# Congress on Track to Provide Big Boost to Physical Sciences, Computing

## But Despite Gains, DARPA IT Research Still at Risk in Appropriations

By Peter Harsha

Before adjourning for the traditional August congressional recess, appropriators in the House and Senate approved a collection of funding measures that would significantly increase funding for federal research efforts in the physical sciences, mathematics, computing and engineering next year.

Both chambers' appropriation committees have passed FY 2007 appropriations bills that provide boosts to the research budgets of the National Science Foundation, National Institute of Standards and Technology, and the Department of Energy's Office of Science, effectively endorsing—at least in the short term—a Presidential initiative to double research funding for those agencies over the next 10 years.

The President's "American Competitiveness Initiative," (ACI) announced as part of his 2006 State of the Union address in January, aims to boost future U.S. innovation and competitiveness by addressing a number of areas of concern, including research investments, education, workforce and immigration issues, and tax credits. A key element of the ACI is the acknowledgment that the federal research investment in fundamental "physical sciences" (broadly defined as including physics, chemistry, computing, mathematics and engineering) has lagged the overall increase in the federal research and development portfolio. To address that shortfall, the ACI commits to a 10-year plan to double the research budgets of the agencies most responsible for funding that research: NSF, NIST and DOE's Office of Science.

Though initially there appeared to be resistance among the House Leadership to any significant increase in federal discretionary spending for FY 2007 (as detailed in *CRN* Vol. 18/No. 3, May 2006), the House acted swiftly to approve appropriations measures that fully fund the President's ACI targets.

In late May, the House passed its version of the FY 2007 Energy and Water Appropriations bill, which included a 14 percent increase to the budget of DOE's Office of Science. Within the $4.1 billion approved for the Office of Science is $319 million for Advanced Scientific Computing Research, an increase of $84 million, or 36 percent, over the FY 2006 level. In addition, House appropriators chose not to earmark the President's requested funding levels; instead, appropriators provided funding above the President's request for congressionally directed projects.

In late June, the House passed its version of the FY 2007 Commerce, Science, State, Justice Appropriations, which contains funding for NSF, NIST, the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA). Again, ACI-targeted agencies fared very well in the bill, with both NSF and NIST receiving the President's request for significant increases. Under the House plan, NSF would see a $439 million, or 8 percent, increase in FY 2007. The Computer and Information Science and Engineering directorate (CISE) would see a 6.1 percent increase, the same as in the President's request. NIST core research would grow to $467 million, an increase of $72 million, or 18 percent, over FY 2006. NIST's Manufacturing Extension Partnership program would see a cut to $92 million (12 percent decline from FY 2006) and the Advanced Technology Partnership program—a source of continuing controversy in

*Physical Sciences, Computing*

## Note to Department Chairs

**Taulbee Survey 2005-06**
*Coming Soon!*

# Argonne National Lab Celebrates 60th Anniversary

By Gail Pieper

*This is another in a series of CRN articles describing the activities of CRA's industry laboratory members. Others are posted at http://www.cra.org/reports/labs.*

Argonne National Laboratory is a direct descendant of the Manhattan Project where Enrico Fermi and his colleagues created the world's first controlled nuclear chain reaction.

Chartered in 1946, Argonne National Laboratory celebrates its 60th anniversary as one of the largest U.S. Department of Energy research centers. Argonne holds many honors and awards and includes Nobelists Enrico Fermi, Maria Goeppert Mayer and Alexei Abrikosov.

Argonne's mission is to serve the Department of Energy (DOE) and national security by creating an environment where scientists can come together to create a brighter future. Its staff represents more than 60 different nations and includes scientists from every scientific discipline. The laboratory seeks the best and brightest in their fields and has over 1,500 scientists and engineers working together, creating a unique atmosphere that is diverse, dynamic and creative. Argonne's continual innovation has led to more than 750 patents and the development of several spin-off organizations, facilitating the transfer and use of technology to industry for public benefit and economical growth.

The lab is situated on 1,500 wooded acres about 25 miles southwest of Chicago, enabling easy access to our facilities for many outside researchers from industry, academia and other government laboratories. These world-class facilities—including the Advanced Photon Source, the Center for Nanoscale Materials, the Intense Pulsed Neutron Source, and the Argonne Tandem-Linac Accelerator Facility—are visited by thousands every year, promoting the open exchange of ideas and collaboration.

### Mathematics and Computer Science Division (MCS)

The basic mission of Argonne's MCS Division is to increase scientific productivity by providing intellectual and technical leadership in the computing sciences. As early as the 1970s, Argonne spearheaded a series of software engineering projects that culminated in the release of EISPACK, LINPACK, FUNPACK, and MINPACK. Today, MCS researchers are continuing this tradition, with an added emphasis on portability and scalability.

Projects in the division range from algorithm development and software design in core areas such as optimization and automatic differentiation, to exploration of new technologies such as distributed (Grid) computing and bioinformatics, to numerical simulations in challenging areas such as

*Argonne National Lab*

# Expanding the Pipeline
# Systers: The Electronic Community for Women in Computing

## By Robin Jeffries, Her Systers' Keeper

Almost 20 years ago, in 1987, seven women met at SOSP (Symposium on Operating Systems Principles). As the only women at the conference they all felt like outsiders, so they banded together to be less isolated. At a dinner meeting, they discovered that they had many experiences in common. Anita Borg, one of those original seven, offered to host a mailing list for the group to continue their interactions. The name chosen for the group was "systers," a wordplay on sisters and systems. As the systers list approaches its twentieth anniversary, it seems timely to reflect on its history and its current goals.

Word spread quickly about the interesting discussions held on systers, and other women asked to join. The community grew rapidly, reaching more than 2,000 members by the mid '90s, despite the fact that the only publicity was by word of mouth from one woman in computing to another. Systers has evolved its own culture in response to a variety of issues that came up in the early years.

There was an explicit decision to exclude men from the community (http://athena.systers.org/about.html), based on experience with other lists where the voices of men, even well-intentioned men, tend to drown out the voices of women. There was, and continues to be, a strong focus on politeness and respect (phrased as "no flaming allowed") in contrast to the tone that was common on most other mailing lists at the time (this was in the heyday of USENET bulletin boards where numerous angry responses to a posting were not uncommon).

The most important rule to this day is that information shared on systers stays within systers, unless there is an explicit agreement from the writer that her words can be shared. As a result of that rule, systers is viewed as a safe place to share very personal stories.

As the community grew, it suffered from its own success. The volume of discussion was too much for many, especially for early members who had moved into senior positions and didn't have the time for the casual chitchat that the newer members found valuable. As a way to keep the volume under control, the community has evolved some strict rules for what is "on topic." Discussions must relate to both women and technology, not to either alone. There is also a culture of "collect and summarize," and long-term systers have kept, and still refer to, those summaries. The one on what to wear

to a job interview is a classic, as is a very different one about dealing with menopausal symptoms on the job.

Anita, who was a researcher at DEC WRL, launched a research project to create a system (called Mecca) that would enable a much wider range of discussion topics, where individual systers could opt in and out as they liked. The system was also designed to make it easier to contact particular subgroups (those living in a particular area; those going to a specific conference) so the entire group wouldn't be disturbed for these more targeted inquiries. Mecca grew into a very powerful system that was used by systers for many years. It never lived up to its full potential, however, because of the syntactic challenges it required for simple tasks like targeting a message toward a particular group.

At various times, systers have mobilized to fight something the group considers anti-women. One case was the Barbie doll that said, "Math is soooo hard"; another was a Sony ad that showed some piece of Sony electronics stuffed into the waistband of a bikini worn by an attractive model (you could only see her lower torso and upper legs). While in neither case did the company admit that the letter-writing and phone-call campaign influenced their decision to withdraw the product or ad, both were withdrawn.

As the moderator (Her Systers' Keeper) for systers, Anita was sought out as a spokeswoman on issues related to women in computing, as she was the visible face of the community and a dynamic speaker as well. In 1997, Anita left DEC/Compaq to found the Institute for Women and Technology (now the Anita Borg Institute for Women and Technology, http://anitaborg.org) to devote herself full time to making sure that women are "full partners in driving the creation of the new technology that will define their lives." I had been a member of systers for some time, and was well aware that Mecca, while technically very sophisticated, wasn't easy to use.

Anita planned to have the Institute build a better systers' system, and I volunteered to help design the user interface. Anita, always a very persuasive woman, managed to convince me and Sun Microsystems, my employer at the time, that I should be in charge of the project. This eventually resulted in a new system (primarily implemented by Ellen Spertus, a faculty member at Mills College and long-time systers member) and my assuming the role of

Systers' Keeper as Anita became more swept up, first in her new role as the Institute's president and later as her health failed.

Systers now has about 2,300 members from 40 to 50 countries. As ever, the topics covered by the list are wide-ranging and interesting. For example, as I write this, recent discussion topics have included: 1) how to cope with relationship issues when you get the job of your dreams and your partner is placed in the role of "accompanying spouse"; 2) how to get tech support to treat you like a knowledgeable human being (and how much does this have to do with being female); and 3) what's it like being an older woman who moved into technology as a second career.

The list isn't especially high volume, by design. While the Internet as a whole has become a more polite place since its early days, members mention that systers, in particular, has a friendliness that you don't find in other electronic groups. When a member posts an item concerning a personal problem, she typically gets a lot of individual email from others who have been in similar situations and who have helpful advice.

In recent years, The Anita Borg Institute has spun off some specialized lists related to systers: 1) researcHers is for women in research careers (both academic and industry); 2) systers-entrepreneurs is for women involved in or contemplating an entrepreneurial career; and 3) there are some lists targeted specifically at women just finishing or recently graduated from Ph.D. programs. More information about researcHers can be found at www.systers.org/researchers; about systers-entrepreneurs at www.systers.org/mailman/listinfo/entrepreneurs; and about the lists for approaching and new Ph.D.s at www.systers.org/phd-grads/.

Systers is open to all women with a background in computing (either in school or in the workplace) who agree to the rules of the community. Please join us by going to: www.systers.org and selecting the Join link.

*Robin Jeffries is currently a UI designer and user researcher at Google, and serves as Her Systers' Keeper.* ∎

# Musings from the Chair
## Education: Research by Another Name

By Dan Reed, CRA Board Chair

By the time you hold this issue of *CRN* in your hands, the fall semester will be well underway. New students will be walking the hallways, revised course materials will be online and yes, that bane of all academics—committee meetings—will have returned. Hence, it seems appropriate to consider the continuum of research and education as we recommence our academic roles.

I call it "the Tom Sawyer effect," where Tom convinces a peer group that fence painting is a privilege. How many times have you lured students into research by calling it a class project? You know the drill—either assign students to small teams or let them self-select, and then require them to generate draft project descriptions that you modify and approve. At the end of the semester, you encourage the teams that produced the best projects to invest additional time and write a conference paper. Is it education or research? Does it matter?

As we examine how to reshape the perception of computing—not as a profession dominated by male geeks who work in windowless rooms, but as a vibrant, integrative and social activity that provides solutions to important problems—the larger questions loom. How do we convey the sense of excitement and discovery that entices the best minds of a new generation? How do we create a continuum of education and research that redefines our public image and attracts new talent?

Unlike Tom Sawyer, we are selling the real deal: computing research is a wonderfully exciting thing, exposing students to much more than the canon of knowledge in our standard texts. Many of our students already know this, as they explore new technologies via internships, collaborative teams and social networking. Research is not just for graduate students; it is part of a larger notion of self-directed learning that can and should permeate the entire educational milieu.

In the coming months, CRA will be defining what, if any, role it should play in helping to shape the future of computing education. As the Computing *Research* Association, our charter and focus are on research, not curriculum. The latter is rightly the province of ACM and IEEE in their roles as standards bodies; any CRA educational activities must be complementary to and in partnership with these organizations.

Instead, I expect CRA to focus on the intersection of research, image and education to build community consensus on emerging research opportunities, change the image of computing, and discuss new approaches to computing education. As I described at Snowbird in my "State of CRA" presentation, this tripartite approach builds on discussions arising from the annual Leadership Summit of computing organization leaders.

At Snowbird, Rick Rashid, chair of the Image of Computing Task Force, discussed plans to create a sense of excitement about computing education, research and applications. In that spirit, I offer a comment from the late Peter Medawar:

*I am often asked, "What made you become a scientist?" But I can't stand far enough away from myself to give a really satisfactory answer, for I cannot distinctly remember a time when I did not think that a scientist was the most exciting possible thing to be.*

All of us have felt that joy. It is, after all, why most of us are in computing; it is the most exciting thing we can imagine. Alas, the public and many of our students have a different, albeit incorrect, perspective: off-shoring, menial jobs, obsolescence and dying companies. We want our prospective students to know the truth: computing is ever more central to our lives; it is the place to make a difference. Our educational approaches must reflect that truth. How we make that a reality is the critical question.

Finally, it was a pleasure to see so many departmental leaders at Snowbird this past summer. The air was electric with discussions of research policies and funding, interdisciplinary education, and computing's image. If you were not able to attend, the slides from several of the presentations, including my own "State of CRA" talk, are now on the CRA website (http://www.cra.org).

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*Dan Reed, CRA's Board Chair, is the Chancellor's Eminent Professor and Vice-Chancellor for Information Technology at the University of North Carolina at Chapel Hill. He also directs the interdisciplinary Renaissance Computing Institute (RENCI). Contact him at: Dan_Reed@unc.edu* ∎

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# February 2 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 2007 (see http://www.cra.org).

## 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: 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: 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. Refer to the appropriate "Guidelines for Nominators" for the award. Include a current curriculum vitae for the candidate. Questions or comments may be addressed to awards@cra.org.

The deadline for receipt of nominations is **February 2, 2007**. Nominators are responsible for collating the nomination materials before e-mailing the *complete package* to: awards@cra.org. ∎

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**UPDATE**

**CRA's Computing Community Consortium Proposal**
**http://www.cra.org/ccc/**

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# CRA Welcomes New Staff Member

Melissa Norr joined the CRA staff as a policy analyst in mid-June. Melissa will be responsible for monitoring and tracking a portfolio of issues important to CRA's government affairs efforts. She will also be tasked with helping CRA communicate its policy activities more effectively to policymakers and to our membership.

Melissa has a BA in Public Relations with a minor in English from Penn State University. She comes to CRA from the Optical Society of America, where she was the Government and Public Relations Coordinator. ∎

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**CRA Welcomes New Academic Members**
George Mason University CS
Nova Southeastern University CS

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# Another Year, More Dollars

By Peter A. Freeman
Assistant Director of NSF for CISE

For the fifth—and probably last—year, it is my honor on behalf of the NSF and CISE to welcome you back after what I hope was a productive and relaxing summer. The coming year promises to be an important one for NSF and CISE, so in addition to commenting briefly on the year past I want to highlight some issues for the coming year.

I have received a number of comments—almost all positive—on my article in the May 2006 issue of *CRN* (http://www.cra.org/CRN/issues/0603.pdf). I'm very pleased that it struck a responsive chord, and even more pleased to report that we are making good progress on the Computing Community Consortium (described in the May issue of *CRN*) and GENI (www.nsf.gov/cise/geni/ and www.geni.net). We expect an award to be made very soon to create the Consortium and we also expect to release a solicitation to establish a GENI Project Office (GPO) in early fall. As we plan the FY08 budget request to Congress (which will be made public in February), we are paying close attention to how we can help the community tackle bigger and bolder projects.

Speaking of budget, the FY08 outlook in general is quite positive. The American Competitiveness Initiative emphasizes the importance of basic research and highlights in a number of ways the work that CISE supports. It is important that you not only let us at NSF know of how your research is having impact (by sending us cogent results of your research and education projects, keeping us generally informed, and proposing great research and educational activities), but also by making sure that those in your community have an understanding of how your research and educational work makes a difference.

Looking back, FY05 granted us a bit of a reprieve in terms of funding success rates and we anticipate that FY06 will finish at a similar level; we plan to have a fuller report in the November issue of *CRN*. On the other hand, as I hope you understand, looking at only a single year's data is imperfect at best—the timing of competitions, the fact that proposals submitted in one fiscal year may be funded in another, changes in community behavior, all impact success rates. That said, there is no question that funding is much tighter now than it was five or ten years ago and is something we must all continue to work on.

The creation over the past year of NSF's new Office of Cyberinfrastructure has gone as smoothly as could be expected. The Deputy AD for CISE, Dr. Deborah Crawford, served as the Acting Director from last July until this June when Prof. Dan Atkins assumed the position of Director/OCI. CISE is working closely with OCI to ensure that their efforts are well informed and that the results of CISE-supported research make their way into deployed cyberinfrastructure as quickly as possible.

While a direct successor to the very successful ITR initiative is not foreseen, I continue to hear of computer scientists who are working with scientists in other domains utilizing a variety of funding sources. Indicative of this is that at this summer's Snowbird meeting, when a speaker asked a plenary session how many in the audience had engaged in such interdisciplinary work, a sizeable fraction of the room raised their hands and indicated, in response to a subsequent question, that they would like to continue such work. We do emphasize our support of those who are trying to develop new generations of concepts and tools that will be fundamental to the progress of all of science and engineering. If you haven't, I encourage you to read http://research.microsoft.com/towards2020science/downloads.htm .

Another topic that was addressed at Snowbird was the coming shortage (yes, shortage!) of CS graduates at all levels. I will address this topic in more detail in a column in the future, but let me note, with the advantage of more than 40 years in the field, that we know enrollments are cyclical, but that the spread of computer-science related topics continues its relentless increase in importance to our society. This is something that CISE will be addressing in an upcoming solicitation.

CISE supported a small, but successful, tour of Chinese universities and labs late this spring that I believe was an eye-opener for those who participated. This was a start at what we are planning to be a heightened and more focused emphasis on international activities involving those who seek funding from CISE.

Two other areas on which we hope to place more emphasis are software design and productivity, and IT and innovation. Regarding the former, we are discussing how to best build on our existing programs in Science of Design, Software Engineering, and related areas. Regarding the latter, we have brought to CISE as a Visiting Scientist a distinguished researcher and educator, Dr. Mary Lou Maher, to help us formulate efforts that will both enable the use of IT-related concepts and tools in the innovation process generally, and the use of creativity/innovation enablers in the process of creating IT-intensive systems.

The CISE Advisory Committee (AC) has given us broad, strategic guidance over the past year, and we will be seeking more of the same in the coming year. Professor Al Aho of Columbia University will be leading the AC again this year, and we are in the process of appointing a new group of members. I will be asking them to help us address strategic issues in the coming year, and I encourage you to interact with the AC members to express your views and assist them in helping CISE. Our meetings are always public and are posted on our website in advance. The next meeting will be held at NSF on October 19-20, 2006.

Regarding CISE personnel, we are very pleased that Prof. Haym Hirsh of Rutgers University will begin as Division Director of IIS in October. We will be posting recruitments this fall for the other two Division Director positions to be filled within a year as Dr. Wei Zhao ends his rotation and Dr. Michael Foster ends a three-year term and assumes other responsibilities. Dr. Suzi Iacono, who has been acting DD/IIS since Dr. Michael Pazzani left to become VP Research at Rutgers, will return to the front office of CISE as a senior advisor.

A distinguished search committee was appointed by the Deputy Director of NSF and has submitted to her a short list of candidates to replace me within the year. The Office of the Director conducts that process and anticipates identifying a new AD/CISE before next summer, at which time I will transition out of NSF to pursue a variety of professional and personal activities.

Last September in this column I wrote:

> Computer science, the disciplines based on it, and the students and results that flow from your efforts are at the heart of everything from economic development to national defense to better human communication. Yet, the future will see developments that even we cannot imagine. We are exceedingly fortunate to spend our time on something that is so important and also so much fun. Yet, with that comes great responsibility to utilize our resources strategically for the benefit of all and to lead, not only technologically, but also in helping to guide the productive use of the wonders that come from our efforts.

That statement is even truer today as our Nation faces increased challenges on all fronts.

Be bold and have a great year!

Peter Freeman (*pfreeman@nsf.gov*) is the Assistant Director of NSF for CISE.∎

# CRA-W Cohort of Associate Professors Project:

## New Meeting—Expanded Goals, Oct. 20-21, 2006

CRA-W announces the third **Cohort of Associate Professors Project (CAPP)** that has been expanded to include associate professors with education as their primary function. Sponsored by an NSF ADVANCE grant, this project aims to increase the percentage of Computer Science and Engineering women faculty with the rank of full professor by forming and mentoring a cohort of women from the associate professor ranks. Associate professors and CRA-W Distinguished Professors will meet to share critical career information and build on strategic leadership skills. The format will be highly interactive, including time for discussions and social interactions along with presentations and panels. The program will include two Professional Development Workshops—one for women whose primary function is research (CAPP-R) and one for women whose primary function is education (CAPP-E). The workshops will be held in Fort Meyers, Florida, **October 20-21, 2006.** Travel support is available through the NSF grant. For additional details, see: http://www.cra.org/craw/capp. ∎

## Taulbee Survey Correction

In the 2004-2005 Taulbee Survey results published in the May 2006 CRN, there was an error in Table 4, "Employment of New PhD Recipients by Specialty." The grand total of 1,189 PhD recipients was correct, but the column totals of PhDs by specialty area did not include those who were employed outside of North America. A corrected version of the table is available online at: http://www.cra.org/CRN/articles/may06/tables.1to8.html ∎

# Gail Murphy, UBC, Wins Anita Borg Award

The Committee on the Status of Women in Computing Research (CRA-W) is pleased to announce the recipient of the 2006 Anita Borg Early Career Award. This year's recipient is Gail Murphy, Associate Professor in the Department of Computer Science at the University of British Columbia.

Gail Murphy is an Associate Professor in the Department of Computer Science at the University of British Columbia. She received a B.Sc. (Honours) degree in Computing Science from the University of Alberta in 1987, and the M.S. and Ph.D. degrees in Computer Science from the University of Washington in 1994 and 1996, respectively.

Gail Murphy
University of British Columbia

Between her undergraduate degree and attending graduate school, she worked as a senior software engineer at MPR Teltech, a telecommunications research and development company, in Burnaby, B.C.

Her research and teaching focus is software engineering. More specifically, the research projects in her group focus on methods and tools to help software developers manage and evolve the structure of the systems they are developing both at design time and in source code. Since new methods and tools have little value unless useful to "real" software developers, the group is also working on assessment methods to understand how to better validate software engineering research results. The work in the research group is currently funded by NSERC, IBM, Siemens and Nokia.

Dr. Murphy has served on numerous program committees for the leading conferences in software engineering research, and was the general chair for the 2004 Aspect-oriented Software Development Conference. She also served two years as the Associate Head for Graduate Affairs in UBC's Department of Computer Science. In 2005, she received the Dahl-Nygaard Junior Prize from AITO, and in 2006 she was awarded a NSERC Steacie Fellowship. One of the most rewarding parts of her career has been collaborating with many talented graduate and undergraduate students.

The award honors the late Anita Borg, who was an early member of CRA-W and an inspiration for her commitment in increasing the participation of women in computing research. This award is given annually by CRA-W to a woman in computer science and/or engineering who has made significant research contributions and who has contributed to her profession, especially in the outreach to women. This award recognizes work in areas of academia and industrial research labs that has had a positive and significant impact on advancing women in the computing research community, and is targeted at women who are relatively early in their careers (no more than 10 years past the Ph.D.).∎

# CRA Hosts Tisdale Fellows

On August 3, CRA hosted a luncheon for the 2006 Tisdale Fellows, pictured above (l to r): Weijie Zhang (Stanford University, recent graduate); Leslie Liang (Stanford University, recent graduate); Cynthia Lin (student, MIT); David Ben Carollo (graduate student, Indiana University); Rachael Hu (graduate student, Duke University); Michael Kelly Bruce (student, University of Virginia); and CRA's Fellow, Erica Omega Camese (graduate student, Carnegie Mellon University). Fellows not pictured include Amanda Jabour (student, University of Pennsylvania) and Saretta Ramdial (graduate student, University of Texas at Austin).

Peter Harsha provided a brief overview of CRA's government affairs activities. The Tisdale Fellowship Program has been bringing college students to Washington, D.C. for internships that explore current public policy issues of critical importance to the high technology sector of the economy. Other participants in the program include HP, Agilent Technologies, Dell, Phillips, Business Software Alliance (BSA), Infotech Strategies, Monster Worldwide, and Mehlman Vogel Castagnetti, Inc. (Technology CEO Council).∎

# Sustained Fall in Share of Under-grad CS Degrees Granted to Women

## By Jay Vegso

Computer science has the dubious distinction of being the only science field to see a fall in the share of its bachelor's degrees granted to women between 1983 and 2002. Among all S&E fields tracked by the NSF, linguistics was the only other discipline to see its share of women drop—but it is a field where the majority of degrees (71 percent) are granted to women.

Between 1983 and 2002, the share of CS bachelor's degrees awarded to women dropped from 36 to 27 percent. The number of female degree recipients grew by 50 percent in that period, and in 2002 numbered 13,504. Nevertheless, this was lower than the 15,126 degrees granted to women in 1986, during the last boom in degree production.

It is notable that the drop in women's representation did not recover during the surge in bachelor's degree production that occurred in the late 1990s. In fact, the interest of incoming freshmen women in CS as a major has fallen for the past several years, and is now at its lowest point since the late 1970s.
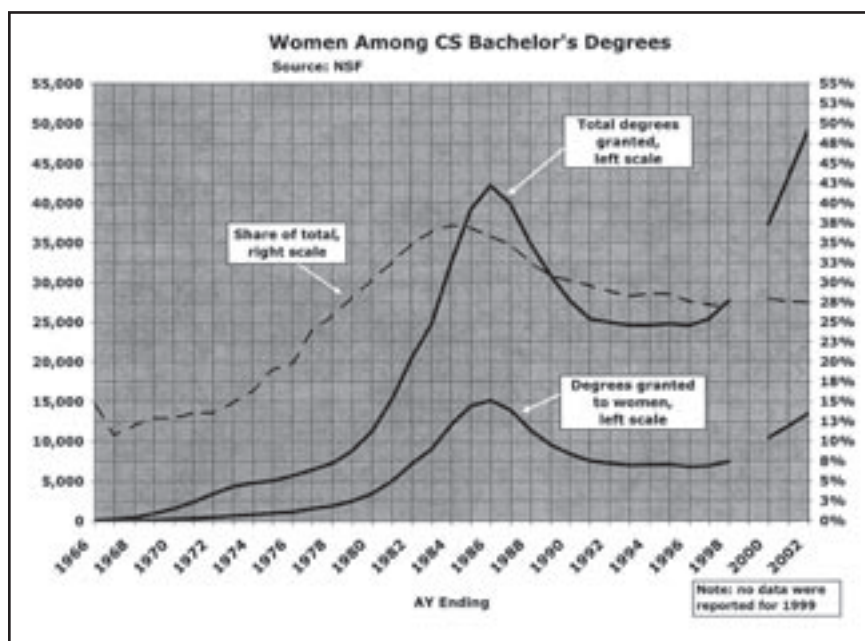


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National Science Foundation, Division of Science Resources Statistics, Science and Engineering Degrees: 1966-2001, NSF 04-311, Project Officers, Susan T. Hill and Jean M. Johnson (Arlington, VA 2004). ∎

# Transitions, Appointments, and Awards

New CRA board member, **Annie Antón**, North Carolina State University, received an award for the most influential paper published in the IEEE International Requirements Engineering Conference ten years ago. The award is based on the importance of the paper to the field after a decade of further research and experience has passed. **Barry Boehm**, University of Southern California, was also recognized for his 1996 conference paper.

The computing community was saddened by the death of well-known computer scientist, **Denice D. Denton**, on June 24. Dr. Denton was serving as Chancellor at the University of California, Santa Cruz. For more on her career and accomplishments, see: http://www.ucsc.edu/administration/denice_denton/

**Haym Hirsh**, Professor and Chair of the Computer Science Department at Rutgers University, has been appointed Director of the CISE Division of Information and Intelligent Systems at the National Science Foundation. Dr. Hirsh will join CISE on October 16, 2006.

Congratulations to CRA Board Member, **Leah H. Jamieson**, who was named the John A. Edwardson Dean of Engineering at Purdue's College of Engineering. The appointment was effective August 15. She recently served as interim dean and was the Ramsburg Professor of Electrical and Computer Engineering at Purdue. ∎

# Nominees Sought for CRA Board

The Computing Research Association seeks your help in suggesting nominations for its Board of Directors. The deadline for receipt of nominations is **December 1, 2006.**

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.

**Note that there is a new procedure for CRA Board elections beginning this year.**

- **On January 9, 2007**, from the nominations received, the Elections Committee will announce its candidates for the ballot.
- **On February 9, 2007**, 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 small professional staff, board members have detailed involvement in all major projects. Recent and current projects include:

- 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.

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. Nominations must reach CRA by **December 1, 2006.** ∎

# 2005-06 Computing Research Association Members

Arizona State University - CSE
Auburn University - CSSE
Binghamton University, SUNY - CS
Boston College - CS
Boston University - CS
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Bowling Green State University - CS
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Florida Atlantic University - CSE
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Florida State University - CS
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Georgia State University - CIS
Georgia State University - CS
Grinnell College - MCS
Harvard University - CS
Harvey Mudd College - CS
Hobart and William Smith Colleges - MCS*
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Iowa State University - CS
Iowa State University - ECE
Johns Hopkins University - CS
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Juniata College - IT & CS
Kansas State University - CIS
Kent State University - CS
Lafayette College - CS
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Montclair State University - CS
National University of Singapore - CS/IS
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New Mexico State University - CS
New York University - CS
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Northeastern University - CIS
Northwestern University - EECS
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 - CSE
Pennsylvania State University - IST
Polytechnic University - CIS
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Princeton University - CS
Purdue University - CS
Purdue University - ECE
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Rice University - CS
Rochester Institute of Technology - CS
Roosevelt University - CS&T
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Saint Louis University - MCS
Santa Clara University - CE
Simon Fraser University - CS
Singapore Management University - IS
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Southern Methodist University - CSE
Southern Polytechnic State University - CSE
Stanford University - CS
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Stony Brook University, SUNY - CS
Swarthmore College - CS
Syracuse University - IS
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Toyota Technological Institute at Chicago - CS
Tufts University - CS
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University at Albany, SUNY - CI*
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University of California, Santa Cruz - CS
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University of Delaware - CIS
University of Denver - CS
University of Florida - CISE
University of Georgia - CS
University of Hawaii - ICS
University of Houston - CS
University of Houston - ECE*
University of Idaho - 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
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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 - EECS
University of Michigan - I
University of Michigan, Dearborn - CIS
University of Minnesota - CSE
University of Mississippi - CIS
University of Missouri, Columbia - CS
University of Missouri, Rolla - CS
University of Montana - CS
University of Montreal - 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 - CS
University of Southern California - EES
University of Tennessee, Knoxville - CS
University of Texas, Arlington - CSE
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
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Utah State University - CS
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Sun Microsystems (Sustaining Member)
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Argonne National Laboratory
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SAP Labs*
SRI International
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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 2005-06

# 2007 CRA Outstanding Undergraduate Awards Deadline October 16

The Computing Research Association is pleased to announce the 13th 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 encourages home departments to provide similar assistance to the Runners-Up and Finalists.

CRA gratefully acknowledges the support of Microsoft Research and Mitsubishi Electric Research Labs (MERL) who sponsor the Outstanding Undergraduate Awards Program in alternate years. Microsoft Research is the 2007 sponsor.

Additional information about the nomination procedure and criteria for selection is available on the CRA website: http://www.cra.org. All nominations must reach CRA by **October 16, 2006**. ■

## Outstanding Undergraduate Awards Presented
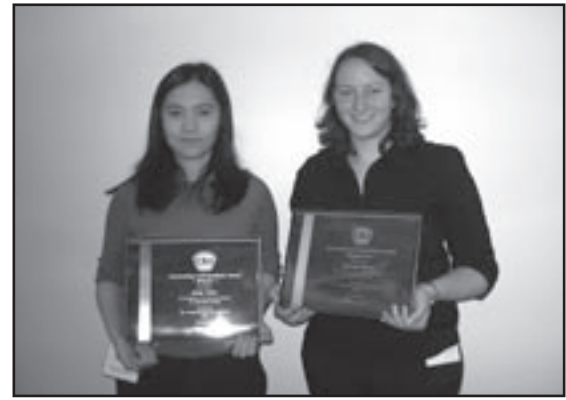


**Jenny Yuen** (left), University of Washington, and **Susanna Ricco**, Harvey Mudd College, received CRA's 2006 outstanding undergraduate awards (Female Winner and Female Runner-Up, respectively) at the IEEE Computer Society Conference on Computer Vision and Pattern Recognition in New York on June 19. CRA's Director of Programs, Carla Romero, made the presentations.

## Eisenstat Receives Outstanding Undergraduate Award



The male winner of CRA's 2006 Outstanding Undergraduate Award, **David Eisenstat**, is pictured following the presentation at ACM's Principles of Distributed Computing Conference in Denver, Colorado, on July 25. CRA's Executive Director, Andy Bernat, presented the award. David recently graduated from the University of Rochester and will attend Princeton University in the fall.

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Congress—would receive zero funding in FY 2007, matching the President's request.

Science agencies not targeted by the ACI did not fare as well in the House bills. Under the House plan, NASA would be slated for an $83 million cut, down to $16.7 billion in FY 2007—though NASA Science would increase $75 million. NOAA overall would receive a $322 million cut—about 9 percent less than FY 2006. And the National Institutes of Health would see only a slight increase of about 1 percent to its budget in FY 2007.

Senate progress on appropriations measures has been much slower than in the House, owing primarily to procedural issues unique to the Senate regarding how it proceeds with appropriations in the absence of a Joint Congressional Budget Resolution, as was the case this year. But by the August recess, Senate appropriations bills dealing with ACI-targeted agencies had either secured approval by the full Senate Appropriations Committee, or the relevant subcommittee, though none had yet reached the floor for consideration by the full Senate. In those bills (the FY 2007 Energy and Water Appropriations and the FY 2007 Commerce, Science, Justice Appropriations), Senate appropriators took, with some differ-

ences, very similar approaches to the ACI agencies as their House counterparts.

Under the Senate appropriators plan, NIST's core research would receive the full $104 million called for in the ACI; NSF would receive $410 million above the FY 2006 level, just $29 million short of the House level and the President's request; and the DOE Office of Science would receive $645 million more than FY 2006, $110 million more than the House level and the President's request. (Advanced Scientific Computing Research would receive the President's requested level in the Senate bill.)

The Senate took very different approaches to non-ACI-targeted agencies, however. Under the Senate plan, NOAA would receive $4.43 billion in FY 2007—an increase of $536 million over FY 2006, $753 million more than the President's request, and $1.0 billion more than the House approved level—and NASA would increase $126 million (compared to an $83 million cut in the House).

But perhaps the most significant difference between House and Senate bills from the computing research community's perspective is the significantly different treatment of information technology research at the Department of Defense's Defense Advanced Research Projects Agency. DARPA IT research, which had been

slated to grow at a robust rate in the President's request and the House appropriations bills, faces significant cuts in the Senate version of the FY 2007 Defense Appropriations.

For the second year in a row, the Senate Appropriations Committee has targeted DARPA's Cognitive Computing program for cuts—this time on the order of $70.8 million in FY 2007, a reduction of 32 percent versus the request and 9 percent versus FY 2006. Programs targeted by the SAC are "Integrated Cognitive Systems" (-$60 million vs. FY 2006), "Learning Locomotion and Navigation," (-$3.8 million), and "Improved Warfighter Information Processing" (-$7 million).

In addition, the SAC would cut $13.4 million from the Information and Communications Technology account at DARPA, a cut of 5 percent from the request (but still an increase of $34 million versus FY 2006). The SAC also would cut the Computer Science Study Group program at DARPA—established this year to help expose young faculty to DOD-oriented problems in Computer Science—from the requested level of $6.6 million in FY 2007 to $3 million. All three accounts—Cognitive Computing, Information and Communications Technology, and Computer Science Study Group—received full funding in the House version of the Defense Appropriations.

As this goes to press, it is not yet clear what the motivation is behind the cuts. Based on similar cuts last year, speculation within the computing research advocacy community is that the SAC remains unconvinced of the military utility of the Integrated Cognitive Systems program at DARPA. DARPA has appealed the cuts and CRA has joined with a number of institutions affected by the cuts to work to oppose them. The full Senate is not likely to consider the Defense Appropriations bill until early September. If the full Senate were to approve the bill with the cuts included—which at this point seems likely—a House/Senate conference would have to resolve the disparity between the bills. Therefore, CRA's efforts, and those of the representatives of the other institutions affected by these cuts, will primarily focus on this conference stage.

For the most up-to-date details on the progress of this effort and the very latest developments in the appropriations process, see CRA's Computing Research Policy Blog (http://www.cra.org/blog). You, too, can join the effort to advocate for federal support of fundamental computing research by joining CRA's "Computing Research Advocacy Network." Sign up for CRAN at *http://www.cra.org/govaffairs/advocacy/cran* to get the latest details and find out how you can take part. ■

magnetohydrodynamics. Thousands of researchers in academia and industry use MCS software in applications that include computational chemistry, protein structure, vortex dynamics, astrophysics, climate modeling, computational fluid dynamics, and reservoir simulation. Many of these activities involve collaboration or partnerships with universities, industry and other research institutions worldwide.

## Four Thrusts

One major thrust of the division is applied mathematics and the incorporation of new numerical methods into portable, high-performance, open source software. MCS computer scientists design robust optimization algorithms, multiscale solvers for linear and nonlinear systems, and automatic differentiation techniques for sensitivity analysis. The new techniques are then incorporated into robust numerical toolkits for use by application scientists in solving large-scale problems. For example, PETSc (Portable, Extensible Toolkit for Scientific Computation) is widely used for applications including transonic flow, modeling vortex dynamics in high-temperature superconductors, parallelization of a 3D magnetostatics code, and study of compressible flows at low and transonic Mach number.

MCS researchers also try to create new technology that will make researchers more productive. For example, as part of the Common Component Architecture project, MCS is collaborating with computational chemists to ensure that their scientific software components are interoperable and reusable. MCS researchers are also exploring mathematical programs with equilibrium constraints, which arise, for example, in the modeling of electricity markets. A new technique developed at MCS now routinely solves applications that are orders of magnitude larger and more complex than previously possible, extending the scope of this important computational paradigm.

System software is another key thrust in the MCS Division. The major challenge here is to develop the technologies needed to fully exploit parallel supercomputers. Research covers a broad spectrum—from parallel programming and performance visualization tools, to high-performance I/O, to operating systems and runtime systems software for data management on petascale computers. When the MPI standard for message passing was under development, MCS computer scientists developed an implementation, called MPICH, that enabled rapid acceptance of the new paradigm; MPICH2, the latest release of this software, has been widely adopted by major computer vendors and users and recently won an R&D 100 award. One of the most exciting new projects at MCS is ZeptoOS, a collaboration between Argonne and the University of Oregon to develop very efficient and customized Linux kernels for petascale architectures with 10,000 to 1 million CPUs.

A third research thrust in MCS is distributed, or Grid, computing. Identified as one of the "ten technologies that will change the world" by MIT Technology Review in 2003, Grid computing seeks to facilitate scientific collaborations over long distances. MCS is attacking Grid computing from two angles. For group-to-group collaboration, MCS researchers developed the Access Grid. Designed to give participants the feeling of being in a single room, the Access Grid is a wall-sized tiled display with 10 million pixels, allowing geographically dispersed audiences to participate in workshops, college courses, seminars, and scientific projects. For example, the Access Grid has been used by doctors and specialists to examine patient scans simultaneously at multiple sites, enriching diagnostics and biomedical applications. For distance collaboration on a larger scale, MCS researchers have spearheaded the development of Grid middleware. The Globus Toolkit, now the de facto standard for Grid computing, enables international groups such as the GriPhyN project to share computer power, databases, and other online tools securely across corporate, institutional, and geographic boundaries.

The fourth thrust within the MCS Division is scientific simulation, a natural outgrowth and complement of other MCS work in advanced software and middleware. MCS has a growing bioinformatics group that is exploring high-throughput comparative and evolutionary analysis of genomes and metabolic networks. MCS bioinformaticists are working with researchers at the Pacific Northwest National Laboratory to find an organism that can clean radioactive materials that have seeped into the ground under tanks at the Hanford site, which produced nuclear materials. The bioinformatics group also provides valuable resources for the National Microbial Pathogen Data Resource at the National Institutes of Health and the Microbial Genomes Program at the Department of Energy. A second simulation group at MCS focuses on climate modeling. A major accomplishment by this group is the development of the Model Coupling Toolkit, a set of open-source software tools for creating coupled models. The toolkit is being used by the Community Climate System Model, a state-of-the-art climate model developed by DOE and NSF and used by U.S. Climate Change Science Program.

## Preparing for the Petascale Revolution

Petascale computing systems promise new frontiers for research and computing applications. MCS's driving goal is to carry out research that will make petaflop performance widespread as soon as hardware is available. The scientific opportunities enabled by these advanced machines include large-scale simulation studies, such as materials dynamics with million-to-billion atom clusters; nuclear reactor core design and performance with 3-D geometry and coupled thermal hydraulics and neutronics; photon-nano cluster interactions for understanding catalysis and ultrafast reaction dynamics; protein/DNA complexes to understand DNA repair and gene regulation; the evolutionary history of protein families to aid in protein engineering; and modeling of nucleosynthesis pathways of the heavy elements in nuclear astrophysics. Concurrently, MCS has launched an ambitious program to develop system software that can work effectively on petascale-sized systems, to devise generalized methods for scaling up broad classes of code, and to formulate performance models that will enable researchers to address scalability bottlenecks.

For example, MCS has teamed with IBM and Lawrence Livermore Laboratory to drive the design and requirements for the next IBM Blue Gene, which is projected to be available in 2008. In addition, MCS established the Blue Gene Consortium. Now, with approximately 50 members from national labs, universities, industry and research institutions, this group explores the capabilities of the Blue Gene/L architecture, sharing software and pooling the expertise and experience of researchers worldwide.

MCS is also leading the Grid Infrastructure Group for TeraGrid. This National Science Foundation-funded project provides extraordinarily large and fast distributed infrastructure for open scientific research. It is linked by networks operating at tens of gigabits per second. TeraGrid integrates high-performance computers, data resources and tools. These resources include more than 102 teraflops of computing capability and more than 15 petabytes (quadrillions of bytes) of online and archival data storage. TeraGrid supports rapid access and retrieval, enabling researchers to access over 100 discipline-specific databases around the globe. Argonne coordinates the entire multi-million-dollar, multi-institutional project as a joint effort with the University of Chicago. These resources are used for computationally intensive projects from severe weather prediction and earthquake modeling to detail modeling of blood circulation and understanding of the human brain.

## A Small Group with a Wide Impact

While the staff of MCS is relatively small, just under a hundred permanent staff positions, its impact is great. The group measures its success based on the number of users of MCS software and the diversity of the applications. Argonne's computer science research is used by a broad community of thousands, enabling them to solve complex problems and take advantage of parallel architectures.

*Gail Pieper is Coordinator of Technical Editing and Writing at Argonne National Laboratory.* ∎

# CRA-W Summer School Workshop



Sarah Murphy (right), University of Notre Dame, discusses her poster "Using Nanotechnology to Solve Hard Problems Better" with Jaime Moreno, IBM Research, at the Computer Architecture workshop at Princeton in July.

# Professional Opportunities

## *CRN* Advertising Policy

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

### Colby College
Computer Science
*Associate or Full Professor Position*

Full-time position, assoc/full professor, starting September 2007. Review of applications will begin November 3, 2006.

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

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

The D. E. Shaw group, a specialized investment and technology development firm with approximately US $23 billion in aggregate capital, is looking for top-notch, innovative software developers to help it expand its tech venture and proprietary trading activities. The firm was founded in 1988 by David E. Shaw, who received his Ph.D. in computer science from Stanford and served on the CS faculty at Columbia before organizing the D. E. Shaw group.

Activities range from computer-based quantitative investment management to the development and financing of technology-oriented business ventures, but are tied together by a common focus on the economic implications of technological innovation. We offer a casual work environment populated by some of the brightest graduates from the strongest computer science programs in the world. In many respects, the firm combines the best traits of academia and the corporate world, offering a focused but informal company culture which is reflected in our casual dress, relatively flat management structure, and flexible vacation policy, as well as in the high degree to which new employees work closely with senior staff on key initiatives. We strongly emphasize personal ownership of projects, and new hires are given substantial responsibility from their first day on the job. If you're interested in applying your talents to challenging problems of software architecture and engineering in an intellectually stimulating environment, then we'd love to see your resume.

To apply, e-mail your resume to:
mailto:CRA-SNowak@career.deshaw.com
Members of the D. E. Shaw group are equal-opportunity employers.

### Henry M. Jackson Foundation
Biotechnology High Performance Computing Software Applications Institute
*Technical Staff and Postdoctoral Positions*

Technical staff and postdoctoral positions are available to support the Biotechnology High Performance Computing Software Applications Institute in Frederick, Maryland.

Applicants should have a Ph.D. in statistics, mathematics, computer science, engineering, or related discipline, and be interested in pursuing research in the development of computational tools to support life science research, such as in bioinformatics, computational biology, and systems biology. In particular, analysis tools, in the form of machine-learning algorithms, data mining, and statistical pattern recognition algorithms need to be developed to provide insight and analysis of physiologic, genomic and proteomic data. Background and/or experience in high performance computing and development of analysis tools for bioscience applications are desirable but not essential. The scientist will work in an interdisciplinary environment and in close collaboration with life scientists and other physical scientists.

Please submit resume to:
Jaques Reifman, Ph.D.
Senior Research Scientist
U.S. Army Medical Research and Materiel Command
Ft. Detrick, MD 21702
E-mail: reifman@bioanalysis.org
Phone: 301-619-7915

### Indiana University – Bloomington
Pervasive Technology Labs
Community Grids Lab
*Campus Postdoctoral Researcher – RSP – (position #00027268 & #00027269)*

The Community Grids Laboratory at Indiana University invites qualified applications for postdoctoral research positions in the fields of *parallel and high performance computing* and *distributed information retrieval.*

Applicants should possess a Ph. D. in Computer/Computational Science or a related field with an appropriate research background. Applicants for the parallel computing postdoctoral position are expected to be able to conduct innovative research in many of the following areas; Parallelism for multi-core chips including multi-threaded systems; Machine learning using techniques such as Hidden Markov Methods; Event driven simulation frameworks such as the US Department of Defense's HLA; and Multi-threaded tree searches and related algorithms developed for computer chess and other related applications.

Applicants to the distributed information retrieval postdoctoral position should be able to demonstrate the ability to conduct innovative research in many of the following areas; Web Service and Grid architectures; Web search/scavenging algorithms, text processing, and metadata extraction; Machine learning using techniques such as Hidden Markov Methods; Semantic Web languages, logic, standards, and tools; and Web 2.0 and on-line communities.

Please send CV material, including education background, publications, links to software products and projects, and the contact information for three professional references to:

Dr. Marlon E. Pierce
Community Grids Laboratory
501 North Morton Street
Suite 224
Bloomington, IN 47404
Or send electronic form to:
ptljobs@indiana.edu
Info - http://grids.ucs.indiana.edu/ptliupages/
Indiana University is an Affirmative Action/Equal Opportunity Employer.

### McMaster University
Department of Computing and Software
*Tenure-Track/Tenured Faculty Position*

The Department of Computing and Software jointly with the School of Computational Engineering and Science invites applications for a tenure-track/tenured position in computational engineering and science. Preference will be given to candidates with experience in computational design, optimization, or signal processing. Industry/practical experience and the ability to be, or to become a Professional Engineer in the Province of Ontario is a definite asset. The position/rank is open with the expectation of the appointment of an established high profile researcher at an Associate Professor level. Exceptionally strong candidates may be considered for being appointed with tenure and/or at the Full Professor level.

For more information see: http://computational.mcmaster.ca/images/cas_cae_position.pdf http://computational.mcmaster.ca/ http://www.cas.mcmaster.ca/

### SRI International
Information Computer System
*Program Director*

SRI International, a nonprofit research institute, is a pioneer in the creation and application of innovative solutions for governments, businesses, foundations, and other organizations. Since SRI's founding in 1946 as the Stanford Research Institute — our name until 1977 — we have been committed to advancing scientific discovery and education, and to the application of science and technology for knowledge, commerce, prosperity, and peace. SRI is well known for its innovations in communications and networks, computing, economic development and science and technology policy, education, energy and the environment, engineering systems, pharmaceuticals and health sciences, homeland security and national defense, and materials and structures.

Essential Functions:
Develop and lead a research program in Artificial Intelligence, with emphasis on machine learning. Define project objectives, secure funding, recruit research personnel, supervise progress, adapt project plan as necessary, deliver project outcomes on time and budget.

Experience:
- 5-10 years experience in universities or commercial sector.
- Demonstrated ability to write and win research proposals.
Education/Discipline Preferred:
PHD in Computer Science or Equivalent
To Apply: www.sri.com/jobs

### Stanford University
Department of Computer Science
*Faculty Opening*

The Department of Computer Science at Stanford University invites applications for the position of Associate Chair for Undergraduate Education. The Associate Chair's responsibilities include: overseeing the introductory course sequence, working with CS faculty and the university administration on designing and coordinating the CS undergraduate curriculum, and teaching several classes (typically one course per quarter). The appointment will be made in the non-tenure line Professor (Teaching), with rank (Associate or Full) depending upon the candidate's seniority and experience.

The ideal applicant for this position will have a strong commitment to and demonstrated aptitude for teaching, as well as an established reputation and national visibility in Computer Science Education and previous leadership/management experience. All candidates must hold a Ph.D. in computer science or a closely related discipline.

Applicants should submit a cover letter, curriculum vitae, teaching statement, material relevant to evaluating the applicant's teaching abilities, and at least three letters of reference to:

Search Committee Chair
c/o Laura Kenny-Carlson
Department of Computer Science
Gates Hall 278
Stanford, CA 94305-9025
or electronically to:
search@cs.stanford.edu.
Applications will be accepted until October 31, 2006.
Stanford University is an affirmative action, equal opportunity employer.

### Stanford University
Department of Computer Science
*Faculty Opening*

The Department of Computer Science at Stanford University invites applications for a tenure-track faculty position at the junior level (Assistant or untenured Associate Professor). We give high priority to the overall originality and promise of the candidate's work rather than the candidate's sub-area of specialization within Computer Science.

We are seeking applicants from all areas of Computer Science, including Foundations, Systems, Artificial Intelligence, Graphics, Databases, and Human-Computer Interaction. We are also interested in applicants doing research at the frontiers of computer science, for instance biological computing, bio-informatics, embedded systems, computer vision, computation and arts, or computational economics.

An earned Ph.D., evidence of the ability to pursue a program of research, and a strong commitment to graduate and undergraduate teaching are required. A successful candidate will be expected to teach courses at the graduate and undergraduate levels and to build and lead a team of graduate students in Ph.D. research. Further information about the Computer Science Department can be found at http://cs.stanford.edu/. The School of Engineering website may be found at http://soe.stanford.edu/.

Applications should include a curriculum vitae, brief statements of research and teaching interests, and the names of at least four references. Candidates are requested to ask references to send their letters directly to the search committee. Applications and letters should be sent to:

Search Committee Chair
c/o Laura Kenny-Carlson
Stanford University
Gates Hall 278
Stanford, CA 94305-9025
or via electronic mail to:
search@cs.stanford.edu.

The review of applications will begin on January 9, 2007, and applicants are strongly encouraged to submit applications by that date; however, applications will continue to be accepted until February 1, 2007 or until the position is filled.

Stanford University is an affirmative action, equal opportunity employer.

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

Applications are invited for research positions at TRDDC, a research unit of Tata Consultancy Services Ltd. (TCS). Current areas of interest include algorithms, automated software development, data intensive systems, data privacy, decision support systems, formal methods, natural language processing, program analysis, requirements analysis, software architectures and software testing. We are looking for exceptional and highly motivated MS/MTech/PhD candidates with research aptitude who can not only strengthen these areas, but also grow new areas in Computer Science. TRDDC provides an opportunity to pursue a PhD while working.

TRDDC is today one of India's premier R&D centers in software engineering. R & D work at TRDDC leads to the creation of intellectual assets, which take the form of new technologies, models, tools and products that serve the needs of software engineering and TCS clients in a wide range of industry verticals. TRDDC organizes regular workshops, seminars and conferences on advanced areas of R & D maintaining strong links with universities and academic institutions all over the world.

We provide a friendly and informal research environment and actively participate in the activities of the research community worldwide. Our research scientists have the unique opportunity to see their research used in products and services in the industry. If you have a top-flight academic record and a passion for research and development, write to us at:

Opportunities
TRDDC
54 B Hadapsar Industrial Estate
Pune 411 013
INDIA
or email to trddc@tcs.com with 'Opportunities' as the subject.
For more details visit us at http://www.tcs-trddc.com.

### The University of Connecticut
Department of Computer Science & Engineering
*Tenure-Track Assistant Professor*

The Department of Computer Science & Engineering (CSE) seeks outstanding candidates for a tenure-track assistant professor position in the Bioinformatics area. The

# Argonne Leadership Computing Facility

Are you looking for a unique opportunity to make petascale computational systems a reality? Argonne National Laboratory invites outstanding candidates to apply for managerial positions in the Argonne Leadership Computing Facility (ALCF).

Argonne is the site of the U.S. Department of Energy's newest Leadership Computing Facility. We will provide the computational science community with a world leading computing capability dedicated to breakthrough science and engineering. In 2007 we will deploy the first of several planned systems for petascale computations, drawing on deep experience in high performance systems and software, operation of one of the earliest IBM Blue Gene/L systems, and leadership of the highly successful Blue Gene Consortium.

Argonne has a long history of leadership roles in high-performance computing – from DOE's Advanced Computing Research Facility in the 1980s offering a series of innovative computer architectures; to ubiquitous software tools such as MPICH for message passing, PETSc scalable equation solvers, and the Globus Toolkit middleware for distributed computing; to today's leadership of the TeraGrid national cyberinfrastructure project.

## Manager, Application Performance Engineering and Data Analytics
### (Requisition 310412 CLS)

We are seeking a highly-qualified individual to lead the ALCF application performance engineering and data analytics effort. You will have the opportunity to work closely with project teams – both at Argonne and at other laboratories and universities – to develop world class solutions for petascale systems. Considerable knowledge of performance analysis, code optimization, software engineering, computational analysis, and software design and methodology for high-performance computing is required. Well-developed collaboration skills are essential. Applicants should hold an advanced degree and have at least 6 years of relevant experience.

## Manager, User Services and Outreach
### (Requisition 310435 CLS)

We are seeking a manager to lead the user services and outreach group and oversee all aspects of its activities. You will have the opportunity to establish user support processes for ALCF's leadership science and development projects. Your team will work with users, operations and systems staff to resolve problems, ensure user needs are met and opportunities for improvement are captured. You will also lead team members in defining and coordinating outreach and training activities appropriate for ALCF's petascale missions.

Comprehensive experience and skill in user and customer support is required, including ability to handle difficult situations tactfully and effectively in a user-driven scientific discovery environment. You will need comprehensive communications skills, both written and verbal, including the ability to develop and present complex material to a variety of audiences.

## Manager, Systems Software and Integration
### (Requisition 310537 CLS)

We are seeking a highly-qualified individual to manage the ALCF systems software and integration effort, leading our software and integration team in deploying and integrating the software stack for the ALCF, identifying new requirements, recommending solutions, and implementing them in the context of a national petascale supercomputer facility. This is a significant opportunity to establish the basis for new pinnacles of scalable system performance, in collaboration with ALCF's operations and performance engineering teams and its leadership science users.

Comprehensive knowledge of high-performance systems software and resources is required, along with demonstrated organizational and communications skills and flexibility in coordinating a spectrum of activities. Experience in national facility team leadership is highly desired. Due to position responsibilities for information security requirements and export control, United States citizenship is required by the U.S. Department of Energy.

## Manager, Facility Operations and Networking
### (Requisition 310538 CLS)

We are seeking a highly-qualified individual to manage the operation of the ALCF computing, storage, and network systems. You will have the opportunity to shape the operating environment of ALCF, recruit FON staff and establish group processes and operating environments. Working closely with the ALCF management and other team leads, you will oversee the day-to-day operations of the FON group and lead incident response and resolution as needed.

This position requires comprehensive skills in leading system support efforts; in deploying and operating advanced computing systems; and in developing effective operations processes. Also required is comprehensive experience in supercomputing systems administration, including configuration, installation, monitoring and load optimization leading to a robust and stable computing environment. Due to position responsibilities for information security requirements and export control, United States citizenship is required by the U.S. Department of Energy.

We invite you to submit your resume through the Argonne job openings web page **(http://www.anl.gov/jobs)** and search by Requisition number.

*Argonne is a U.S. Department of Energy laboratory managed by The University of Chicago. Argonne is an equal opportunity employer, and we value diversity in our workforce.*

# Professional Opportunities

position (Search #06A397) augments our expanding focus on Bioinformatics in research and education. We are seeking candidates that can supplement and complement our existing Bioinformatics strengths in algorithms, databases, and visualization. Candidates must have completed all requirements for their Ph.D. in Computer Science, Computer Engineering, Computer Science & Engineering, Bioinformatics, or a related field, by June 30th for a Fall start and October 30th for a Spring start.

The CSE Department resides in the new Information Technologies Engineering building, and has a faculty of 19 with 250 undergraduate and 100 graduate students. The University of Connecticut is the flagship graduate degree-granting institution in Connecticut ranked as the number one public university in New England by U.S. News & World Report. For further information please see http://www.cse.uconn.edu.

To apply, email your application (indicate Search #06A379 in the email header) consisting of a resume including a full publication list, names of at least three references, and separate statements of research and teaching interests to:

cse_search@engr.uconn.edu.

To expedite the selection process, we request that the reference letters be emailed to us at the time of application. Review of applications will proceed on their arrival and continue until the position is filled. (Search#06A397)

## University of Pennsylvania
**Department of Computer and Information Science**
*Faculty Positions*

The University of Pennsylvania invites applicants for tenure-track appointments in both experimental and theoretical computer science to start July 1, 2007. Tenured appointments will also be considered. Faculty duties include teaching undergraduate and graduate students and conducting high-quality research.

Successful applicants will find Penn to be a stimulating environment conducive to professional growth. Over the last few years, we have successfully recruited faculty in artificial intelligence, computer architecture, databases, machine learning, machine vision, programming languages, and security. We are now especially interested in candidates in graphics/animation and systems.

The University of Pennsylvania is an Ivy League University located near the center of Philadelphia, the 5th largest city in the US. Within walking distance of each other are its Schools of Arts and Sciences, Engineering, Medicine, the Wharton School, the Annenberg School of Communication, Nursing, Law, and Fine Arts. The University campus and the Philadelphia area support a rich diversity of scientific, educational, and cultural opportunities, major technology-driven industries such as pharmaceuticals, finance, and aerospace, as well as attractive urban and suburban residential neighborhoods. Princeton and New York City are within commuting distance.

To apply, please complete the form located on the Faculty Recruitment Web Site at:

http://www.cis.upenn.edu/departmental/facultyRecruiting.shtml

Electronic applications are strongly preferred, but hard-copy applications (including the names of at least four references) may alternatively be sent to:

Chair, Faculty Search Committee
Department of Computer and Information Science
School of Engineering and Applied Science
University of Pennsylvania
Philadelphia, PA 19104-6389

Applications should be received by January 15, 2007 to be assured full consideration. Applications will be accepted until positions are filled. Questions can be addressed to faculty-search@central.cis.upenn.edu.

The University of Pennsylvania values diversity and seeks talented students, faculty and staff from diverse backgrounds.

The University of Pennsylvania does not discriminate on the basis of race, sex, sexual orientation, gender identity, religion, color, national or ethnic origin, age, disability, or status as a Vietnam Era Veteran or disabled veteran in the administration of educational policies, programs or activities; admissions policies; scholarship and loan awards; athletic, or other University administered programs or employment. The Penn CIS Faculty is sensitive to "two –body problems" and would be pleased to assist with opportunities in the Philadelphia region.

## University of Nebraska-Lincoln
**Civil Engineering and Computer Science & Engineering**
**Geographic Information Systems (GIS) in Water Resources**
*Assistant/Associate/Full professor*

The University of Nebraska-Lincoln seeks applicants for a tenure-track faculty position in Water Resources Engineering with emphasis in Geographic Information Systems. This position is part of a new campus-wide Water Initiative that integrates activities in natural and social sciences, engineering, and law (faculty positions in water law, aquatic chemistry, river ecology, environmental economics, climate modeling, and surface hydrology were filled in 2005). This position will have a tenure home in Civil Engineering or Computer Science & Engineering, with a joint appointment in those two units.

We seek a highly motivated individual who will take an active role in promoting research, education, and interdisciplinary interactions associated with the Initiative. Applicants must have a specialization in the application of spatial information technology to water resources engineering and management, particularly integrating Geographic Information Systems (GIS), engineering science, computing technology, and mathematical modeling. Special consideration will be given to applicants who also have expertise in other computational applications to water resources management, such as data visualization and geospatial databases. Expertise with ESRI software products is desirable. Candidates must have an earned Ph. D. in engineering, computer science & engineering, or related discipline.

Applicants must have a demonstrated interest and ability in teaching and advising undergraduate and graduate students, and strong promise for, and commitment to, pursuing and developing an externally-funded program of sponsored research and scholarly activities. Appointment at the Associate Professor rank, or higher, requires a demonstrated record of teaching, research, and professional service. This faculty position is available January 2007.

Applications should be submitted on-line at:

http://employment.unl.edu (requisition # 060384).

The application should include your curriculum vitae, description of research and teaching interests, and a list of at least three references with their contact information. Questions regarding the positions can be directed to Bruce Dvorak (bdvorak@unl.edu; 402-472-3431). Review of applications will begin on September 28, 2006 and continue until the position is filled. A more detailed job description is available on the web at http://wrri.unl.edu/. Further information about the university is available on the web at http://www.unl.edu/unlpub/2004unltoday.shtml.

The University of Nebraska is committed to a pluralistic campus community through affirmative action and equal opportunity and is responsive to the needs of dual career couples. We assure reasonable accommodation under the Americans with Disabilities Act; contact Bruce Dvorak (402-472-3431) for assistance.

## University of North Carolina at Greensboro
**Computer Science Department**
*Professor/Department Head*

The University of North Carolina at Greensboro and the College of Arts and Sciences invite applications and nominations for the position of Department Head for the newly created Department of Computer Science (formerly a division within the Department of Mathematical Sciences). Applicants for this leadership position should hold a doctorate in computer science or a closely related area and have a strong record of theoretical or applied research and a commitment to exemplary teaching at both the graduate and undergraduate levels. Previous administrative experience will be an advantage but is not required. The successful candidate will be appointed to the rank of Professor with tenure effective August 1st, 2007.

The Department of Computer Science is one of 21 departments in the College of Arts and Sciences at UNC Greensboro. The excellent core faculty consists of 5 tenured/tenure-track members plus additional lecturers and part-time faculty. The department currently offers the B.S. and M.S. degrees in computer science. There are approximately 210 students currently enrolled in the various programs. The B.S. in Computer Science is accredited by the Computing Sciences Accreditation Board. For additional details, including brief accounts of faculty research interests, visit the Department's web page at http://www.uncg.edu/cmp.

UNC Greensboro, one of 16 campuses in the University of North Carolina system, is a doctorate-granting university with approximately 16,000 students in the College and six professional schools. Greensboro is a medium-sized city of about 220,000 in the Piedmont Triad region of North Carolina near the Research Triangle Park and other major universities, a location providing easy access to recreational opportunities at the beach and the mountains. The local metropolitan area (which includes the cities of High Point and Winston-Salem) has a population of almost 1 million and offers an excellent quality of life. (For more information on the city and the region, visit http://www.thedepot.com/).

Review of applications will begin on November 15 and will continue until the position is filled. Nominations and informal inquiries are encouraged; e-mail should be directed to RLMILLER@UNCG.EDU. Inquiries and applications will be treated confidentially on request. Applicants should submit a letter explaining their interest in the position, a separate statement that describes their approach to the responsibilities of a Department Head, a research statement, a vitae, and names and addresses of four references to:

Robert L. Miller, Chair
Computer Science Headship Committee
Office of the Dean
105 Foust Building UNC
Greensboro, NC 27402
EEO/AA

## University of Waterloo
**Department of Electrical and Computer Engineering**
*Faculty Positions*

The Department of Electrical and Computer Engineering invites applications for faculty positions in most areas of computer engineering, software engineering, and nanotechnology engineering, and in VLSI/circuits, information security, photonics, MEMS, control/mechatronics, signal/image processing, and quantum computing. The University has been named the "Best Overall" university by reputation in Canada.

For more information and online application, please visit:

https://eceadmin.uwaterloo.ca/DACA.

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## CRA-W Summer School Workshop



Pictured above at the recent Computer Architecture workshop in Princeton are (l to r): Suzanne Iacono, NSF, and workshop organizers Russ Joseph (Northwestern University), Li-Shiuan Peh (Princeton University), and Margaret Martonosi (Princeton University).

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## CRA Conference at Snowbird 2006
### Program Slides Now Available:

http://www.cra.org/Activities/snowbird/2006/agenda.html