowling Green State University - CS  
 Bradley University - CS  
 Brandeis University - CS  
 Brigham Young University - CS  
 Brown University - CS  
 Bryn Mawr College - MCS  
 Bucknell University - CS  
 California Institute of Technology - CS  
 California Polytechnic State University - CS  
 Carnegie Mellon University - CS  
 Case Western Reserve University - EECS  
 City University of New York, Graduate Center - CS  
 Claremont Graduate University - IST\*  
 Clemson University - CS  
 Colgate University - CS  
 College of William & Mary - CS  
 Colorado School of Mines - MCS  
 Colorado State University - CS  
 Columbia University - CS  
 Cornell University - CS  
 Cornell University - ECE  
 Dalhousie University - CS  
 Dartmouth College - CS  
 DePaul University - CS  
 Drexel University - IST  
 Drexel University - CS  
 Duke University - CS  
 Emory University - MCS  
 Florida Atlantic University - CSE  
 Florida Institute of Technology - CS  
 Florida International University - CS  
 Florida State University - CS  
 Florida State University - IS  
 George Mason University - CS\*  
 George Washington University - CS\*  
 Georgia Institute of Technology - CSE\*  
 Georgia Institute of Technology - CSS\*  
 Georgia Institute of Technology - IIC\*  
 Georgia Southern University - IT  
 Georgia State University - CS  
 Grinnell College - MCS  
 Harvard University - CS  
 Harvey Mudd College - CS  
 Hobart and William Smith Colleges - MCS  
 Hofstra University - CS\*  
 Illinois Institute of Technology - CS  
 Illinois State University - ACS  
 Indiana University - ICS  
 Iowa State University - CS  
 Johns Hopkins University - SI  
 Johns Hopkins University - CS  
 Juniata College - IT & CS  
 Kansas State University - CIS  
 Kent State University - CS  
 Lafayette College - CS  
 Lehigh University - CSE  
 Long Island University - ICS  
 Louisiana State University - CS  
 Massachusetts Institute of Technology - EECS  
 Memorial University of Newfoundland - CS\*  
 Miami University - CS  
 Michigan State University - CSE  
 Michigan Technological University - CS  
 Mississippi State University - CSE  
 Montana State University - CS  
 Montclair State University - CS  
 Mount Holyoke College - CS\*  
 National University of Singapore - CS/IS  
 Naval Postgraduate School - CS  
 New Mexico State University - CS  
 New York University - CS  
 North Carolina State University - CS  
 North Dakota State University - CSOR\*  
 Northeastern University - CIS

Northwestern University - EECS  
 Nova Southeastern University - CS\*  
 Oakland University - CSE  
 Ohio State University - CSE  
 Ohio University - EECS  
 Oklahoma State University - CS  
 Old Dominion University - CS  
 Oregon State University - EECS  
 Pace University - CSIS  
 Pennsylvania State University - IST  
 Pennsylvania State University - CSE  
 Polytechnic University - CIS  
 Pomona College - MCS  
 Portland State University - CS  
 Princeton University - CS  
 Purdue University - ECE  
 Purdue University - CS  
 Rensselaer Polytechnic Institute - CS  
 Rice University - CS  
 Rochester Institute of Technology - CS  
 Roosevelt University - CS&T  
 Rutgers University, Busch Campus - CS  
 Saint Louis University - MCS  
 Santa Clara University - CE  
 Simon Fraser University - CS  
 Singapore Management University - IS  
 Southern Illinois University, Carbondale - CS  
 Southern Methodist University - CSE  
 Southern Polytechnic State University - CSE  
 Stanford University - CS  
 Stevens Institute of Technology - CS  
 Stony Brook University, SUNY - CS  
 Swarthmore College - CS  
 Syracuse University - IS  
 Temple University - CIS  
 Texas A&M University - CS  
 Texas State University - CS\*  
 Toyota Technological Institute at Chicago - CS  
 Tufts University - CS  
 Union College - CS  
 University at Buffalo - CSE  
 University of Alabama, Birmingham - CIS  
 University of Alabama, Tuscaloosa - CS  
 University of Alberta - CS  
 University of Arizona - CS  
 University of Arkansas at Little Rock - IS&SE  
 University of British Columbia - CS\*  
 University of Calgary - CS  
 University of California, Berkeley - EECS  
 University of California, Berkeley - IMS  
 University of California, Davis - CS  
 University of California, Irvine - ICS  
 University of California, Los Angeles - CS  
 University of California, Riverside - CSE  
 University of California, San Diego - CSE  
 University of California, Santa Barbara - CS  
 University of California, Santa Cruz - CS  
 University of California, Santa Cruz - CE  
 University of Central Arkansas - CS\*  
 University of Central Florida - CS  
 University of Chicago - CS  
 University of Cincinnati - CS  
 University of Colorado, Boulder - CS  
 University of Delaware - CIS  
 University of Denver - ECS  
 University of Georgia - CS  
 University of Hawaii - ICS  
 University of Houston - CS  
 University of Illinois, Chicago - CS  
 University of Illinois, Urbana Champaign - CS  
 University of Illinois, Urbana Champaign - ECE  
 University of Iowa - CS  
 University of Kansas - EECS  
 University of Kentucky - CS

University of Louisiana at Lafayette - CACS  
 University of Louisville - CECS  
 University of Maine - CS  
 University of Maryland - CS  
 University of Maryland, Baltimore Co - CSEE  
 University of Maryland, Baltimore County - IS  
 University of Massachusetts, Amherst - CS  
 University of Massachusetts, Boston - CS  
 University of Michigan - I  
 University of Michigan - EECS  
 University of Michigan, Dearborn - CIS  
 University of Minnesota - CSE  
 University of Minnesota, Duluth - CS\*  
 University of Mississippi - CIS  
 University of Missouri, Columbia - CS  
 University of Missouri, Kansas City - CS\*  
 University of Missouri, Rolla - CS  
 University of Montana - CS  
 University of Nebraska at Omaha - CS/IST  
 University of Nebraska, Lincoln - CSE  
 University of Nevada, Las Vegas - CS  
 University of Nevada, Reno - CSE  
 University of New Brunswick - CS  
 University of New Hampshire - CS  
 University of New Mexico - CS  
 University of New Mexico - ECE  
 University of North Carolina at Chapel Hill - CS  
 University of North Carolina at Chapel Hill - SILS  
 University of North Carolina, Charlotte - IT  
 University of North Dakota - CS  
 University of North Texas - CS  
 University of Notre Dame - CSE  
 University of Oklahoma - CS  
 University of Oregon - CIS  
 University of Pennsylvania - CIS  
 University of Pittsburgh - CS

University of Pittsburgh - IS  
 University of Puget Sound - MCS  
 University of Rochester - CS  
 University of South Alabama - CIS  
 University of South Carolina - CSE  
 University of South Florida - CSE  
 University of Southern California - EES  
 University of Southern California - CS  
 University of Tennessee, Knoxville - EECS  
 University of Texas, Arlington - CSE  
 University of Texas, Austin - ECE\*  
 University of Texas, Austin - CS  
 University of Texas, Dallas - CS  
 University of Texas, El Paso - CS  
 University of Toronto - CS  
 University of Tulsa - MCS  
 University of Utah - CS  
 University of Virginia - CS  
 University of Washington - CSE  
 University of Washington - I  
 University of Washington, Bothell - CS  
 University of Washington, Tacoma - CSS  
 University of Waterloo - CS  
 University of Wisconsin, Madison - CS  
 University of Wisconsin, Milwaukee - EECS  
 University of Wyoming - CS  
 Utah State University - CS  
 Vanderbilt University - EECS  
 Villanova University - CS\*  
 Virginia Commonwealth University - CS  
 Virginia Tech - CS  
 Wake Forest University - CS  
 Washington State University - EECS  
 Washington University in St. Louis - CS  
 Wayne State University - CS  
 Williams College - CS  
 Worcester Polytechnic Institute - CS  
 Wright State University - CSE  
 Yale University - CS  
 York University - CS

### Labs and Centers Members

Microsoft Corporation (*Sustaining Member*)  
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 San Diego Supercomputer Center  
 SAP Labs  
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### Affiliate Professional Society Members

American Association for Artificial Intelligence   
 Association for Computing Machinery   
 Canadian Association of Computer Science (CACS/AIC)  
 IEEE Computer Society   
 Society for Industrial and Applied Mathematics   
 USENIX Association 

\*Indicates new members in 2006-07

**Key Appropriations, Authorizations from Page 1**

percent increase in the House bill. House Appropriations Committee members appeared particularly pleased with the ASCR program, noting in the committee report that accompanied the appropriations bill to the floor that:

*Perhaps no other area of research at the Department is so critical [as ASCR] to sustaining U.S. leadership in science and technology, revolutionizing the way science is done, and improving research productivity.*

While the DOE Sci increases are significant, they are mitigated somewhat because the agency did not get its full allotment of funding in FY 2007 (as requested by the President and approved by Congress) because of the appropriations “meltdown” that ultimately required a long-term, stopgap funding measure that cut funding to agencies across the board. While both NSF and DOE Sci had some of their gains in the FY 2007 appropriations process protected in the stopgap measure, DOE Sci was harder hit.

The House and Senate Appropriations Subcommittees on Commerce, Justice, and Science also approved their versions of the FY 2008 CJS Appropriations bill, which include funding for science agencies NSF, NIST, NASA and NOAA. Under both chambers’ versions of the bill, NSF would see an increase of about 10 percent to its research accounts. Additionally, the Senate included language noting its support for NSF’s proposed new cross-directorate research initiative called “Cyber-enabled Discovery and Innovation” (CDI) and providing the full requested funding for the program of \$52 million in FY 2008—of which NSF’s Computer and Information Science and Engineering (CISE) directorate will control about \$20 million. The initiative aims to “explore radically new concepts, approaches and tools at the intersection of computational and physical and biological worlds to address such challenges,” and stems, in part, from an idea for an initiative that emerged from the computing theory community. NSF intends to increase funding for the program to \$250 million per year by FY 2012, with CISE likely controlling a proportionate share.

The Senate Appropriations Committee also included increases of just over 15 percent for NIST’s core research programs, and a \$69 million budget for the Computer Science and Applied Mathematics program at the agency.

As this issue goes to press, the House Appropriations Subcommittee on Defense had just released its approved funding levels for the Department of Defense, including Defense research, for FY 2008. Overall, funding levels for defense research would be up compared to the President’s requested budgets for FY 2008, but down—in some cases significantly—compared to FY 2007. Basic research (6.1) would be up \$48 million over the request, but down \$10 million (or 0.7 percent) versus FY 2007. Applied research (6.2) would go up \$724 million compared to the request (a 16.6 percent increase),

but is still a \$248 million (4.7 percent) decrease versus FY 2007. Advanced Technology Development (6.3) would see an increase of \$571 million over the request (11.4 percent), but decrease \$874 million (13.6 percent) versus FY 2007.

In addition, the Defense Advanced Research Projects Agency (DARPA) is also called out for special reductions in the House bill, related to concerns the committee continues to have with the rate of spending at the agency. DARPA has been slow to execute programs for which it has been appropriated money, either because the agency has been a careful steward of taxpayer dollars or because programs have become bottlenecked in the Director’s office, depending on whether one believes the agency’s explanation or the feeling among some congressional committee staff. As a result, the committee reduced funding in the Biological Warfare, Electronics Technology, Advanced Aerospace Systems and Land Warfare Technology program elements. These cuts amount to a loss of \$80 million to DARPA versus FY 2007, a reduction of 2.6 percent.

However, all these funding levels are just a first step in what promises to be a contentious appropriations process with the President. The President has indicated he intends to veto most, if not all, of the spending bills the House has approved so far, should they be presented to him. For Congress-watchers, this is not terribly surprising. Facing for the first time a Congress controlled by Democrats, it was likely that the President would be drawn into a political fight over spending, and his most effective leverage in that fight is the veto. While Congress continues to move forward with passing the twelve annual appropriations bills necessary to fund the operations of government, it is unlikely that many will pass with the majority required to override any potential presidential veto. Indeed, in the House, the “magic number” for the President is 145—he needs only 145 out of 201 Republican members of the House to sustain any veto and preserve his leverage in the spending negotiations that will follow.

While it is unclear what kind of train wreck the appropriations process will be, many in the scientific advocacy community believe it may again end in another large omnibus appropriations bill passed late in the session (or early next year). Despite strong support for science programs in Congress and by the President, any science programs stuck in an omnibus could be threatened by any across-the-board cuts to the bill that might be required to get spending down to a level that the President will ultimately accept and sign. Then the focus of the science advocacy community will once again be on protecting the increases for science agencies approved by Congress and supported by the President in a bill in which those programs are just a few of the hundreds, if not thousands, of programs competing for support. The good news for the community, however, is that such a strategy did find some small amount of success last year when a special protection was granted to NSF, NIST and DOE Sci that

preserved some of the increases they received in a final bill that ultimately cut spending by 4 percent.

Despite the veto threat, the funding levels included in the appropriations bills for science are powerful symbols of the support R&D issues have in Congress—even if it is likely that those levels might get modified in the coming months for reasons having nothing to do with Congress’s support of science.

Another powerful symbol of support is the conference agreement on H.R. 2272, the America COMPETES Act—a compromise bill between the Senate’s S. 761, The America COMPETES Act and the House’s HR 2272, the 21<sup>st</sup> Century Competitiveness Act. This huge bill incorporates significant portions of both chambers’ versions of omnibus innovation legislation, calling for the doubling of NIST, NSF and DOE Sci over seven years, the creation of a variety of new programs geared towards

increasing the number of U.S. students who choose to study math and science and increasing the number of teachers who teach them, as well as some prize programs and other organizational changes to spur innovation at federal science agencies like DOE Sci. (As this issue went to press, the final details on the compromise measure were not yet known. But see CRA’s Computing Research Policy Blog for all the details (<http://cra.org/blog>).

Symbolically, this compromise legislation is especially important for Congress. Both Congress and the Administration have spent a considerable amount of time over the past two years talking about the importance of bolstering the chain of innovation that helps keep America a world leader, but neither has much to show for it. With HR 2272 on its way to final passage, it appears that could change soon. ■

## CRA Hosts Tisdale Fellows

On August 2, CRA hosted a luncheon for the 2007 Tisdale Fellows, where Peter Harsha provided a brief overview of CRA’s government affairs activities. The Tisdale Fellowship Program brings college students to Washington, DC for summer internships that explore current public policy issues of critical importance to the high technology sector of the economy.



Photo Credit: Frank Wojciechowski Photography

(Left to right) Susan Fredholm (Technology CEO Council and Mehlman Vogel Castagnetti); Cynthia Kuo (Dell); Joshua Cregger (Monster); Chung-Chun Huang (Computing Research Association); Rolando Manzo (Information Technology Association of America); Srinivas Gopalan (TechNet); Avonne Bell (Hewlett Packard); Kate Vershov (Philips Electronics); Kristin Centanni (Business Software Alliance); and Patrick Dieter (Infotech Strategies)

**Expanding the Pipeline from Page 1**

3. <http://www.cse.ucsd.edu/isca2007/TravelGrants.html>
4. <http://www.workoptionsgroup.com/>
5. <http://gracehopper.org/2007/participate/child-care/>
6. <http://www.gso-edit.princeton.edu/studentlife/childcare/carebridge/>
7. <http://ccrs.hcd.uiuc.edu/parents/backup.htm>

**Sarita V. Adve** ([sadve@cs.uiuc.edu](mailto:sadve@cs.uiuc.edu)) is a Professor of Computer Science at UIUC. This article evolved from discussions with Anne Condon (UBC), Margaret Martonosi (Princeton), and Elaine Weyuker (AT&T), and is additionally endorsed by Vikram Adve, Andrea Arpaci-Dusseau, Remzi Arpaci-Dusseau, Anita Borg Institute for Women and Technology, Doug Burger, Alan Cox, Carla Ellis, Babak Falsafi, Mark Hill, Mary Jane Irwin, Norm Jouppi, Maria Klawe, Li-Shiuan Peh, Larry Pileggi, Marc Snir, and Guri Sohi. Andrew Bernat, Richard Ladner, and David Patterson also gave valuable comments. ■

## Professional Opportunities

### CRN Advertising Policy

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

#### Colby College

Computer Science Full-time Assistant Professor Position

Full-time tenure-track position, assistant professor, starting September 2008. Review of applications will begin November 1, 2007.

For more information, see: <http://www.cs.colby.edu/jobs/>

#### D. E. Shaw & Co., L. P. Software Developer

Location: New York, NY and Cupertino, CA

The D. E. Shaw group is looking for top-notch, innovative software developers to help it expand its tech venture and proprietary trading activities. We're a global investment and technology development firm with approximately US \$29 billion in aggregate investment capital and a decidedly different approach to doing business. The application of advanced technology is an integral part of virtually everything we do, from developing computationally intensive strategies for trading in securities markets around the globe to designing a supercomputer intended to fundamentally transform the process of drug discovery.

Developers at the firm work on a variety of interesting technical projects including real-time data analysis, distributed system development, and the creation of tools for mathematical modeling. They also enjoy access to some of the most advanced computing resources in the world. If you're interested in applying your intellect to challenging problems of software architecture and engineering in a stimulating, fast-paced environment, then

we'd love to see your resume.

To apply, e-mail your resume to: <mailto:CRA-Prog@career.deshaw.com>. EOE.

#### Henry M. Jackson Foundation Bioinformatics Cell Senior Scientist

We are looking for a dynamic scientist to join the U.S. Army Medical Command's Bioinformatics Cell (BIC). This opening is for a senior-level scientist with proven technical experience to work in an interdisciplinary environment with focus on the development and application of computational solutions to biomedical problems involving the analysis of genomic, proteomic, and time-series physiologic data. The candidate should have a Ph.D. in a related discipline (physical science with experience in biomedical problems or life science with excellent computational skills), at least 7 years of experience, and a strong publication record. The candidate is expected to simultaneously work in multiple projects involving a diverse and inter-disciplinary team of scientists across multiple laboratories. This position is located in Frederick, Maryland.

To apply send resume to: Jaques Reifman, Ph.D.  
Email: [reifman@bioanalysis.org](mailto:reifman@bioanalysis.org)  
Phone: 301-619-7915  
<http://www.bhsai.org>

#### Institute for Defense Analyses Center for Computing Sciences Research Staff Members

The Institute for Defense Analyses Center for Computing Sciences is looking

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

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

Developing imaginative computational solutions employing novel digital technology is one of several long-term themes of work at CCS. The Center is equipped with a very large variety of hardware and software. The latest developments in high-end computing are heavily used and projects routinely challenge the capability of the most advanced architectures.

IDA/CCS offers a competitive salary, an excellent benefits package and a superior professional working environment. IDA/CCS is located in a modern research park in the Maryland suburbs of Washington, DC.

U.S. citizenship and a DoD TS//SI clearance are required. CCS will sponsor this clearance for those selected.

The Institute for Defense Analyses is proud to be an equal opportunity employer. Please send responses or inquiries to: Francis Sullivan

Director  
IDA Center for Computing Sciences  
17100 Science Drive  
Bowie, MD 20715-4300  
[fran@super.org](mailto:fran@super.org)  
301-805-7534

#### Tata Research Development & Design Centre (TRDDC) Software and Systems R&D Member of Research Staff

TRDDC, a Pune, India-based research unit of Tata Consultancy Services Ltd. (TCS), is looking for exceptional and highly motivated MS/MTech/PhD candidates with research aptitude in all areas of Computer Science. Specific areas of interest include algorithms; formal methods; model-driven software development; program and requirements analysis; software testing; distributed/operating systems and networks; data privacy and security; databases and data warehouses; statistical data analysis and data mining; machine learning; information extraction and retrieval; decision support systems; among others.

TRDDC is one of India's premier R&D centers in Computer Science, and TCS is the largest Indian IT company. R&D work at TRDDC leads to the creation of intellectual assets that address some of the most challenging problems faced by the IT industry and, more generally, by the computing science research community. Researchers at TRDDC collaborate with academia, start-ups, industrial partners, and TCS clients; publish R&D results in top-tier conferences/journals; and instantiate their findings to create novel products and services. TRDDC offers a friendly and

### Computer Science at TTI-Chicago Faculty Positions at All Levels

Toyota Technological Institute at Chicago (TTI-C) is a recently established institute of computer science located on The University of Chicago campus. Applications are being accepted for faculty positions at all ranks. In addition to traditional faculty positions, TTI-C is also seeking limited term faculty positions. The Institute is expected to grow to a steady-state of 12 traditional faculty (tenure and tenure track), and 18 limited term faculty by 2010.

TTI-Chicago is supported by the earnings on a fund of \$105 million. We are dedicated to education of Doctoral students and to basic research in fundamental areas of computer science. Faculty members are expected to receive continuing research grants and will have a teaching load of one course per year in a quarter system. TTI-C has close ties with the Computer Science Dept. of The University of Chicago.

Faculty is particularly sought with research programs in computer vision, theoretical computer science, computational linguistics, computational biology, electronic commerce and scientific computing.

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

<http://ttic.uchicago.edu/facapp>



Toyota Technological Institute at Chicago is an Equal Opportunity Employer.



Louisiana Tech University College of Engineering and Science

Cluster Hire in Cyberspace Security

Faculty and Post-Doc Positions

Louisiana Tech University has significant strengths in the areas of cyberspace security, distributed data storage grid computing, and sensors networks. Through a targeted investment by the State, the University has established a Center for Secure Cyberspace. The College of Engineering and Science invites applications for tenure-track faculty positions and post-doc positions in the Computer Science and Electrical Engineering Programs. Louisiana Tech is one of six member institutions of the Louisiana Optical Network Initiative (LONI), which represents a \$50M investment by the State in computing and networking infrastructure. The infrastructure includes a statewide supercomputing grid with a projected computing power of 100 Tflops which is connected by a high-bandwidth (40 Gbps) multi-lambda fiber-optic network that is also tied to the National Lambda Rail. This cluster hire is designed to build a team of faculty and researchers to complement our existing strengths and to collaborate with Louisiana State University faculty associated with the center. Expertise in one or more of the following is desired:

- Internet and network security, security in sensor networks
- Electromagnetics for sensing and/or interference of wireless networks
- Secure wireless networks and communications protocols
- High Performance Computing that leverages any of these research areas

**Tenure Track Faculty requirements:** Ph.D. in Computer Science, Electrical Engineering, Mathematics or closely related field with distinguished record of scholarship commensurate with experience, exceptional potential for world-class research, and a commitment to undergraduate and graduate education. Excellent oral and written communication skills, commitment to high quality professional service, and active participation in college responsibilities are expected. All faculty levels (Assistant, Associate, and Full) being considered based upon experience.

**Post-Doc requirements:** Ph.D. in computer science, mathematics, computer/electrical engineering or closely related field. Immediate needs are in the areas of sensor networks, Cyberspace security, and visualization with high interest in anomaly detection, network traffic analysis, biometric authentication, Internet traceback, and visualization of malicious network activity. Relevant industrial experience, and/or entrepreneurial experience are advantages.

Please submit in electronic form curriculum vitae, statement of research and teaching interests, and the names and contact information for at least three references to:

Chair of Cyberspace Security Search Committee  
Box 10348, Ruston, LA 71272-0046  
e-mail: [CSSearch@latech.edu](mailto:CSSearch@latech.edu)

Applications will be reviewed on a continual basis until all positions are filled. Please see <http://www.latech.edu/coes> for further details. EEO/AA employer. Women and minorities are encouraged to apply.

Passion to be the Best

## Professional Opportunities

informal research environment, along with an opportunity to pursue a PhD while working.

If you have a top-flight academic record and a passion for R&D, come join us! Write to us at: [trddc@tcs.com](mailto:trddc@tcs.com) with 'Opportunities' as the subject. For more details visit us at: <http://www.tcs-trddc.com>

### University of Colorado-Boulder Interdisciplinary Telecommunications Program (ITP) Faculty Director Senior Instructor

ITP is the nation's first program of its kind, has a 30-year track record of success, and possesses an active research faculty with a dynamic and international student body. To learn more about the program go to: <http://telecom.colorado.edu>

To apply for either position, go to <http://www.jobsatcu.com>, and search for job posting number 801877 and 801876, respectively.

The Search Committee requests interested applicants to send their CV and a statement of interest by Sept. 30, 2007.

### University of Illinois at Urbana-Champaign

Computer Science Department  
Post Doctoral Research Associate  
Machine Learning Post-Docs at UIUC

The Cognitive Computation Group at the University of Illinois at Urbana-Champaign has one or two post-doc positions for the 2007-08 academic year, with possible extensions.

The positions are in the area of Machine Learning and, in particular, the use of background knowledge and inference techniques as part of the learning process.

Prospective candidates should apply with a cover letter, CV, statement of research interests and accomplishments, and names and e-mail addresses of three references. Please send by e-mail with the subject line: "Post-Doc ML" to:

Name: Robin King  
Email: [rbking@uiuc.edu](mailto:rbking@uiuc.edu)  
Phone: (217) 244-4789

The start date can be as early as Aug. 15, 2007. For more information about our research, please look at: <http://L2R.cs.uiuc.edu/~cogcomp/>

### University of Rochester Computer Science Department Director: Center for Computational Arts, Sciences and Engineering

The University of Rochester invites applications for a tenured or tenure track position as Director of an emerging Center for Computational Arts, Sciences, and Engineering. A joint venture of the University Office of Information Technology and some 16 departments in the College of Arts, Sciences, and Engineering and the School of Medicine and Dentistry, the Center represents a substantial commitment of space and financial resources. The Director will serve as administrative and technical leader for

computationally intensive interdisciplinary efforts across the full range of research fields, and will enjoy a faculty appointment in Computer Science or other related department. Candidates must possess an appropriate doctoral degree and an established record of leadership in high-end research computation.

Founded in 1850, the University of Rochester is one of the nation's leading private research institutions. Many of its doctoral programs are ranked among the finest in their fields, and the distinctive combination of small size and high quality facilitates intellectual and educational linkages across departments and schools. Full-time enrollment totals approximately 4,600 undergraduates and 2,900 graduate students. Aggregate annual external research funding exceeds \$350M. Signature efforts in computational science include astrophysical fluid dynamics, bioinformatics, cognitive science, computer architecture, inertial-confinement fusion, *(continued)*



### Arizona State University- Fulton School of Engineering

#### Senior Faculty Position in Media Computing/Engineering

The Arts, Media and Engineering Program (AME) (<http://ame.asu.edu>) at the Fulton School of Engineering and the Herberger College of the Arts at Arizona State University is announcing a leadership-level, tenured, senior faculty opening in Media Computing and Engineering.

AME is a nationally leading program for transdisciplinary research and education in media. The program has established digital media concentrations in the PhD and Masters degrees of ten different disciplines: Electrical Engineering, Computer Science and Informatics, Bioengineering, Psychology, Education, Design, Dance, Music, Theater and Film, Visual Arts. The program also offers a PhD in Media Arts and Sciences. Ten AME faculty and thirty affiliated faculty from the participating departments work collaboratively with graduate students supported by research assistantships for the creation of innovative experiential media systems, models and applications. Core research areas include: multimodal sensing, perception and modeling, interaction and feedback, experiential composition and knowledge creation. AME research results in applications of societal significance in the areas of health, communication, education and creativity. The program has diverse external support streams: federal (NSF, NEA, NEH, NIH – they include prestigious IGERT and CISE RI grants), Foundation (Kauffman), and industry (Microsoft, IBM, Deutsche Telecom, Avaya, NRC). AME is a well-supported, strategic initiative of ASU and is a key part of the highly innovative New American University concept being established at ASU (<http://www.asu.edu/president/newamericanuniversity>). AME has collaborative projects with other strategic initiatives of ASU (Sustainability, Biodesign and more).

The successful candidate will take a leadership role in the media computing and engineering research and education activities of AME. The appointee will be invited to serve as *Associate Director* of AME so they can better influence the development of the unit. The appointee will contribute significantly to the evolution of AME's integrated approach to media research and education – an approach that spans arts, sciences and engineering and is strongly connected to the local and global community and to industry.

The individual hired will spearhead research in the area of their interest. The appointee's efforts will merge with efforts of other AME faculty for the achievement of significant advancements in experiential media. The appointee will have the opportunity to collaborate with distinguished faculty of diverse backgrounds and specializations, explore connections with participating unit(s) of interest and provide mentorship to the highly innovative transdisciplinary junior faculty at AME. The successful individual will also work with other AME faculty to shape the educational mandate of AME.

**Required Qualifications:** Doctorate degree in Engineering OR Computing OR Media OR closely related field; significant research record and international reputation in media computing/engineering commensurate with the level of the appointment; strong external income record.

**Desired Qualifications:** Experience in industry-academia collaboration; record of interdisciplinary collaboration; experience in research and education spanning sciences, engineering and the arts

**Application Deadline:** November 1, 2007; if not filled, every FOUR weeks thereafter until search is closed. Anticipated start date is August 16, 2008.

**Application Procedure:** Send a letter of interest, CV, statement of research vision – consistent with the transdisciplinary research at AME, statement of teaching interests including pedagogical approach, representative publications and/or media products, and names, addresses and telephone numbers for three professional references to: Chair, Media Computing/Engineering search, AME, Box 878709, Tempe, Arizona 85287-8709. Background check required for employment. For more information write to: [mce-search@asu.edu](mailto:mce-search@asu.edu)

Arizona State University is an AA/EO employer

## Professional Opportunities

molecular dynamics, plasma physics, and statistical language modeling.

Creation of the Center for Computational Arts, Science, and Engineering reflects a recognition that computation is changing the nature of research across a very wide range of fields, that shared interests in computational techniques are creating new opportunities for collaboration, and that shared facilities and programs can enhance both research efficiency and the genesis of new ideas.

Applicants should send a curriculum vitae, copies of relevant papers, and the names and addresses of at least three references to:

Director Search Committee  
Center for Computational Arts,  
Sciences, and Engineering  
Office of the Provost  
University of Rochester  
Rochester, NY 14627

Inquiries can be emailed to: case-search@rochester.edu.

To be assured of full consideration, applications should be received by December 1, 2007.

The University of Rochester is an Equal Opportunity employer; women and members of underrepresented minorities are strongly encouraged to apply. Further information can be found at <http://www.rochester.edu>.

### The University of Western Ontario Department of Computer Science Chair

Applications are invited for the position of Chair, Department of Computer Science in the Faculty of Science at The University of Western Ontario. A record of commitment to quality undergraduate and graduate teaching, a strong research record and administrative experience are essential. The new Chair is expected to provide strong leadership in teaching, research, and administration.

The Department of Computer Science, established in 1964, is one of the oldest in North America, now with more than 30 faculty and 100 graduate students. The department is recognized as a worldwide centre of strength in several areas, including finite automata and formal languages, computer algebra, image analysis and computer vision, DNA computing and distributed systems management. Moreover, the department is uniquely positioned at the research forefront in computing and law, bioinformatics, data security and programming languages. For further information about the department, please visit <http://www.csd.uwo.ca>

The application package should include a cover letter, a curriculum vitae and names of three references. References would not be consulted without the applicant's permission. The successful applicant will be appointed at the rank of Associate Professor or Professor, with tenure.

The appointment as Department Chair will be for a five-year term. The preferred start date is July 1, 2008. More information can be found on the Computer Science website at <http://www.csd.uwo.ca>.

Application packages should be sent to:  
Dr. David M. Wardlaw, Dean  
Faculty of Science, Western Science  
Centre

The University of Western Ontario  
London, Ontario, N6A 5B7  
by November 1, 2007, although applications received after that date will be considered until the position is filled.

Positions are subject to budget approval. Applicants should have fluent written and oral communication skills in English. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

The University of Western Ontario is committed to employment equity and welcomes applications from all qualified women and men, including visible minorities, aboriginal people and persons with disabilities.

### University of Victoria Department of Computer Science Department Chair

Applications are invited for the position of Chair of the Department of Computer Science. The appointment as Department Chair will be effective on or before July 1, 2008. Candidates should have a Ph.D. in Computer Science or a related field and have the qualifications and standing to be appointed as a tenured Associate Professor or tenured Professor.

Candidates will usually have a strong record of teaching and research at a university, but candidates from industry with a strong research record are also encouraged to apply. Administrative experience, particularly at a university, will be a strong asset. The successful candidate will have demonstrated, or have the potential for, strong academic leadership and innovation.

The Department offers B.Sc. Major and Honours degrees in Computer Science and a Bachelor of Software Engineering program, jointly offered with the Department of Electrical and Computer Engineering. A number of combined programs are offered combining Computer Science with Geography, Health Information Sciences, Mathematics, Music, Physics, Psychology, Statistics and Visual Arts. Masters and Doctoral programs are offered and there are currently 113 graduate students. Cooperative education is offered at both the undergraduate and the graduate levels.

There are currently 34 faculty members. The Department is very active in research, and houses a large number of research personnel and visiting researchers. The new Engineering / Computer Science building opened in Oct. 2006 and the Department has excellent laboratory and office facilities. Information on the Department can be found on the web at <http://www.csc.uvic.ca/>.

The University of Victoria ([www.uvic.ca](http://www.uvic.ca)) is situated in the City of Victoria, the capital of British Columbia. Founded in 1963, the University has developed into

one of Canada's leading universities with a reputation for excellence in teaching and research. Situated at the southeast tip of Vancouver Island on the picturesque west coast, Victoria enjoys one of the most scenic locales in Canada and a pleasant climate year round.

Please send applications, including curriculum vitae and the names of at least six references, to:

Dean D. Michael Miller  
C SC Chair Search Committee  
Faculty of Engineering  
University of Victoria  
P.O. Box 3055 STN CSC  
Victoria, BC, Canada. V8W 3P6

E-mail: [csc-chair-search@engr.uvic.ca](mailto:csc-chair-search@engr.uvic.ca) (attachments should be in Word or PDF)

Closing date for applications is October 1, 2007. All qualified applicants are encouraged to apply; in accordance with Canadian Immigration requirements, Canadian and permanent residents will be given priority.

The University of Victoria is an equity employer and encourages applications from women, persons with disabilities, visible minorities, aboriginal peoples, people of all sexual orientations and genders, and others who may contribute to the further diversification of the University.

### Virginia Tech Department of Computer Science Department Head

The Department of Computer Science at Virginia Tech ([www.cs.vt.edu](http://www.cs.vt.edu)) invites applications for the position of department head. The head should strive to continue the accelerating rise of the department toward greater national prominence—and is expected to have a strong commitment to advancing the research and teaching missions of the department, to nurturing interdisciplinary collaborations, and to working closely with the university in advancing departmental strategic goals.

CS@VT is expanding with regard to people, research, and resources. In the last 5 years, 18 faculty members have been hired to make a total of 45. The number

of PhDs awarded places the department among the top 30 in the United States. Research expenditures have more than tripled in the last 7 years. Broadening from long-standing research strengths in HCI, HPC, CS education, and digital libraries, there are growing numbers of projects in interdisciplinary areas such as computational biology and bioinformatics, CyberArts, digital government, and problem solving environments. A new building opened in 2006, leading to a near doubling in space.

CS@VT offers BS, MS, and Ph.D. programs in the Blacksburg campus and a graduate program at its satellite campus in the Washington, D.C. area (which has about 100 students). CS@VT is part of the College of Engineering ([www.eng.vt.edu](http://www.eng.vt.edu))—the premier engineering school in the Commonwealth of Virginia. The college has a history of innovation, e.g., inexpensive supercomputing (System X). Virginia Tech is a comprehensive research university, with almost \$300 million per year in research, and with more than 26,000 students, the largest full-time student population in Virginia. Blacksburg is consistently ranked among the country's best places to live (<http://www.liveinblacksburg.com/>).

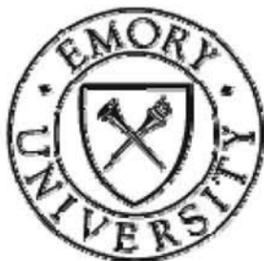
Salary for suitably qualified applicants is competitive and commensurate with experience.

Applications must be submitted online to:

<https://jobs.vt.edu>

for posting 070739. Inquiries should be directed to Edward A. Fox, [fox@vt.edu](mailto:fox@vt.edu).

Virginia Tech is an Equal Opportunity/Affirmative Action Institution.



## Computational and Life Sciences

EMORY UNIVERSITY  
Atlanta, Georgia

Emory is seeking to make multiple faculty appointments within a Computational and Life Sciences (CLS) strategic initiative (<http://www.cls.emory.edu/>), to build upon Emory's strengths in the physical, biological, and health sciences. The CLS initiative's goal is the development and application of computational and experimental technologies for analyzing, modeling, and creating complex biological and bio-inspired systems in the pursuit of new knowledge. CLS encompasses three broad focus areas: Computational Science and Informatics, Synthetic Sciences (including synthetic biology, chemical biology, biomaterials science, and bionanoscience), and / or Systems Biology (experimental and computational).

We invite applications at all academic ranks from individuals with a PhD in a relevant discipline, a proven record of accomplishment in research and scholarship, and a commitment to interdisciplinary collaboration in support of this initiative. Successful applicants will have appointments in one or more departments of the University along with a CLS affiliation. We also invite queries from small teams of collaborating scientists who bring complementary strengths to the CLS initiative. Applications consisting of a CV, research and teaching statements, and three letters of recommendation directly from recommenders should be sent via email to [cls@emory.edu](mailto:cls@emory.edu). Informal inquiries are also invited by email. Screening starts September 1, 2007 and will continue until all positions are filled. For further details on the CLS initiative please see: <http://www.cls.emory.edu/>

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