CCC Early Career Researchers Symposium: Workshop Feedback and Evaluation of the CI Fellows Attendees

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COMPUTING RESEARCH ASSOCIATION

CERP
Computing Research Association
Evaluation

CCC
Computing Community Consortium
Catalyst

Table of Contents

About CERP

The Computing Research Association's (CRA) Center for Evaluating the Research Pipeline (CERP) evaluates the effectiveness of intervention programs designed to increase retention of individuals from underrepresented groups in computing, namely men from underrepresented racial/ethnic groups, and women of all racial/ethnic backgrounds. More generally, CERP strives to inform the computing community about patterns of entry, subjective experiences, persistence, and success among individuals involved in academic programs and careers related to computing.

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For more information about CERP, visit http://cra.org/cerp/.

Executive Summary

The CCC Early Career Researcher Symposium was held in August of 2018 to bring together former CI Fellows postdocs and other early career researchers in the field of computing to learn about tips for success in their careers, how to get involved in science policy, and the emerging visions of computing. CERP was hired to evaluate the symposium with hopes of understanding the effectiveness of the symposium. CERP also conducted a capstone evaluation of the CI Fellows postdoc program, a former CCC program that was run between 2009 and 2011. Below are key findings from this report.

KEY FINDINGS
Overall, attendees of the workshop reported the following about the symposium: - The first plenary talk, "Best Job in the World" by Greg Morrisett, and the poster session with networking reception were most informative   - The poster session was perceived as valuable for their careers   98% of attendees learned at least a little about tips useful to their careers   80% of attendees learned quite a bit or very much about how to work with the CCC   Former CI Fellows reported the following about their experience as a postdoc: 100% agreed or strongly agreed the program made a positive impact on their career   100% agreed or strongly agreed the program enabled them to start a research program or project   89% agreed or strongly agreed the program helped build their professional network, develop new research collaborations, and cultivate necessary technical skills   When compared against non-fellow postdocs and non-postdocs, CI Fellows were more likely to be currently tenured in their academic positions.

Introduction

The Computing Community Consortium (CCC) is a committee of the Computing Research Association (CRA) whose mission is to catalyze the computing research community and enable the pursuit of innovative, high-impact research[1]. Due to the 2008 economic downturn, the number of postdocs in computer science was expected to be on the rise as academic and industry jobs became scarce[2]. In response, the CCC developed the Computing Innovation Fellows (CI Fellows) postdoctoral program that extended over a span of three cohorts between 2009 and 2011, and later led to a community-wide best practices initiative for computer science postdoctoral researchers. The CI Fellows program was intended to provide recent PhDs opportunities to develop valuable experiences and skills necessary to become effective researchers and achieve long-term success. Across all three cohorts, 127 PhD graduates were awarded the CI Fellowship.

The CRA Center for Evaluating the Research Pipeline (CERP) was hired by the CCC to provide post hoc evaluation of the CI Fellows program in 2013. CERP conducted comparative evaluation, measuring former CI Fellows postdocs against a comparison group of non-fellow postdocs. Research results from CERP's evaluation indicated that compared to other postdocs, CI Fellows experienced greater independence in their work, were more satisfied with their ability to balance their time between work and life responsibilities, received higher postdoc salaries, and had higher salaries at the time of the 2013 evaluation[3].

In 2014, the CCC hosted a workshop for the CI Fellows in San Francisco, which served as an opportunity for former CI Fellows to network with peers and leaders in the field and receive advice related to career success and research mobility[4]. During the summer of 2018, the CCC again brought the CI Fellows together for the Early Career Researcher (ECR) symposium as a capstone event. In addition to CI Fellows, the symposium extended to other past and current postdocs, as well as early career researchers from a broad range of career pathways. Themes at the symposium included career advice, getting involved with policy, and emergent research visions[5].

A total of 482 early career researchers were invited to attend the symposium. Of those, 73 researchers accepted the invitation and joined the CCC in Washington, DC to learn from panels of senior research professionals from academia, industry, and government agencies. CERP was again hired by the CCC to provide evaluation of the ECR symposium as a whole and assess the long-term impact of the CI Fellows program. In this report, CERP discusses their research findings from that evaluation.

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[1] https://cra.org/ccc/

[2] https://cra.org/ccc/leadership-development/cifellows/

[3] Cundiff, J. L., Wright, H. M., & Stout, J. G. (2014). Computing Community Consortium's Computing Innovation Fellowship Program: 2014 Comparative Evaluation Report. Washington, DC: Computing Research Association.

[4] https://cra.org/ccc/events/ci-fellows-2014-workshop/#overview

[5] https://cra.org/ccc/events/early-career-researchers/

Evaluation Method

To evaluate the effectiveness of the ECR symposium and measure any long-term impacts of the CI Fellows program, CERP distributed a survey to attendees of the symposium immediately following the event's conclusion. The survey contained questions about sessions, what participants learned, and any suggestions for improvement to future workshops. Participants were also asked about their careers and professional development. If they were a past CI Fellow postdoc, additional survey questions were included to understand the impact of the program on their career trajectory and professional development.

Survey Respondents

CERP's feedback survey was distributed to all participants, speakers, and agency representatives of the symposium. Speakers and agency representatives comprised 12% of respondents and provided feedback on the sessions and symposium as a whole. In addition to feedback on the symposium, participants (n = 58) were asked questions about their goals and careers. Characteristics of the survey respondents are included in Table 1 below.

Table 1. ECR symposium attendee characteristics.

Characteristic	Percentage of total respondents (N = 67)
Gender	
Men	58%
Women	42%
Race/Ethnicity	
African American/Black	5%
Arab/Middle Eastern	12%
Asian	26%
Caucasian/White	46%
Hispanic/Latino	7%
Other	4%
Current job setting	
Academia	92%
Industry	5%
Government	3%
Ever held a postdoc position	63%

Notes. All attendees (participants, agency representative, and speakers) provided responses to these items. Values represent percentages within each demographic group for all survey respondents.

Symposium Feedback

This section contains summary tables displaying survey responses from attendees of the event.

Session Feedback

Attendees of the symposium reported the degree to which they found sessions from Days 1 and 2 informative and provided open-ended comments related specifically to those days. For all sessions across both days, respondents reported them to be at least "Moderately" or "Quite a bit" useful on average. As shown in Tables 2.1 and 2.2, respondents rated the first plenary "The Best Job in the World" and the poster session with reception and networking as particularly informative for Day 1. Open-ended comments related to Day 1 reflect these positive findings. Open-ended comments (see Appendix) also suggest making logistic changes to the poster session to give attendees more space around their posters and more time to see other presenters.

Further, Table 3 indicates that the majority of attendees found the poster session valuable for their professional development. They also reported learning new things from the poster session and found that it was a great way to interact with the broader community. While there were a small percentage of attendees who did not find the poster session as valuable to their professional development, this is likely due to the wide range of audiences in attendance, from very early career researchers to senior-level attendees invited as speakers.

Finally, Table 4 displays attendees' ratings for Day 2 sessions. Overall, the session "How to Work with the Agencies" and the roundtable discussions were reported as most informative. Open-ended comments reflect these findings, with attendees expressing interest in more time to interact with the agencies (see Appendix).

Table 2.1. The degree to which attendees found Day 1 sessions informative.

	Not at all	A little	Moderately	Quite a bit	Very	Mean
Welcome and Introductions	2%	5%	27%	23%	43%	4.02
Plenary: The Best Job in the World	0%	3%	8%	18%	70%	4.56
Parallel Sessions						
Having Impact (Research / Teaching / Service)	0%	9%	24%	18%	50%	4.09
Grants: Proposal Writing / Winning Grants / Collaborations for Grants	0%	3%	30%	46%	22%	3.86
Parallel Sessions						
Career Planning: Taking Hurdles in Stride and Figuring Out the Next Hurdle	0%	12%	6%	21%	61%	4.30
Networking: Building Your Research Village	3%	5%	22%	41%	30%	3.89

Notes. All attendees (participants, agency representative, and speakers) provided responses to these items. In column Mean, values represent the mean score; higher scores indicate stronger agreement. 1 = Not at all; 2 = A little; 3 = Moderately; 4 = Quite a bit; 5 = Very. Attendees who indicated they did not attend a given event are excluded from the analysis above. Table continued in Table 2.2.

Table 2.2. The degree to which attendees found Day 1 sessions informative. (continued).

	Not at all	A little	Moderately	Quite a bit	Very	Mean
Parallel Sessions						
When and How to Move into Leadership	0%	17%	11%	17%	56%	4.11
Balance - doing it all while NOT working 24/7	4%	4%	13%	35%	44%	4.10
Plenary: Shaping Audacious Visions for Computing Research	0%	5%	28%	27%	40%	4.02
Parallel Sessions						
Fairness / Privacy	6%	12%	15%	30%	36%	3.79
Human Technology Frontiers	0%	3%	22%	33%	42%	4.14
Parallel Sessions						
Cybersecurity	0%	0%	27%	21%	52%	4.24
Post Moore's Law Computing	0%	16%	20%	28%	36%	3.84
Poster Session Reception, Networking	0%	2%	10%	17%	71%	4.59

Notes. All attendees (participants, agency representative, and speakers) provided responses to these items. In column Mean, values represent the mean score; higher scores indicate stronger agreement. 1 = Not at all; 2 = A little; 3 = Moderately; 4 = Quite a bit; 5 = Very. Attendees who indicated they did not attend a given event are excluded from the analysis above. Table continued in Table 2.1.

Table 3. Value of poster session.

	Strongly disagree	Disagree	Neither disagree nor agree	Agree	Strongly agree	Mean
The poster session was valuable for my professional development	5%	10%	26%	28%	31%	4.17
I learned new things from the poster session	0%	5%	16%	47%	33%	3.69
The poster session was a great way to interact with the broader community	2%	5%	10%	40%	43%	4.07

Notes. All attendees (participants, agency representative, and speakers) provided responses to these items. In column Mean, values represent the mean score; higher scores indicate stronger agreement. 1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree.

Table 4. The degree to which attendees found Day 2 sessions informative.

	Not at all	A little	Moderately	Quite a bit	Very	Mean
Plenary: Understanding Science Policy	0%	5%	16%	33%	46%	4.20
Panel: Opportunities to Serve and Have Impact	2%	9%	23%	36%	30%	3.84
Panel: Overview of the Agencies	0%	6%	8%	37%	48%	4.27
How to Work with the Agencies	0%	5%	10%	25%	59%	4.39
Roundtable Discussions with Agency Experts, Informal Networking	2%	4%	10%	20%	63%	4.39

Notes. All attendees (participants, agency representative, and speakers) provided responses to these items. In column Mean, values represent the mean score; higher scores indicate stronger agreement. 1 = Not at all; 2 = A little; 3 = Moderately; 4 = Quite a bit; 5 = Very.

Professional Development at the Symposium

Participants (not speakers or agency representatives) of the symposium answered additional questions about their professional growth from the workshop. Table 5 shows that 90% of participants learned something new by attending the symposium and in Table 6, the majority of participants gained knowledge about aspects related to their careers, making an impact on policy, and working with the CCC. On average, participants reported learning the most about how to work with the CCC and the least about technical skills useful for their careers.

Finally, Tables 7 and 8 display the extent to which participants were networking with others and building professional relationships. As seen below, at least 90% of attendees networked with others at all career stages and gained peers and collaborators for future research. Although participants reported networking with others at a more advanced career stage, participants were least likely to report gaining a mentor with whom they could discuss career and research opportunities (Table 8).

Open-ended comments suggest attendees were also interested in learning more about grant writing, hearing from a broader range of speakers (e.g., from a variety of school types and career levels), and receiving further details about each of the agencies. Please see the Appendix for all open-ended responses.

Table 5. Learned something new during the symposium.

	Strongly disagree	Somewhat disagree	Neither disagree nor agree	Somewhat agree	Strongly agree	Mean
I learned something new by attending the CCC symposium.	7%	2%	2%	29%	61%	4.36

Notes. Percentages may not equal 100% due to rounding error. In column Mean, values represent the mean score; higher scores indicate stronger agreement. 1 = Strongly disagree; 2 = Somewhat disagree; 3 = Neither agree nor disagree; 4 = Somewhat agree; 5 = Strongly agree.

Table 6. Knowledge gained during the symposium.

	None	A little	A moderate amount	Quite a bit	Very much	Mean
Technical skills useful for my career	29%	23%	25%	18%	5%	2.48
Tips to succeed in my career	2%	9%	28%	36%	26%	3.76
How to communicate my ideas to make an impact on policy	4%	16%	30%	42%	9%	3.37
How to balance work with my personal life	19%	11%	30%	28%	12%	3.04
How to overcome obstacles in my career	11%	19%	26%	35%	9%	3.12
How to work with the CCC	2%	0%	19%	52%	28%	4.03

Notes. Percentages may not equal 100% due to rounding error. In column Mean, values represent mean scores within each item; higher scores indicate greater gains in knowledge. 1 = None; 2 = A little; 3 = A moderate amount; 4 = Quite a bit; 5 = Very much.

Table 7. Networking during the symposium.

Question	Not at all	A little	A moderate amount	Quite a bit	Very much	Mean
The degree to which participants networked with others at an **earlier career stage**	10%	14%	26%	38%	12%	3.28
The degree to which participants networked with others at **their own career stage**	0%	7%	25%	51%	18%	3.79
The degree to which participants networked with others at **a more advanced career stage**	4%	20%	34%	29%	14%	3.30

Notes. Percentages may not equal 100% due to rounding error. In column Mean, values represent mean scores within each item; higher scores indicate greater gains in knowledge. 1 = None; 2 = A little; 3 = A moderate amount; 4 = Quite a bit; 5 = Very much.

Table 8. Mentors, peers, and collaborators gained during the symposium.

Question	Not at all	A little	A moderate amount	Quite a bit	Very much	Mean
A mentor with whom you can discuss career/research opportunities	42%	21%	12%	16%	9%	2.28
Peers with whom you can discuss career/research opportunities	2%	10%	28%	34%	26%	3.72
Potential collaborators for future work	3%	19%	34%	24%	19%	3.36

Notes. Percentages may not equal 100% due to rounding error. In column Mean, values represent mean scores within each item; higher scores indicate greater gains in knowledge. 1 = None; 2 = A little; 3 = A moderate amount; 4 = Quite a bit; 5 = Very much.

Section Summary

Overall, attendees found sessions from the ECR symposium informative; in particular, they enjoyed the first plenary talk and the poster session with a networking reception. Participants also reported professional growth at the symposium, such as learning tips about how to succeed in their careers and building their

professional network. Finally, open-ended comments suggest participants had an enjoyable and productive time at the event. Many participants suggested more opportunities to network among other attendees and agency representatives. Participants also suggested some logistic improvements to the poster session, such as spreading the poster session out into two sessions and providing more space for discussions between presenters and attendees.

CI Fellows Evaluation

This section discusses the CCC CI Fellows Postdoc Program and compares responses from CI Fellow attendees with other non-fellow postdocs (e.g., past postdocs who were not part of the CI Fellows program and non-postdocs (e.g., PhD recipients who did not take a postdoc position upon graduation). Among participants who were not currently a postdoc (n = 44), 23% were past CI Fellows, 48% were non-fellow postdocs, and 30% were non-postdocs.

Impact of the CI Fellows Postdoc Program on Former CI Fellows

Former CI Fellows who attended the ECR symposium and completed CERP's survey (n = 13; represents 10% of all CI Fellow awardees) were asked the degree to which they felt the CI Fellows program made an impact on their careers and professional development. As displayed below in Table 9, 100% of CI Fellows agreed or strongly agreed the program had a positive impact on their career and enabled them to start a research program/project. Further, 89% of CI Fellows agreed or strongly agreed the program helped build their professional network, develop new research collaborations, and cultivate necessary technical skills.

Open-ended comments also reflect that the CI Fellows program positively impacted former postdocs' careers. Many suggested the program gave them independence and freedom to explore new topics and develop research projects. CI Fellows were also able to gain valuable collaborators. However, one CI Fellow did note their mentor retired during the fellowship, but they had a productive experience during their postdoc. Finally, open-ended responses indicated the program met their expectations and were appreciative of the experience. See the Appendix for all open-ended comments.

Table 9. Impact of the CI Fellows program on former CI Fellows' professional development.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean
The CI Fellows postdoc had a positive impact on my career	0%	0%	0%	22%	78%	4.78
The CI Fellows postdoc helped build my professional network	0%	0%	11%	33%	56%	4.44
I developed new research collaborations because of my CI Fellows postdoc	0%	0%	11%	67%	22%	4.11
The CI Fellows postdoc gave me the technical skills needed for my career	0%	0%	11%	44%	44%	4.33
I started a research program/project because of my experiences as a CI Fellows postdoc	0%	0%	0%	33%	67%	4.67

Notes. Percentages may not equal 100% due to rounding error. In column Mean, values represent mean scores within each item; higher scores indicate stronger agreement. 1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree.

Comparison of CI Fellows to Non-fellow Postdocs and Non-Postdocs

To further understand the impact of the CI Fellows program, CERP compared the CI Fellows postdocs to non-fellow postdocs and non-postdocs of the symposium on a number of measures, including their current job status and salary, self-reported career plans, and awards and professional achievements. It is important to note that while the data displayed below are useful anecdotes, samples sizes between groups are small and only represent the proportion of individuals who both attended the CCC symposium and responded to CERP's survey. Even so, we analyzed group differences using three-way Analysis of Variance models and chi-square test of fit with z-proportion tests. Statistical significance was determined using Bonferroni corrected[6] $p \leq$ .05.

Current Job Status and Salary
Within each group, 100% of respondents were currently employed in academia at the time of the survey. A follow-up question for academics collected information about their tenure status. As shown below in Table 10, CI Fellows were statistically significantly more likely to already be tenured than non-fellow postdocs and non-postdocs. They were also less likely to be currently on tenure-track.

Survey respondents also provided their salary range for their current positions. Due to a large cluster of salaries reported within the same range, we aggregated the list of salaries into two groups for analysis: less than $100k and greater than $100k. As displayed in Table 11 below, a greater proportion of CI Fellow postdocs had current salaries greater than $100k as compared to non-fellow postdocs and non-postdocs. Although we see this trend as a percentage, the difference in proportions were not statistically significant.

Table 10. Current academic tenure status.

	CI Fellow postdocs (n = 8)	Non-fellow postdocs (n = 17)	Non-postdocs (n = 12)
Currently tenured	50%*	0%	0%
Tenure-track	40%*	85%	92%
Neither tenured nor tenure-track	10%	15%	8%

Notes. Percentages may not equal 100% due to rounding error. Values represent percentages within each group. * Bonferroni corrected p ≤ .05.

Table 11. Current salary range.

	CI Fellow postdocs (n = 8)	Non-fellow postdocs (n = 17)	Non-postdocs (n = 12)
Current salary less than $100,000	13%	29%	33%
Current salary greater than $100,000	88%	71%	67%

Notes. Percentages may not equal 100% due to rounding error. Values represent percentages within each group.

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[6] Bonferroni correction is a method used to correct for pitfalls related to multiple comparisons between groups. For more information, see: https://en.wikipedia.org/wiki/Bonferroni_correction

Career Planning

Survey respondents indicated the degree to which they disagreed or agreed with three statements related to aspects important for career planning. There were no statistical differences between groups, but each group reported an average agreement with each statement. See Table 12 below.

Table 12. Career planning.

	CI Fellow postdocs (n = 9)	Non-fellow postdocs (n = 20)	Non-postdocs (n = 13)
I have a long-range vision for my career.	4.00	4.05	4.08
I know the steps I need to take to reach the next step in my career.	3.89	4.00	3.85
I know people I can go to for guidance on how to advance my career.	3.44	4.05	4.15

Notes. Values represent mean scores within each group. Higher scores indicate stronger agreement with each statement. 1 = Strongly disagree; 2 = Disagree; 3 = Neither agree nor disagree; 4 = Agree; 5 = Strongly agree.

Professional Growth and Achievements

Tables 13-15 display a variety of measures used to assess professional growth and achievements. We would like to make note of the smaller sample sizes in these tables – a small percentage of individuals in each group either (a) did not respond to the questions or (b) intentionally left the questions blank because they had never held any of the listed achievements.

Table 13 shows the average number of journal or conference publications survey respondents had at the time of the survey. The average number of grants that have been submitted and awarded by funding type (federal, industry, and other) can be found in Table 14. Further, survey respondents indicated whether they were holding, have held, or received a list of awards or positions, which is displayed in Table 15. Respondents could also write in other roles in a text entry box (listed below Table 15.) In all measures, there were no statistically significant differences detected between groups; anecdotally, proportions between groups, and the extent to which means differ, vary for each measured item.

Table 13. Average number of authored journal publications and refereed conference papers.

	CI Fellow postdocs (n = 10)	Non-fellow postdocs (n = 21)	Non-postdocs (n = 12)
First author on a journal publication	1.33 [2.35]	2.71 [2.95]	2.00 [1.53]
Co-author on a journal publication (not first author)	5.22 [5.76]	2.95 [3.69]	3.33 [5.84]
First author on a refereed conference paper	6.30 [9.57]	5.60 [5.38]	6.33 [4.52]
Co-author on a refereed conference paper (not first author)	11.90 [14.04]	6.62 [8.99]	7.08 [8.33]

Notes. Values represent the average number of experiences reported for each item. Inside the brackets, we report the standard deviation. For example, CI Fellow postdocs reported an average of 1.33 first authored journal publications during their career thus far with a standard deviation of 2.35.

Table 14. Average number of grants submitted and funded as PI or Co-PI.

	CI Fellow postdocs (*n* = 6)	Non-fellow postdocs (*n* = 13)	Non-postdocs (*n* = 10)
Federal Grants - Submitted as PI/Co-PI	5.67 [2.42]	6.79 [8.60]	4.10 [3.41]
Federal Grants - Funded as PI/Co-PI	1.50 [1.22]	1.77 [1.69]	1.10 [1.20]
Industry Grants - Submitted as PI/Co-PI	3.17 [1.94]	1.07 [2.06]	1.10 [1.66]
Industry Grants - Funded as PI/Co-PI	0.83 [1.17]	0.31 [0.63]	0.45 [0.83]
Other Grants - Submitted as PI/Co-PI	0.17 [0.41]	1.00 [1.18]	0.90 [1.38]
Other Grants - Funded as PI/Co-PI	0.17 [0.41]	0.69 [0.63]	0.20 [0.63]

Notes. Values represent the average number of experiences reported for each item. Inside the brackets, we report the standard deviation. For example, CI Fellow postdocs reported an average of 5.67 submitted federal grants during the past 24 months with a standard deviation of 2.42.

Table 15. Awards received, and positions held or currently holding.

	CI Fellow postdocs (*n* = 8)	Non-fellow postdocs (*n* = 16	Non-postdocs (*n* = 9)
Early career award (e.g., NSF CAREER; PECASE)	38%	13%	44%
A faculty fellowship (e.g., Google; Microsoft)	13%	6%	11%
Conference program committee member (beyond reviewing)	88%	88%	67%
Conference program committee chair	50%	13%	33%
Conference general chair	13%	13%	11%
Editorial Board of a computing journal	50%	25%	44%
Editor in Chief of a computing journal	0%	6%	0%
Proposal reviewer for NSF or another agency	100%	63%	89%
Other leadership or administrative role in computing (other roles written in a text-entry box)	25%	19%	11%

Notes. Percentages may not equal 100% due to rounding error. Values represent percentages within each group. Survey respondents could select all that apply.

Other leadership or administrative role in the computing community text entries:

- Steering committee member of a research consortium **(Non-fellow postdoc)**
- Served as a member-at-large for a conference steering committee and provided testimony before a senate subcommittee on AI. Recently selected for a Fulbright US Senior Scholar in Australia. **(CI Fellow)**
- Keynote speakers **(Non-fellow postdoc)**
- Guest editor of a Journal **(Non-fellow postdoc)**
- Local arrangements chair of a conference **(CI Fellow)**
- Future of Computing Academy **(Non-postdoc)**

Section Summary

Overall, CI Fellows postdocs reported the program made a positive impact on their careers. Open-ended comments indicated that CI Fellows felt they were given independence to pursue their own research and build strong collaborations.

In our analysis comparing CI Fellows postdocs to non-fellow postdocs and non-postdocs, we did not find any statistically significant differences with the following exception: CI Fellows were more likely to be currently tenured than non-fellow postdocs and non-postdocs. Comparative evaluation findings from this report should be interpreted with caution due to small sample sizes.

Conclusion

In this report, we discussed evaluation findings related to the CCC's ECR symposium for former CI Fellows and other early career researchers in computing. Results indicated that overall, attendees of the symposium were enthusiastic about their experience, enjoying session content and growing professionally. Further, attendees found the poster session with the networking reception informative and valuable for their professional development. Participants of the workshop networked with other attendees at various career levels and felt they gained peers and collaborators for future research. Although participants reported networking with others at a more advanced career stage than their own, only a small proportion of participants felt like they gained a mentor during the symposium. That is, while participants communicated with potential mentors at the event, they did not perceive those individuals as mentors.

In this report, we also conducted a capstone evaluation of the CI Fellows postdoctoral program targeted toward PhD recipients graduating during the economic downturn of 2008. In our analysis, we compared former CI Fellows to non-fellow postdocs and non-postdocs, all of whom attended the ECR symposium and responded to CERP's survey. Results indicate that compared to non-fellow postdocs and non-postdocs, CI Fellows were more likely to be currently tenured; anecdotally, a greater proportion of CI Fellows also had current salaries greater than $100,000. Other measures considered in this evaluation showed no statistically significant results among groups, which is likely explained in part by the small sample sizes and large amount of variation in survey responses. Even so, former CI Fellows indicated that the program made a positive impact on their careers. Through open-ended comments, CI Fellows expressed enthusiasm over the program and found the experience met, or exceeded, their expectations.

Overall, research findings in this report indicate that the CCC met their goal of connecting early career researchers with peers and senior members of the field to grow professionally and learn how to make an impact on the future of computing. Finally, results also indicate that overall, the CI Fellows postdoctoral program made a positive impact on those engaged in the program.

Appendix: Open-ended Responses

This section reports open-ended responses provided by attendees of the symposium. Comments are organized by survey question and have been edited lightly for clarity.

Do you have any specific comments about sessions on Day 1?

- Alternate the poster presentations so we can rotate between presenting and seeing posters.
- Very nice event. I enjoyed and learned a lot. Thank you!
- The day went very well. All the sessions were excellent, and the poster session was phenomenal. The food and drinks were very good!
- While I value the advice of senior colleagues, it would have been nice to include some more active sessions that weren't in the standard panel format. Most of the sessions I attended felt a bit like "this is what worked for me 20 years ago to get where I am today" but didn't have much advice about how to approach being an early-career professional with today's challenges like decreasing grant funding, increasing competition, changing expectations for academia and research, greater interaction between academia and other sectors, larger classes, new forms of impact, new forms of collaboration, new ways to build a scholarly reputation (nobody mentioned the importance of an online identity!), etc. I think we would have gotten more out of some sessions where we [could have] brainstormed together as a cohort, rather than just listening to the received wisdom of the elders.
- Conversations at the Poster Session were scarce. I believe this was partly because of the arrangement of the room, where posters were too close together and unavailable to the people walking by. Actually, the small squared space with posters would be full with the 3 or 4 poster presenters. I was a bit bummed about the lack of opportunity to talk about my work. Maybe having a section where all poster presenters could give an elevator pitch to the audience and give badges per question asked at the poster session, [which] could help to tackle this problem.
- I really enjoyed the interactive nature of the parallel sessions, especially the ones on hurdles and leadership! Thanks so much!
- I wish there was a session for academics in majorly undergraduate schools, such as liberal arts colleges or teaching universities.
- Sessions are all very good but the "Best Job in the World" session was absolutely fantastic! I have recommended others to have a look at the slides when they come out (I hope they do).
- I enjoyed them quite a bit! The poster session might have been better if there were shifts, since it was difficult to decide whether to stand by mine or go to someone else's.
- I think more diversity in the panel of speakers would improve the ability to mentor early career faculty who might have been as "lucky" as those who spoke. For example, faculty from less highly ranked pedigrees or who have experienced significant failures or challenges in their careers.
- Everything was great. Breakfast, lunch, breaks and poster session gave me a unique opportunity to network!
- The visioning session I attended felt pointless. Without prior expertise or preparation there was little the audience as a whole could contribute. The poster session was great I enjoyed the chance to with others about their research.
- I am almost up for tenure. Much of the young career advice, while excellent, was not useful at my career stage. (Again, not to say that it wasn't great advice.)
- The session on research impact was redundant after the first plenary due to lots of overlap in content. Could have been avoided.

- There was no vegetarian protein. I prefer visioning/topic sessions to advice sessions, perhaps in part because by this stage I suspect many of us have heard similar advice before.
- All on Day 1 were very motivating and informative. Thanks to all.
- The 9:30 parallel session on having impact was okay but repeated much of what was already said in the preliminary. Unfortunately, the session didn't go as much into impact as I expected. The impact session really happened on the second day with the first set of panelists.

Do you have any specific comments about sessions on Day 2?
- The entire workshop was very well organized. The information presented was very relevant and inspiring. The topics opened my eyes to some amazing possibilities that will be redirecting my research direction (potentially with one or two new collaborators).
- Talking to the program directors has been very helpful! The opportunities for networking have been excellent! The venue and food were great!
- Having slides would have been helpful for the presentations. Less focus on history and org charts, more on programs and hints for success (e.g., examples). Interaction with DARPA should emphasize need for industrial partners.
- The last session "Roundtable Discussion with Agency Experts": Maybe it's better to break it down into two sessions placed in two days. This way everyone gets a chance to talk to different representatives from at least two agencies.
- My specific panel discussion with the NSF Program Officer was excellent. That was my first time with a PO up and close and the time with her was extremely informative.
- This was extremely useful! I would have liked to have split the "how to work with the agencies" into 2 sessions so we could chat with more than one agency during the structured session.
- I found the Agencies presentation very interesting and in a future version the presenters should have a bit more time and maybe present things in a more structured way (FAQ-like): structure, funding types, …
- Learning more about policies and how that works was helpful! I really enjoyed meeting with the different agencies and having an opportunity to learn about other agencies and get questions answered was great! Thanks so much! I loved this workshop!
- It might be nice to have more formal roundtable discussions since it was unclear how exactly to locate the experts. In general, meals and breaks were great for networking!
- It would have been nice to have the agencies attend the poster session to see our research.
- As an entry-level academic, I have a shallow knowledge of agencies, their acronyms, and even searching for the deadlines. I wish there was more fine-grained information about the grants in general (grants 101). Maybe a handout does the job. Moreover, the roundtable for grants was a bit of XOR, and I felt uncomfortable to wander among the tables. Thank you though, it was very informative in general.
- I am in my 6th year of TT professor. A lot of the "how to navigate funding" is stuff that I've previously learned, but it was all very good advice - just not at my career stage. The bits about government service and CRA service were great.
- These felt like more uniquely CRA/CCC opportunities/connections and therefore less generic, which was great.
- Very important information, but maybe not as exciting as day 1
- I didn't realize that the roundtable discussions at 1:15 were happening in a separate room. I assumed that this would happen over lunch as well.

If the CCC were to hold another activity like this in the future, what would you change?
- It would be nice to have a more detail-oriented session on putting together a grant proposal.

- Have more one-on-ones and time at the poster sessions
- Provide better descriptions of what each parallel session would cover. Even if the description is just shared verbally right before the session, that would be helpful.
- Split the poster presentation time (odd/even) so that we can both present and check the posters.
- A couple more breaks for informal networking
- Parallel sessions. It was difficult choosing between these sessions because I would have love to attend both
- Provide more background material to attendees ahead of time. More "things to avoid" and "realistic expectations".
- It's pretty good already. But it would be very helpful if there could be a parallel session for selected program managers to advertise their programs a bit, say 10 minutes' slides show/talk for each one. Also, I think it would be rather helpful to arrange a few selected agency representatives to talk about the situation of last years' proposals: percentage of getting funded, how the scores are given, maybe a few more tips for watching-out.
- I would like to have more time with funding agencies. I'm interested in multiple agencies but can only attend two of them due to parallel setting.
- Tone down the advice component. Everyone was kind of repeating the same thing. In the future, let's have fewer panels and more networking events.
- More organized session in grant writing -- with specific advice and things to avoid. Would be nice to have a session where people would be assigned tables and they would socialize for 30 mins and then switch tables and socialize and switch tables again... (1.5 hours total). Perhaps some collaborations/grant proposals can be produces.
- Nothing. Everything was excellent - exceeded all my expectations.
- I'd like to see a more dynamic program that allowed for some more creative and ad hoc activities. I'd also like speakers to recognize that the diversity of research careers is growing - not everyone's path will look like the traditional tenured professor model. Take the alternate paths seriously, don't just treat them as anomalies. Invite some senior corporate or other researchers to present as well.
- More conversation about posters (within smaller thematic groups? or as I suggested in a previous answer) and maybe some hands-on to give it a feel about how CCC works (let's say a workshop on policy discussion on a current topic - the security session got close to that!)
- I would be glad to hear more about other researcher's (junior or senior) work in addition to the poster session.
- I would diversify the attendees, to be a more balanced proportion from computational fields: Computer Science, Mathematics and Statistics, Operations Research and Engineering
- To have more things geared toward other levels of career than just early career. I was not sure this would be helpful, but it actually was, and I enjoyed also mentoring some of the newer faculty.
- Overall it was really great. Minor comment: I just felt that some of the vision sessions were not very related to my area and they also could benefit from having more structure / density.
- I really liked it. It might be nice to have more discussion of next steps and even more opportunities for networking (e.g. changing the poster session format to accommodate this). Some of the speakers seemed a bit unsure of what they were supposed to be speaking about (I couldn't tell- but they mentioned this in their talks).
- A broader selection process to include more early-career faculty who really need mentoring.
- More networking opportunities and meeting with agency representatives. Poster session should be broken down into multiple sessions. The grant writing aspect should be more detailed and longer and should contain people who have actually written a grant.
- The time in the parallel session with agencies was not enough.
- Seems good.
- I would change the roundtable's structure and will have shorter sessions for leadership and policy. I would focus more on grants, work-life balance (will choose at least one assistant-professor to be panelist instead of

- all full professors), and strategies on teaching (more for female faculty). I would have more scenario-based activities (like student A acts badly in the class) and will open these questions for the audiences.
- Talks and panels were far too passive. Speakers frequently ran over. Only allowing questions at the end inhibited dialog. While I appreciate that CRA / CCC paid for everything, the relative opulence of the venue makes me wonder whether money could have been spent more effectively. I wonder whether it might have been more effective to do the agency discussions on site at the agency.
- Adding another roundtable discussion on the first day.
- The focus of the talks for early career and postdoc is great, but make sure that the audience matches that.
- A little too packed with sessions--info overload, the poster session was a little long and came at the end of a long day. One of our biggest challenges is how to get funding in an increasingly competitive environment, so creating more opportunities to speak with funding agencies -- 2-3 sessions instead of 1-2 could be helpful.
- More getting to meet people, less talks on generic topics like "impact."
- A better coordination among speakers in content delivered.
- I think the more unique the talks/panels are to CCC related opportunities, whitepapers, visioning, etc, the better. While I liked this event, I much prefer the addressing national priorities events. Also…. more veggie options :)
- A few more talks similar to Day 1 for day 2: motivational and words of wisdom
- I wouldn't have minded a bit more time, especially during breaks---I needed to stay in touch with my family on the west coast, so I missed a couple of the breaks almost entirely due to time zone issues.
- I'd like the speakers to give more real examples rather than generalizations.
- I'd eliminate the redundancy in the plenary session about the best job in the world and the following session on impact. I'd rather have the plenary session and spend more time having the speaker and/or panelists take more questions from the audience.
- It seems like many of the talks were advice talks. Such talks are at best humorous and a little uplifting, and at worse, downright depressing. For example, hearing time management from people like Shwetak Patel is downright depressing: the guy does 10x more than me and *still* spends tons of time with his family… argh! I would much rather see talks with more depth and specificity: Peter Harsha was a great example. His talk gave insight into the world of science policy that might be useful someday. All of the invited speakers were senior people. That's great to get a view from the top. On the other hand, networking with them is not that useful: they won't remember me, and they can't address my specific concerns b/c they are too high up. I wonder if there could be a way to structure such events so there could be opportunities to network with program managers (e.g., could the meeting be held in Arlington with a breakout session in the afternoon where we can schedule 1-1 meetings with PMs in our area?)

If the CCC were to hold another activity like this in the future, what would you keep the same?
- The size was good, and the poster session was a great opportunity to talk to and meet people.
- mostly everything.
- The videos to view the program after the event end. I would like to watch the parallel sessions I couldn't attend.
- Giving participants opportunities to interact with one another on their own. Keeping the relatively short session lengths.
- I do really enjoy the poster session at the end of day 1.
- The networking opportunities, chance to talk to the program directors, long breaks to meet other colleagues, diverse profile of 'early careers', venue, scheduling.
- Poster sessions were very useful for getting to know people's research and mingling
- Session with the agencies.

- Poster session and unstructured time to network with other attendees.
- Mix of topics. Duration.
- How to build research network. Understanding how to work with different agencies. Food and Location.
- Networking component.
- Poster session and socializing was fantastic, first lecture about best job in the world was great!
- Everything, including the participants. It was so good to see some of my old colleagues from the CI Fellows program and to see where they were today.
- The agency overviews and discussion sessions were very helpful!
- I really appreciated the diverse views on research and the positions on life-work balance. I deeply believe that early career researchers (and maybe all of us) need to listen to sincere career stories full of failures and some nice moments... Just as life is.
- It was a very nice opportunity to meet and talk about agency representatives.
- Location and schedule.
- The networking and the interactive sessions that encourage questions and knowledge building.
- Please make sure to organize other conferences like this! I think they bring tremendous value to researchers in the beginning of their careers. As a postdoc transitioning to a tenure-track position it was very valuable to meet others that were a bit ahead in their careers -- I would keep this balance between senior and junior people.
- The many but short sessions was a great format.
- The symposium leaders were really committed to mentorship and connecting people to one another. The atmosphere was quite inviting in that sense. Helen and her team also did a great job organizing everything. It ran very smoothly. Thank you!
- The discussion on work-life balance, networking, and meeting with agency representatives.
- I loved the poster session. This time helped a lot to increase my networking.
- I will keep the sessions on Day 1 of the symposium intact.
- The Speakers' personal anecdotes were quite effective. I enjoyed many chats with others about their experiences and research. It was especially good to talk with people outside of my research area.
- The sessions topics
- The different panels in various areas of CSE. I don't work in architecture of materials at all, but I really enjoyed the post Moore's law talks because I got to see something I hadn't seen before.
- Funding discussions and Q/A with agencies, networking activities, and the hotel was awesome!
- Most everything else.
- There was a good balance of relevant topics. The venue was nice.
- Rest of it all was great. Overall it was very informative for me.
- Keep everything the same
- Presenters and structure, food quality, and venue great as well
- Mix of topics and inclusion of young researchers presenting their work was well-done -- overall length and schedule seemed quite good.
- I like the lunch with NSF folks. One on one conversations, even around a table, is better than slideshows. I like that they address individual's concrete problems
- The plenary sessions, most of the panel sessions (see comment above).
- Poster session was great. Love the video thing — will use that. The CCC board members and staff were great! Venue and food was great. Thank you so much for organizing!!

Are there other things you learned at the CCC Symposium that you would like to share?

- Thanks for organizing this event and inviting me. I feel very lucky to have the opportunity. It was a great opportunity to find out how I can get involved with review panels at NSF and NIH. Additionally, it was a great opportunity to connect with new researchers whose work I have read and admired, but never met in person, as well as continue to firm up relationships I started building in previous conferences/research events.
- DARPA submission process still seems mysterious. The networking opportunities have been excellent! Thanks for diversifying the profile of the faculty who attended the event! The organization and venue were great!
- I learned that there is a lot behind "science and research" other than writing papers.
- How to work with different agencies. What other researchers are doing. Trendy and highly funded topics in the field.
- Senior people preach stuff that they don't practice (e.g., work-life balance).
- The role of the CCC in shaping policy related to computing. How leadership at the top of the government affects my day-to-day when positions of importance are left vacant for long periods of time. Work life balance means different things for different people.
- I believe that the CCC mission in itself was new to me and I was pleased to know that NSF funds such an effort on an institutional level. Good luck, and please keep connecting and informing society.
- I was able to learn tips and knowledge through networking and unofficial communications as well as the presentation and parallel discussions. It was a great opportunity. Sincerely appreciate the organizers!
- I learned more about how to get more involved and I sincerely hope I have an opportunity to do more.
- I did not know much about CCC in general, so it was nice to learn more about the organization.
- I learnt that CCC is a wonderful community and all of the organizers, speakers, and especially the attendees are very kind and supportive. I received endless advice from my colleagues, and I aim to return to the community someday soon.
- Connections and recommendations for research considerations and connections from other attendees
- The visioning material was pretty inspiring! I also learned that even a relatively random sampling of my peers is a hugely interesting group with lots of opportunities for research collaboration.

How did the CI Fellows postdoc program impact your career? Please explain below.

- It gave my independence and freedom to pursue my own ideas and was instrumental to my success at obtaining and succeeding in a faculty position.
- I attended a highly reputable university and worked under the mentorship of a new investigator. Unfortunately, he retired shortly after I completed my fellowship and he is no longer active in the community. I worked on a project that I would probably not have been able to work on otherwise, and we had some strong publications out of the work. I am no longer pursuing this line of work though, but I hope to incorporate it into my new area of research. Much has changed since then with the technology. I met other post-docs and we have stayed somewhat in touch since.
- I was able to work with great people thanks to the program. I developed new research projects, created publications, and the experience helped me to find a permanent position.
- It allowed me the opportunity to explore new topics areas for research and to develop necessary skills to move my research into a new direction that has been successful overall. It gave me new insights and perspectives and provided me with opportunities I might not have had otherwise. It kept me in academia, as I would have had to accept a position in industry otherwise! I love what I do and feel I have the best job in the world as a professor, and I have the CI Fellows Program to thank for that support! :-)
- I took a postdoc in industry that gave me freedom to do what I wanted and valuable collaborators.
- The CI fellowship program has been extremely helpful to my career in all aspects.

Did the CI Fellows postdoc program meet your expectations? Please explain below.

- Yes! I just wish it had continued so others could benefit, especially as many new PhDs are leaving academia for industry.
- Yes, it was an excellent stepping stone to my independent position
- Yes.
- It met greatly my expectations in that: (1) I had opportunities to work with great people and (2) the fellowship itself and the collaborators during the fellowship helped me to increase my visibility in the academia.
- Yes. I had a wonderful mentor who I stay in touch with. It gave me the opportunity to remain in academics and for that I am so grateful. I learned new skills and felt better prepared to begin a faculty position when I finished.
- It was good, except for the uncertainty about renewal after year 1 (I was in the first batch.) That uncertainty made me look for another postdoc prematurely.
- Yes, it actually exceeded my expectations [very much].