



## **2011 ANNUAL REPORT**

### ***Message from the Board Chair***

I am pleased to report that CRA had a very productive year in 2010-11. During a period of significant uncertainty for the computing field, given the challenges posed by the economic downturn on institutions and individuals, CRA provided leadership on a range of issues and initiatives, detailed below. Despite these challenges, the number of people actively engaged in CRA's activities continues to grow, and its financial position remains stable and sound.

***The Computing Community Consortium (CCC)***, a standing committee of CRA funded by the National Science Foundation (NSF), continued to provide thought leadership to the research community this year, pursuing a wide range of activities to identify compelling research ideas that are likely to shape the future of computer science and related fields. In particular, the CCC interfaced with the research community as well as Federal agencies on the outputs of a number of its recent visioning activities, notably computer architecture, robotics, educational technology, health information technology, computational sustainability, and big data.

With renewed funding from the NSF, the ***Computing Innovation Fellows (CIFellows)*** Project provided postdoctoral positions to a new cohort of 47 recent Ph.D.s in computer science and related fields during the 2010-11 academic year. The project—first implemented in 2009 and described in CRA's previous annual report—has sought to forestall a permanent loss of research talent likely to occur as a consequence of the financial crisis, while enabling new Ph.D.s to develop experience and become more effective researchers and/or teachers over the long term. In addition to these 47 CIFellows, the CIFellows Project funded 42 CIFellows from the initial (2009) cohort for a second year in the program during the 2010-11 academic year. The remaining 18 CIFellows from the 2009 cohort departed the program by the end of the first year (roughly fall 2010), many with permanent opportunities in academia (including tenure-track faculty positions) and industry (research scientist positions) in hand. Though there were some improvements in the economic conditions during this reporting period, in the spring, CRA/CCC proposed and anticipated additional support from NSF to fund a third (and presumably) final cohort for the 2011-12 academic year. This additional funding will provide for 20 CIFellows, representing a continued ramping down of the CIFellows Project (from 60 CIFellows in the first year).

In 2010-11, ***CRA's Women's Committee (CRA-W)*** celebrated its twentieth anniversary with a celebration in June at a gathering held during the FCRC. CRA-W continues to thrive as an energetic subcommittee of CRA focused on increasing the representation of and opportunities

for women in computing research. A major goal of CRA's Broadening Participation in Computing (BPC) grant from NSF have been efforts to increase coordination on several projects between CRA-W and the Coalition to Diversify Computing (CDC). A major development in this fiscal year was the launching of a large-scale national data collection and analysis initiative. This effort responds to NSF's increasing interest in measures of performance of BPC programs. In addition, the initiative addresses a long-standing problem CRA-W has faced in evaluating its programs—the need for a comparison group to determine their efficacy. In February 2011, CRA was awarded \$750k as a supplement to the BPC grant to fund this endeavor for the first year. Forty-five “data-buddy” schools have been recruited and data collection has begun. Funding will be sought to continue the project for an additional five years.

CRA-W coordinated a range of popular mentoring programs and workshops designed to increase the representation and opportunities for women in computing research. CRA-W and the Coalition to Diversify Computing (CDC) have partnered to expand several programs to include underrepresented minorities as well as women. Active CRA-W projects include: the *Distributed Research Experience for Undergraduates (DREU) (US and Canada)*; the *Collaborative Research Experiences for Undergraduates (CREU)*; and *Discipline-Specific Workshops* designed to increase the participation of members of underrepresented groups within a specific research area. In addition, CRA-W's *Grad Cohort Program* brought together 234 women graduate students in their first, second, or third year of graduate school for a two-day workshop on graduate school survival, career planning, and networking.

CRA-W organized a teaching-oriented *Career Mentoring Workshop* in March that attracted 26 participants and five speakers and CRA-W organized a *Cohort of Advanced Professionals Project (CAPP)* workshop designed to increase the percentage of CS&E women faculty members and researchers who reach the top of their career tracks. In its *Distinguished Lecture Series*, faculty and lab researchers visited campuses to encourage women and minorities to attend graduate school. CRA-W also revamped its website, published regular “Expanding the Pipeline” articles in *Computing Research News*; and formed a team to develop a more formalized process to better manage its various evaluation efforts.

**CRA** conducted the 40th annual **Taulbee Survey** of Ph.D.-granting CS&E departments. The survey documents trends in student enrollment, degree production, employment of graduates, and faculty salaries in Ph.D.-granting departments of computer science (CS), computer engineering (CE), and information (I) in the United States and Canada. This year's results indicated an increase in undergraduate CS degree production, with doctoral production holding steady. The overall response rate was 74 percent; the rate for US CS departments was higher at 82 percent. Plans are underway to introduce a new stratification method for US CS departments for the next survey to replace the now outdated 1995 NRC rankings previously used.

**CRA's Government Affairs Committee (GAC)** continued its work to be the eyes and ears—and boots on the ground—in Washington, DC, on behalf of the computing research community. CRA advocated in strong support of the reauthorization of the America COMPETES Act, and for increased funding for federally supported computing research at federal science agencies (including the National Science Foundation, Department of Defense science agencies, and the Department of Energy). It joined with affiliate organizations like the Task Force on American Innovation and Computing in the Core to advance federal research and education issues beneficial to the computing community, and co-sponsored a number of briefings on Capitol Hill to highlight the importance of K-12 computer science education, robotics, and the importance of fundamental research in driving American innovation.

CRA also served as a trusted source of information—both formally and informally—for Members of Congress and their staff, as well as the White House and the President’s Council of Advisors for Science and Technology, as all sought to understand the issues confronting the federal Networking and Information Technology Research and Development program (NITRD)—the thirteen-agency, nearly \$4-billion-a-year federal effort to support computing research. And the GAC continued to serve as the first point of contact for many in the press as they tried to understand issues like CS enrollments (*Computerworld*, *NY Times*), changes at DARPA (ASEE Aspire, IEEE Computer), and whether CS departments are reshaping themselves to attract new students.

With a climate of austerity hovering over every budget decision made in Washington now, it is vitally important that GAC continues to work hard to ensure that federal support for fundamental research in computing remains a priority.

In the area of **Communications**, the Government Affairs Committee’s *Computing Research Policy Blog* where current activities in the policy arena are posted continued to be a popular CRA site. Those who joined CRA’s *Computing Research Advocacy Network* received timely information about key advocacy opportunities—providing summary and background information, recommended actions, talking points, and contact information—to enable them to speak out on behalf of computing research. The *Computing Community Consortium’s* website was substantially revamped and its CCC Blog continued to provide news and information for and about the computing research community. Under contract through the CCC, an external public relations firm began developing brochures about computing research in the context of national priorities, to include healthcare, energy, and sustainability.

CRA provided current items of interest to chairs of U.S. and Canadian Ph.D.-granting CS, CE, and I departments and the larger computing research community through its newsletter, *Computing Research News*, and via regular e-mail communications to department chairs and lab directors. Both Board members and staff regularly responded to requests from journalists, researchers, educators, and others for statistical information on CS and CE enrollments gleaned from CRA’s Taulbee Survey. CRA-W continued to produce its biannual newsletter for its alumni.

The ideal outcome of **CRA’s Education Committee (CRA-E)** activities would be that every computer science undergraduate gains an understanding of what computer science research is about, has the opportunity to be involved in research activities, and understands the benefits of a graduate education and a research career. CRA-E believes that there are opportunities for innovation in the NSF Research Experience for Undergraduates grant and supplement program (REU). Possibilities include identifying new methods to enable undergraduate programs to network and gain critical mass in selected research fields, new approaches for collaboration between graduate and undergraduate programs, and internships that would allow students from undergraduate departments to spend a semester in a larger laboratory at a PhD-granting institution. During 2010-11, plans were made to prepare a proposal to submit to NSF to sponsor a workshop to solicit new ideas on how REU programs are proposed, funded, and administered.

The **Coalition to Diversify Computing (CDC)** is a joint organization of the ACM, CRA and IEEE-CS. CDC’s major effort was the April 2011 Tapia Conference, the premier conference for Celebration of Diversity in Computing. Evaluation results of the conference were published in the September 2011 edition of *Computing Research News*, vol. 23/No. 4, p. 2. The 2011 Academic Career Workshops for Underrepresented Participants in Computing Sciences was held February 24-27 at the University of Southern California. Twenty men and thirteen women attended with 55% of the participants self-identified as African American/Black and 30% as

Hispanic. The majority of participants were either assistant professors or senior graduate students (79%). Nineteen participants were from Research Institutions (58%). The responses were overwhelmingly positive and attendees indicated they would recommend the Academic Workshop to their colleagues. Other CDC activities included: Distributed Research Experiences for Undergraduates (DREU); Collaborative Research Experiences for Undergraduates (CREU); CDC/CRAW Distinguished Lecture Series; IEEE-CS Distinguished Visitor Program Liaison; Sending Students to Conferences; Addressing the Shrinking Pipeline; and NCWIT Leadership Team.

By far the most fruitful collaboration that CDC has is with CRA-W. In May 2010, the Alliance submitted a proposal to NSF for continuation of the *CDC/CRA-W Alliance* and to expand the programs enumerated above. NSF agreed to fund the proposal at a reduced amount with an emphasis on a data collection effort that will serve our programs as well as other NSF Alliances for assessment purposes. In spring 2011, the Alliance began collecting data from several universities in the US to create a pool of data with which to generate comparison groups for our assessment efforts. The initial survey sent to CS departments covered graduating seniors. In the fall, a second round of surveys will be sent to other undergraduate students and to graduate students. The project is well underway.

**CRA** hosted the annual **Computing Leadership Summit** for presidents, executive directors, and other senior leadership of CRA, its five affiliate societies (AAAI, ACM, CACS/AIC, IEEE-Computer Society, SIAM and USENIX) and NRC's Computer Science and Telecommunications Board. The seventeenth Summit was held February 28, 2011, in Washington, DC.

Two individuals were recognized by CRA for outstanding service in 2010-11. Jeannette Wing, President's Professor of Computer Science and Head of the Computer Science Department at Carnegie Mellon University, received the 2011 **Distinguished Service Award** for her national and international thought leadership with respect to Computational Thinking, and for her extraordinary performance as NSF Assistant Director for CISE from 2007-10. The **A. Nico Habermann Award** was given to Charles Lickel, Retired Executive Vice President, Global Research Software Strategy, IBM Thomas J. Watson Research Center. Lickel's accomplishments have had an impact at the national, local, and individual levels for underrepresented groups, and particularly for researchers in the GLBT (gay, lesbian, bisexual, and transgendered) computing community. Within IBM Research, he developed a series of leadership conferences for the GLBT employees.

**The Board of Directors** welcomed new members in 2010-11: Ron Brachman (Yahoo! Research) and Edward Fox (Virginia Tech).

Board members whose terms ended in 2010-11 included: Andrew Chien (University of Chicago), Rich DeMillo (Georgia Tech), Kathleen Fisher (AT&T Research), Ran Libeskind-Hadas (Harvey Mudd College), Sebastian Thrun (Stanford University) and Richard Waters (MERL). We thank them all for their dedicated service to CRA and to the computing research community. As always, we are grateful to the many people who contribute to CRA by serving as chairs and members of its various committees and who participate in its activities in other ways.

The success of any organization is defined by the enthusiasm and active participation of its members and volunteers. By that standard, CRA is a vibrant and thriving organization, committed to advancing aspects of computing research. This report is a vignette of the diverse

activities of CRA and its members. On behalf of the CRA Board, thank you for all you do to make CRA the success that it is today.

**W. Eric Grimson**  
Board Chair

Attachments:

CRA Financial Statement 2010-11  
2010-11 Highlights by Mission Area

- Research Policy
- Information Activities
- Human Resources
- Community Building

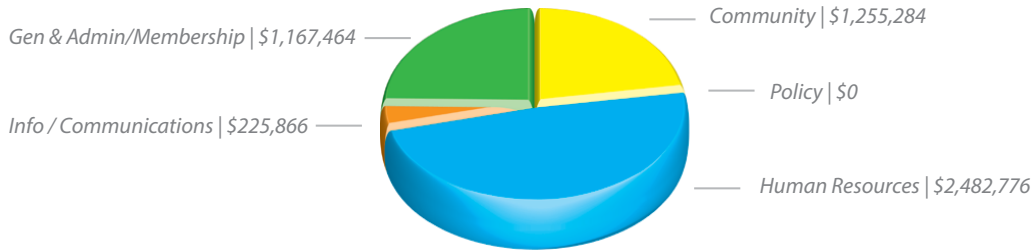
CRA Members

CRA Board of Directors and Staff

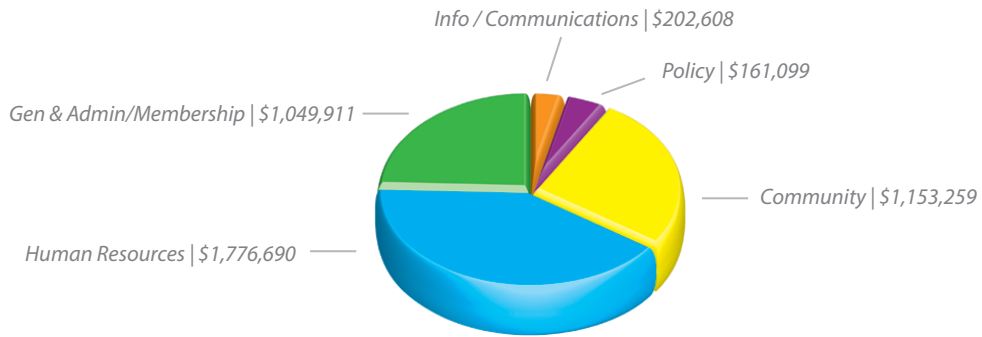
# CRA FINANCIAL STATEMENT

JULY 2010-JUNE 2011

## INCOME \$5,131,390



## EXPENSES \$4,343,567



## FINANCIAL POSITION \$3,375,045

Cash & Accts Receivable	\$7,748,096
Investments	\$2,527,751
<b>Total Assets</b>	<b>\$10,609,705</b>
Total Liabilities	\$7,234,660
<b>Total Net Assets</b>	<b>\$3,375,045</b>

Includes: total unrestricted Net Assets of \$3,061,459 and total temporarily restricted Net Assets of \$313,586

## CRA HIGHLIGHTS 2010-11 BY MISSION AREA

### *Research Policy*

CRA's biggest asset in making the case for fundamental research in Washington is the willingness of our membership to participate in the effort. To that end, CRA's GAC ramped up its efforts in 2010-11 to engage more of the CRA community in policymaking and advocacy. Two key pieces of that effort were planned in 2010-11 and bore fruit later that year: a CRA-wide fall Congressional Fly-in, in which representatives from CRA member institutions agreed to fly to Washington, DC, for a day of meeting with their representatives in Congress; and a first-ever joint CRA/CCC Leadership in Science Policy Institute, designed to identify 30 or so active researchers at the mid-career level and provide them a detailed instruction on how Washington policymaking works and how they can be a part of that process. The hope with LiSPI is to create a policy-savvy cohort of researchers who can both help on CRA's behalf in making the case for computing to their own representatives, and bring an better grasp of policymaking to their own spheres of influence. Planning and selecting participants for both of those events, held in fall 2011, took much of 2010-11.

The GAC continued to serve as both a formal and informal conduit of information about the impacts of various legislative proposals in Congress and the Administration, providing formal input in letter or testimony in response to requests for comment, as we did on America COMPETES, or in more informal, "back-channel" ways, on a range of other policy issues, many of which never saw introduction. The GAC was asked for informal input, for example, on a range of other issues, including questions about IT productivity, the role of NITRD and its effectiveness, the state of CS education, and whether there ought to be a permanent, free-standing advisory committee for IT. Maybe most significantly, CRA was asked to provide informal input to Members of Congress to help defuse controversy stirred up by Senator Tom Coburn's specious charges of wasted research dollars at the National Science Foundation by explaining the research beyond its silly-sounding title and show its real value.

The GAC also continued to proactively make its case in DC by sponsoring or co-sponsoring a number of different briefings on timely topics for Members and staff. The GAC teamed with the Task Force on American Innovation, AAAS, Texas Instruments, and the American Physical Society to plan an "Innovation 101" briefing on "Deconstructing the iPad," planned for September 2011. The focus of that briefing was to highlight the fact that the iPad represents a remarkable confluence of technologies that all have their roots in basic research sponsored by the federal government, anywhere from 5 to 50 years ago. The GAC also partnered with Computing in the Core to announce a new effort to reform K-12 computer science education, and with the Congressional Robotics Caucus in support of National Robotics Week. And it continued to participate in the Coalition for National Science Funding's Capitol Hill Science Exposition, providing representatives from the computing research community to show off their NSF-funded research.

The GAC continues to be the "organization of record" for the computing research community in Washington, DC.

## ***Information Activities***

CRA provided current items of interest to chairs of U.S. and Canadian Ph.D-granting CS&CE departments and the larger computing research community through its newsletter, *Computing Research News*, and via regular e-mail communications to department chairs and lab directors. Both Board members and staff regularly responded to requests from journalists, researchers, educators, and others for statistical information on CS and CE enrollments gleaned from CRA's Taulbee Survey. CRA-W continued to produce its biannual newsletter for its alumni.

CRA's communications efforts during 2010-11 continued to feature the popular Computing Research Policy Blog which provided postings on current activities in the policy arena. Those who joined CRA's Computing Research Advocacy Network received timely information about key advocacy opportunities—providing summary and background information, recommended actions, talking points, and contact information—to enable them to speak out on behalf of computing research.

In addition, significant additional effort was devoted to the CCC Blog, through which the CCC provides current news and information for and about the computing research community. Beginning in February, the CCC moved toward near-daily postings on the Blog, and this activity has contributed to a surge in readership, from an average of 2,000 visitors per month during the first half of the fiscal year to nearly 8,000 visitors in June. In addition, under contract through the CCC, an external public relations firm developed four brochures describing fundamental computing research opportunities in the context of national priority areas, to include healthcare, sustainability, education, and big data. These brochures were very well received by the research community and funding agents, including colleagues at NSF.

## ***Human Resources***

### ***CRA-W***

The twentieth anniversary of CRA's Committee on the Status of Women in Computing Research (CRA-W) was celebrated in June at a gathering held during the FCRC. CRA-W continues to thrive as an energetic subcommittee of CRA focused on increasing the representation of and opportunities for women in computing research. As a major goal of its Broadening Participation in Computing (BPC) grant from NSF, efforts have been increased to coordinate on several projects with the Coalition to Diversify Computing (CDC).

### **BPC Evaluation Project**

The purpose of this project is to examine factors affecting the experiences of undergraduate and graduate students in computing. It was begun to provide comparison data for evaluation of several Broadening Participation in Computing programs for underrepresented students, but it will also provide information about the experiences and retention of students from a broad range of undergraduate and graduate programs. Conducted by the Computing Research Association, the survey is supported by the National Science Foundation as part of a Broadening Participation in Computing grant to an alliance of the Computing Research Association Committee on the Status of Women (CRA-W) and the Coalition to Diversify Computing (CDC).

Participating departments were randomly selected from among schools of comparable size and type that had at least one student participate in a CRA-W/CDC program during 2008-2010, including schools that were the undergraduate institutions of Grad Cohort participants. Some



are PhD-granting departments among CRA's members, but many are not. This effort is supported by other members of the Broadening Participation Program funded by NSF, and will benefit all computer science departments in their efforts to understand the mechanisms of successful programs to broaden participation.

Currently, 50 departments have agreed to participate in the program and we have set up an advisory board. Advisory board members advise the evaluation teams on how to stay actively engaged with the data buddy departments in order to meet their needs, to reduce duplicate gathering of information, and to maximize the value of our results for multiple uses in broadening participation. The board will meet electronically and, if needed, over the phone.

We have fielded online surveys for completing undergraduate and graduate students. Surveys have been completed by more than 500 non-participant and 40 past participant undergraduates and 400 non-participant and 37 past participant graduate students. The response rate varies by department, but overall is about 35%. Data collection ended July 8.

Reporting on the spring surveys is planned in four stages with dissemination of results in the fall.

## **Workshops**

**Discipline-Specific Workshops:** Funded by a grant from NSF, CRA-W and CDC are collaborating to provide discipline-specific mentoring workshops in various subfields of computing. The goal is to increase participation of members of underrepresented groups within a specific research area by providing career mentoring advice and discipline specific overviews of past accomplishments and future research directions. Examples in 2011 included: 1) *Workshop on Multicore Systems—Architectures, Runtime Systems and Software Development* in March. This workshop had 38 participants (most were Ph.D. students) and 11 panelists from industry and academia. And 2) *First CRA-W/CDC Workshop on Diversity in Design Automation and Test* in May, which had 40 participants (primarily Ph.D. and Masters students) and 19 panelists from industry and academia. Eighteen institutions were represented.

**Grad Cohort:** This program brings together women graduate students in their first, second, or third year of graduate school for a two-day workshop on graduate school survival, career planning, and networking. The speakers and panelists are graduate students and senior women in academia and industry. The program continues to thrive with generous support from Google, Microsoft, a private foundation, Yahoo!, and IBM Research. In addition, 13 departments provided support for 21 students.

**Career Mentoring Workshops (CMW):** The biennial CRA-W mentoring workshops took place this year—one for women at primarily teaching institutions and one for women at research universities and labs. The CMW-E (Education) workshop took place March 8 at SIGCSE. There were 24 participants and seven speakers at this one-day event. The CMW-RL (Research and Labs) took place June 4-5. The workshop had 80 attendees, 20 of whom were panelists.

**Cohort of Advanced Professionals Project** (formerly the Cohort of Associate Professors Project): The goal of CAPP is to increase the percentage of Computer Science and Engineering women faculty members and researchers who reach the top of their respective career tracks—faculty members by being promoted to full professor; and researchers in industrial or governmental labs by being promoted to the top of their institution's technical ladder or by entering research management. The workshop also aims to build a cohort of senior women in

academia and industry who can provide each other with an information network and mutual support. CAPP is funded through an NSF grant and donations from IBM, Microsoft, and a private foundation.

**Distinguished Lecture Series:** The Distinguished Lecture Series sends faculty and labs researchers to campuses to encourage women and minorities to attend graduate school. The visits include a technical talk as well as a variety of "recruiting" events: lunches with underrepresented undergraduates, panel discussions about graduate school, meetings with faculty interested in recruiting/retention, and meetings with female and minority graduate students. The program focuses on arranging events at institutions that do not have a large number of research, women, or minority faculty, and has an increasing emphasis on Historically Black Colleges and Universities (HBCUs) and Minority Serving Institutions (MSIs). Funded by a grant from the NSF, three events were held between February and May 2011.

### ***Mentoring Programs***

**Distributed Research Experience for Undergraduates (DREU) (US and Canada)** continues to be one of CRA-W's most visible and well-known programs. The program pairs each accepted undergraduate student with a research faculty member to pursue an in-depth summer research project at the faculty member's institution. Since 2008, CRA-W and CDC have partnered to expand this program to include underrepresented minorities as well as women. This program is funded by a grant from the NSF.

In 2011, DREU funded 53 of the 185 student applications that were sufficiently completed to merit review. There were 416 started applications. Of the matches, there were 32 women students (16 white, 13 Asian, 2 African American, and 1 Hispanic) and 21 men (12 African American, 4 Hispanic, 1 Native American, and 4 white). Five of the men (1 Hispanic and 4 white) were in the Access Computing program for students with disabilities. There are 38 mentors in total. Twenty-one of them are providing full or partial funding for their students, corresponding to 27 students who are either fully or partially supported by their mentors. These mentors provided \$125,300 in total.

**Collaborative Research Experiences for Undergraduates:** CREU also continues to be a highly visible program. It provides research mentoring for small teams of students at the students' home institution during the academic year. Teams are composed of students from underrepresented groups in computing and with the selection committee composed of CRA-W and CDC members.

In 2010-11, 31 proposals were submitted, of which 21 were selected for funding. Of these, 12 projects will run for the full year (academic year plus the following summer); 8 projects will run for the academic year only. In all, 51 students will receive financial support from CREU, though the projects will involve additional students as well. Ten out of 17 projects from AY2010 were presented at GHC in fall of 2010. Several students presented posters at the 2011 Tapia conference.

### ***Other CRA-W Projects***

**Workshops at Grace Hopper:** CRA-W is again organizing three parallel tracks of three sessions each for Undergraduates, Graduate Students, and Early Career Researchers at Grace Hopper in 2011. A group is also arranging a Birds-of-a-Feather session.

**Communications:** The communications committee released an issue of our biannual Alumni Newsletter this spring which can be found on our web site <http://www.cra-w.org/Newsletter/>. The Grad Brochure was also updated.

**Web site:** The CRA-W website was updated in 2011. A company has been hired to design and host the site creating a new, more professional look and feel.

**Fundraising:** CRA-W received a \$750k supplement to our current BPC grant to conduct a national survey to assess the impact of the BPC programs on expanding the numbers of women and minorities in computing research. We will be putting together an NSF proposal this fall to ask for continued funding for the evaluation study and for our BPC-funded programs.

**Travel Grant Program:** Since its inception in 2007, the Travel Grant program, which provides funding for women in research labs to attend conferences, has had 34 applicants, of which 27 have been accepted. Since March 2010, we have had 11 applications of which 10 were funded. Conferences we have sent women to include Grace Hopper, ISCA, BPM, OSDI, NIPS, CSCW, COSYNE, and ICCS. This program is funded by a private foundation.

**Pipeline Column:** Between September 2010 and May 2011, four articles were solicited, edited and submitted for publishing in Computing Research News.

**Mail Lists:** CRA-W provides a collection of mailing lists designed to cover all the stages of the research pipeline. The lists are monitored by CRA-W and hosted by ABI. We have written and posted clear descriptions of each mail list and are now clearly publicizing them both at ABI and CRA-W web sites.

### ***Coalition to Diversify Computing (CDC)***

CDC is a joint organization of the ACM, CRA and IEEE-CS. The leadership of CDC and CRA-W continued to streamline and merge their mentoring projects during the year. CDC's major effort was the April 2011 Tapia Conference, the premier conference for Celebration of Diversity in Computing. A full evaluation of the conference was coordinated by conference chair Dave Patterson and the results published in the September 2011 edition of Computing Research News, vol. 23/No. 4, p. 2. The 2011 Academic Career Workshops for Underrepresented Participants in Computing Sciences was held February 24-27 at the University of Southern California. Twenty men and thirteen women attended with 55% of the participants self-identified as African American/Black and 30% as Hispanic. The majority of participants were either assistant professors or senior graduate students (79%). Nineteen participants were from Research Institutions (58%). The responses were overwhelmingly positive and attendees indicated they would recommend the Academic Workshop to their colleagues. Other CDC activities included: Distributed Research Experiences for Undergraduates (DREU); Collaborative Research Experiences for Undergraduates (CREU); CDC/CRAW Distinguished Lecture Series; IEEE-CS Distinguished Visitor Program Liaison; Sending Students to Conferences; Addressing the Shrinking Pipeline; Design your Future; and NCWIT Leadership Team.

By far the most fruitful collaboration that CDC has is with CRA-W. In May 2010, we submitted a proposal to NSF for continuation of the *CDC/CRA-W Alliance* and to expand the programs enumerated above. NSF agreed to fund the proposal at a reduced amount with an emphasis on a data collection effort that will serve our programs as well as other NSF Alliances for assessment purposes. In spring 2011, we began collecting data from several universities in the

US to create a pool of data with which to generate comparison groups for our assessment efforts. The initial survey sent to CS departments covered graduating seniors. In the fall, a second round of surveys will be sent to other undergraduate students and to graduate students. The project is well underway.

### ***Computing Innovation Fellows Project***

Originally funded by the National Science Foundation (NSF) in May 2009, the goal of the Computing Innovation Fellows (CIFellows) Project—run by CRA's Computing Community Consortium (CCC)—has been to enable recent Ph.D.s in computer science and related fields to obtain one- to two-year postdoctoral positions at academic institutions and industrial organizations with fundamental research and education programs. The initiative has sought: a) to forestall a permanent loss of research talent likely to occur as a consequence of the financial crisis, and b) to enable new Ph.D.s to develop experience, making them more effective researchers and/or teachers in the long term.

The program funded 60 CIFellows in fall 2009, and, given the persistence of the economic downturn, received additional funding from NSF to support another 47 CIFellows in fall 2010 (as detailed in CRA's previous annual report). In addition, of the 60 CIFellows in the inaugural cohort, 42 chose to continue for a second (and final) year in the program; of the rest, the vast majority landed permanent research positions in academia and industry by the end of their first year.

In December, the CCC organized a two-day Research Meeting and Career Mentoring Workshop for current CIFellows (from both cohorts), providing opportunities for them to network with one another and to receive career advice from leading experts in the field. Talks spanned funding opportunities, as well as how to plan one's research career, network, land a permanent position in academia or industry, successfully apply for research grants, teach, mentor and manage students, and manage the work/life balance. In addition, the CIFellows engaged in a "one-minute madness" (during which each of the CIFellows has 60 seconds to describe his/her background, research interests, and future career aspirations), as well as a poster session with presentations by second-year CIFellows.

In late March and early April, nearly halfway through their first year in the program, each 2010 CIFellow and mentor pair reported either "highly successful" or "moderately successful" experiences. Three CIFellows informed CCC staff that they had secured permanent positions and plan to depart the program by fall 2011. The remaining 44 CIFellows from the 2010 cohort plan to continue for a second (and final) year.

Meanwhile, among the 2009 CIFellows who were in their second year in the program, reports streamed in of offers for permanent positions in academia, industry, and government. CRA expects to be able to provide a complete summary of these "outcomes" in its next annual report.

The success of the CIFellows Project, coupled with slowly improving economic conditions, prompted CRA/CCC to request funding to support a third (and presumably final) cohort of CIFellows for the 2011-12 academic year. In April, given anticipated funding from NSF, the CCC announced a call for applications for 2011-12 CIFellowships and assembled a committee of nearly 25 leading computer scientists in preparation for a rigorous review of candidates during the summer months. A total of 177 applications were submitted by the application deadline at the end of May, and a total of 20 awardees are expected to begin CIFellowships in fall 2011.

### ***Postdoctoral Positions in Computer Science***

In November, at the suggestion of members of the CCC Council, and given data from CRA's Taulbee survey showing a significant increase (independent of the CIFellows Project) since the early 2000s in the number of recent computer science Ph.D.s pursuing postdoctoral positions, CRA launched an effort to engage the computing research community in a conversation about postdoctoral fellows. A white paper, the result of a CRA-commissioned committee, was posted to the CRA website (<http://cra.org/postdocs/>) in February, presenting statistics about academic and industry hiring, and articulating relevant issues about postdoctoral fellows. The CRA sought to use this paper to solicit input from the community, encouraging faculty, postdoctoral fellows, and graduate students to discuss the various issues and opine on the website. Input was collected through late spring, and the committee along with members of the CCC Council and CRA Board are planning further discussion of the issue at summertime meetings.

### ***CRA-Education***

During the Conference at Snowbird 2010 a meeting was held to solicit community input on the role of CRA in ensuring the continuing health of the research pipeline related to education. The ideal outcome of CRA-E's activities is that every computer science undergraduate gains an understanding on what computer science research is about, has the opportunity to be involved in research activities, and understands the benefits of a graduate education and a research career. One of the most helpful programs for introducing undergraduates to computing research is the NSF Research Experience for Undergraduates grant and supplement program. CRA-E believes that there are opportunities for innovation in REU and proposes to sponsor a workshop intended to solicit new ideas in how REU programs are proposed, funded, and administered. Possible new approaches include methods that would enable undergraduate programs to network and gain critical mass in selected research fields, new methods for collaboration between graduate and undergraduate programs, and internships that would allow students from undergraduate departments to spend a semester in a larger laboratory at a PhD-granting institution. The committee will focus on preparing a proposal to submit to NSF this spring for a late fall meeting of no more than 40 participants. The proceedings and recommendations will be reviewed by both CRA and NSF.

### ***Outstanding Undergraduate Researcher Awards***

In 2011, CRA presented awards to winners Hijung (Valentina) Shin and Patrick Wendell, both seniors at Princeton University, and to Peter Bailis, a Senior at Harvard University. Runners-Up were Mitchell Koch from Rice University and Mark D. Leiserson from Tufts University. In addition, twelve students were selected as Finalists and a number received Honorable Mentions. The student awards, given for outstanding research potential, were sponsored this year by Microsoft Research.

### ***Community-Building***

***The Computing Community Consortium (CCC)*** – a standing committee of CRA funded through a cooperative agreement between the National Science Foundation (NSF) and CRA – takes the lead in CRA's community-building efforts. The CCC is comprised of 18 leading, broad-based computer scientists who serve staggered three-terms, plus five ex officio members: the CCC Council Chair; CCC Council Vice Chair; CCC Director; CRA Executive Director; and CRA Board Chair. The CCC Council meets by conference call approximately every two weeks and in person three times each year, with at least one meeting each year taking place in Washington, DC.

During this reporting period, the CCC continued to support and guide visioning activities led by researchers in the community, pursuing outreach both to the community and to Federal agencies. One particular activity on robotics was the subject of extensive dialogue between the CCC and officials at the White House Office of Science and Technology Policy (OSTP). These conversations contributed to the launch of a \$70 million, multi-agency National Robotics Initiative (NRI) at a Presidential event at Carnegie Mellon University in early June<sup>1</sup>. The NRI, which spans NSF, the National Institutes of Health (NIH), the U.S. Department of Agriculture (USDA), and the National Aeronautics and Space Administration (NASA), supports fundamental research advances in support of next-generation robotics, across a broad swath of application areas including health, agriculture, and space exploration.

In September, the CCC rolled out a series of 8 white papers on big data, describing the wealth of data emerging in science, engineering, and society, and, particularly, highlighting the critical role of data mining, machine learning, predictive modeling, and related computational approaches in enabling a “data to knowledge to action” pipeline in virtually all areas of national priority, including health, education, and national defense. Following the release of these community-authored white papers, the CCC engaged in numerous conversations with colleagues at OSTP and Federal agencies, in hopes of encouraging a future multi-agency initiative in big data research and development.

In October, at NSF’s request, the CCC began planning a February workshop on the “Role of Information Sciences and Engineering in Sustainability” (RISES), with the aim of identifying key computing research opportunities in sustainability broadly-speaking, including energy, transportation, and the environment. The workshop, which took place in Washington, DC, brought together over 60 leading researchers in computer science as well as the domain sciences, and the report that resulted helped inform planning at NSF for future sustainability-related solicitations within the Foundation’s nearly \$1 billion Science, Engineering, and Education for Sustainability (SEES) portfolio.

Throughout the year, the CCC continued to conduct outreach on its recent visioning activities, with trips by the CCC director and visioning activity PIs to multiple Federal agencies, notably on the subjects of computer architecture, cross-layer reliability, health information technology, and education technology. Some examples: discussions between CCC and colleagues at NIH resulted in the identification of new partners for potential multi-agency solicitations that would build upon NSF’s Smart Health and Wellbeing program started in spring 2010 following a CCC workshop on “Discovery and Innovation in Health Information Technology” (see CRA’s previous annual report for details about that workshop); and discussions between CCC and OSTP resulted in the generation of a series of three white papers describing open opportunities in learning technologies.

In late March, CRA submitted a proposal to NSF requesting an additional four years of support for the CCC. The CCC was initially funded in fall 2006 and commenced full-scale operations in spring 2007 with a budget of approximately \$2 million per year. This initial funding is set to run through fall 2012. The new proposal summarized key accomplishments and benefits of the CCC during its “startup” phase, as well as key goals for the proposed period during which the CCC will continue to transition into a mature and potentially long-term activity of the CRA.

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<sup>1</sup> <http://www.cccb.org/2011/06/24/robotics-research-a-pillar-of-new-500m-advanced-manufacturing-partnership/>

Finally, in June, the CCC Council considered and approved a proposal by the director to create Council subcommittees and task forces with the intent of improving the structure and operation of the CCC organizationally (through the subcommittees) and enhancing specific areas of interest for the field (task forces).

**Computing Leadership Summit:** CRA hosted the annual Leadership Summit for presidents, executive directors, and other senior leadership of CRA, its five affiliate societies (AAAI, ACM, CACS/AIC, IEEE-Computer Society, SIAM, and USENIX), and NRC's Computer Science and Telecommunications Board. The seventeenth Summit was held February 28, 2011, in Washington, DC. Speakers included: *Jon Eisenberg*, Director, Computer Science and Telecommunications Board (CSTB); *Jan Cuny*, NSF-CISE; *Bobby Schnabel*, Chair, ACM Education Policy Committee; *Ed Lazowska*, CCC Council Chair, Co-Chair PCAST Working Group on NITRD; *Dan Kaufman*, Director, Information Innovation Office, DARPA; and *Farnam Jahanian*, Incoming NSF CISE AD.

## 2010-2011 Computing Research Association Members

### Academic Members

*The following departments held membership in CRA for all, or in a few cases part, of the period from July 2010 to June 2011.*

Arizona State University (CSE)	Indiana University School of Informatics and Computing
Auburn University (CSSE)	Iowa State University (CS)
Binghamton University, SUNY (CS)	Iowa State University (ECE)
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Boston University (CS)	Johns Hopkins University (SI)
Bowling Green State University (CS)	Juniata College (IT & CS)
Bradley University (CS)	Kansas State University (CIS)
Brandeis University (CS)	Kent State University (CS)
Brown University (CS)	Korea Advanced Institute of Science & Technology (CS)
Bryn Mawr College (MCS)	Lafayette College (CS)
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Carnegie Mellon University (CS)	Louisiana State University (CS)
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College of William & Mary (CS)	Miami University (CS)
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Columbia University (CS)	Mississippi State University (CSE)
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Cornell University (IS)**	Montclair State University (CS)
Dalhousie University (CS)	Mount Holyoke College (CS)
Dartmouth College (CS)	National University of Singapore (CS/IS)
DePaul University (CDM)	Naval Postgraduate School (CS)
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Drexel University (IST)	New York University (CS)
Duke University (CS)	North Carolina State University (CS)
Emory University (MCS)	North Dakota State University (CSOR)
Florida Institute of Technology (CS)	Northeastern University (CIS)
Florida International University (CS)	Northwestern University (EECS)
Florida State University (CS)	Nova Southeastern University (CS)
George Mason University (CS)	Oakland University (CSE)
George Washington University (CS)	Ohio State University (CSE)
Georgetown University (CS)	Ohio University (EECS)
Georgia Institute of Technology (CS)	Oklahoma State University (CS)
Georgia Institute of Technology (CSE)	Old Dominion University (CS)
Georgia Institute of Technology (IC)	Oregon State University (EECS)
Georgia Southern University (IT)	Pace University (CSIS)
Georgia State University (CS)	Pennsylvania State University (CSE)
Grinnell College (MCS)	Pennsylvania State University (IST)
Harvard University (CS)	Polytechnic University (CIS)
Harvey Mudd College (CS)	Pomona College (CS)
Hobart and William Smith Colleges (MCS)	Portland State University (CS)
Illinois Institute of Technology (CS)	



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 Regis University (CIS)  
 Rensselaer Polytechnic Institute (CS)  
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 Santa Clara University (CE)  
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 University of New Mexico (ECE)  
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