



CRA-WP Grad Cohort for Women Workshop: 2024 Immediate Impact Evaluation Report

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CERP

Computing Research Association
Evaluation



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Widening Participation

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ABOUT CERP AND ACKNOWLEDGEMENTS

The Computing Research Association's (CRA) Center for Evaluating the Research Pipeline (CERP) is a research and evaluation center whose mission is to promote diversity in computing. CERP serves as a resource for the computing community by supporting efforts to recruit and retain individuals considered underrepresented in computing or historically marginalized (i.e., women; people who are Black/African American, Hispanic/Latinx, Indigenous and First Nations, Native Americans, Alaska Natives, Native Hawaiians, and Pacific Islanders; persons with disabilities; persons from low-income backgrounds; first generation college students; LGBTQIA+ individuals; and veterans). 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.

CERP was created by the Committee on the Status of Women in Computing Research (CRA-W)/Coalition to Diversify Computing (CDC) Alliance through a National Science Foundation grant to the Computing Research Association (CNS-1246649). The current research was supported by the U.S. National Science Foundation, grant CNS-2335072. Any opinions, findings, conclusions, and recommendations are the authors' and do not necessarily reflect the views of the U.S. National Science Foundation.

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



TABLE OF CONTENT

- ABOUT CERP AND ACKNOWLEDGEMENTS 2**
- TABLE OF CONTENT 3**
- INTRODUCTION..... 4**
- METHODS..... 5**
 - Procedure 5
 - Measures 5
 - Analysis..... 5
- PARTICIPANT PROFILE 7**
- EVALUATION FINDINGS: ALL PARTICIPANTS..... 8**
 - Identification with Computing, Confidence, & Imposter Syndrome 8
 - Professional Support 11
 - Career Interest..... 13
 - Chapter Summary 14
- INTERSECTIONAL EVALUATION FINDINGS15**
- DISCUSSION & SUMMARY20**
- REFERENCES.....21**

INTRODUCTION

The CRA-WP Grad Cohort for Women (GCW) is a two-day mentoring workshop for women in computing-related graduate degree programs in their first, second, or third year of their program. Since its inception, GCW has been seen as an important catalyst for women's persistence in computing-related disciplines. CRA's Center for Evaluating the Research Pipeline (CERP) began evaluating the GCW workshop in 2014, and CERP results indicate that the workshop has a strong positive immediate impact on participants (Cundiff, Stout, & Wright, 2014; Wright, 2017; Wright, 2018; Idowu, 2023). For the 2024 workshop, it was co-located with CRA-WP Grad Cohort for IDEALS in Minneapolis, Minneapolis and brought 133 attendees to build networking with IDEALS attendees.

Previous research has also found long-term benefits of GCW. For example, Stout et al (2017) found that past GCW participants had a stronger interest in giving back to the community than non-participant women and men (Stout, Tamer, Wright, Clarke, Dwarkadas, & Howard, 2017).

Using a pretest/posttest methodology, the CRA Center for Evaluating the Research Pipeline (CERP) evaluated the 2024 workshop using an online survey distributed to participants before and immediately after the workshop. The post-workshop survey also included open-ended feedback questions for participants to provide feedback about the workshop (results are found in the [2024 Participant Feedback Report](#)). This report discusses CERP's evaluation efforts and results of their analysis assessing any immediate and intersectional impact on participants' outcomes (e.g., sense of belonging) as they relate to the goals of the workshop.

“Thank you for the opportunity; it was a great experience. And I have already told my other advisor about how great it is and other incoming PhD students.”

- GCW 2024 Participant

METHODS

Procedure

CERP evaluated the Grad Cohort for Women workshop using a pretest/posttest framework, wherein participants were recruited at two time points to complete an online survey: once approximately two weeks prior to the workshop (Time 1) and again immediately after the workshop (Time 2). The online survey distributed at both time points gauged participants' perceptions of the computing field and experiences in their degree programs, self-assessments of social support, and future career visions. The survey administered after the workshop also contained questions capturing participants' feedback and evaluation of the workshop.

Measures

CERP used the following outcome measures in analyses: **identification with computing, confidence to achieve, confidence to communicate, perceived mentorship support, perceived professional network, feelings of imposter syndrome, and career interests**. These measures were selected because they align with the goals of the program, which were outlined in the Introduction.

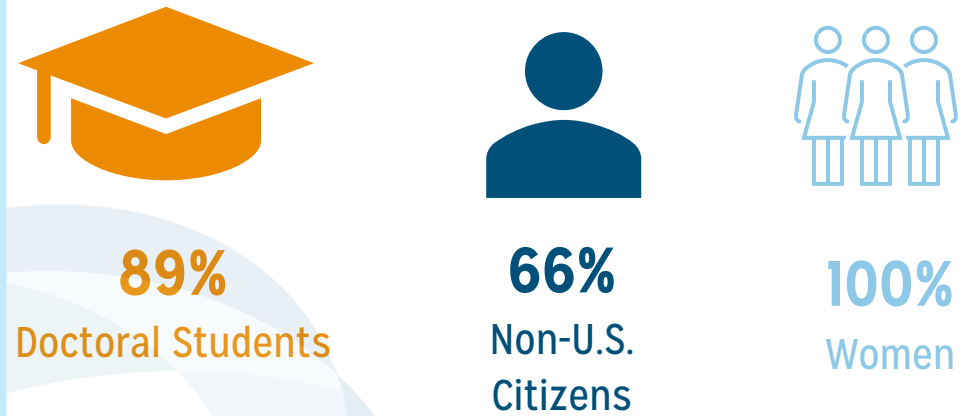
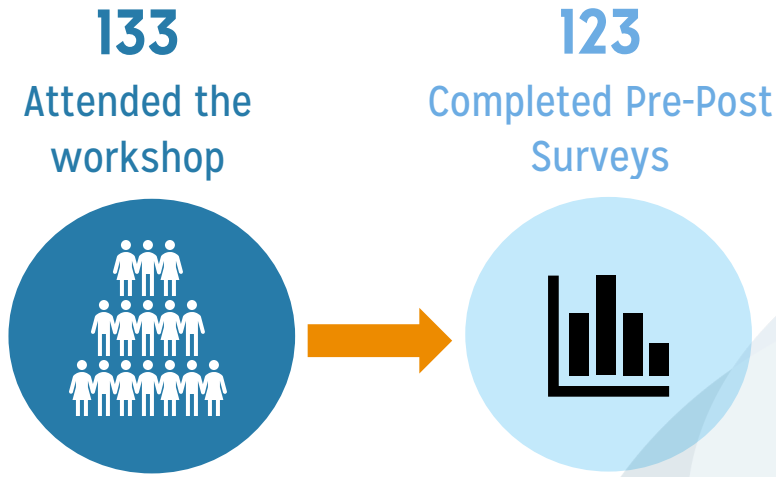
Reliability was tested for multi-item outcome measures (e.g., identification with computing) using Cronbach's alpha. Alpha levels greater than .70 are considered acceptable. Items that were found reliable were averaged together to form composite mean scores, which were used in analyses to test for changes from Time 1 to Time 2. Results for individual items are also presented in this report for completeness.

Analysis

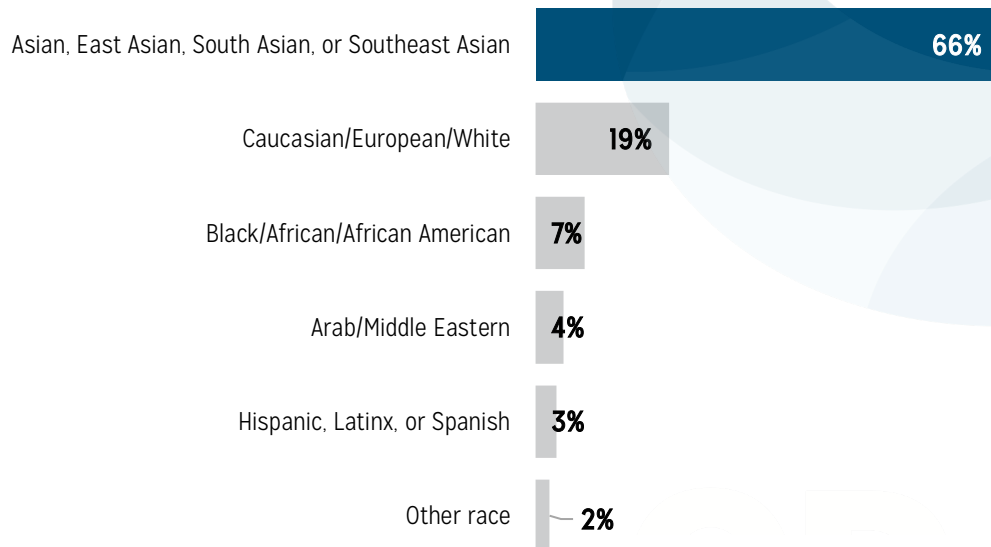
Pre/post comparisons of all participants were analyzed using a paired samples t-test on each Likert-scale outcome measure (e.g., measures rated on a scale from 1 to 5 to create a mean score), regardless of intersectional identities. Results assessing intersectional differences over time were generated using a repeated measures ANOVA, wherein Time was treated as a within-subjects variable and Group (i.e., underrepresented women vs. non-underrepresented women; has a disability vs not) was treated as a between-subjects variable. For each statistical test, we indicate whether differences in means or proportions from Time 1 to Time 2 are statistically significant using the conventional, $p \leq .001$, $p \leq .01$, and $p \leq .05$ thresholds for inferential statistics. Post-hoc tests were conducted to further explore significant findings more closely across the intersectional groups.

It is important to note that positive changes between Time 1 and Time 2 responses suggest, but do not prove, the positive impact of the workshop. Due to limitations inherent in pretest/posttest self-reported data, changes between Time 1 and Time 2 could be due to response bias, demand characteristics, or may be fleeting and not sustained over time.

WHO ATTENDED 2024 CRA-WP GRAD COHORT FOR WOMEN WORKSHOP?



Race/Ethnicity



PAST GRAD COHORT ATTENDEES



PARTICIPANT PROFILE

Of the 133 attendees, 123 participants completed both the pretest and posttest survey. Data from these 123 participants were analyzed for the pretest/posttest evaluation findings. Demographic and other characteristics of those attending the GCW workshop conference are displayed in the infographic above. Most workshop attendees identified as Asian, East Asian, South Asian, or Southeast Asian, and 66% were non-U.S. citizens. 89% are enrolled in doctoral programs as 11% are enrolled in master's program. Additionally, all participants identified as women, as this was a requirement for workshop attendance. Finally, among the 2024 participants, about 3% had previously attended a Grad Cohort for Women workshop.

Table 1. Participant demographic characteristics by gender, racial/ethnic identity, and citizenship.

	Percent of Participants (n = 123)
Gender Identity	
Woman	100%
Racial/Ethnic Identity	
African American/African/Black	7%
Arab/Middle Eastern	4%
East Asian (e.g., Chinese, Japanese, Korean)	27%
Southeast Asian (e.g., Cambodian, Vietnamese, Hmong, Filipino)	3%
South Asian (e.g., Indian Pakistani, Nepalese, Sri Lankan)	37%
American Indian/Alaska Native	0%
Caucasian/European/White	20%
Hispanic, Latinx, or Spanish Origin	4%
Native Hawaiian / Pacific Islander	0%
Other Asian	5%
Something	2%
Disability Status	
No Disability	79%
One or More Disability	19%
Citizenship Status	
U.S. Citizen or Permanent Resident	34%
Non-U.S. citizen with temporary visa	59%
Other Non-U.S. Citizen	7%

Notes: Values for racial/ethnic identity represent the percentage of respondents who selected each item; respondents could select more than one item.

EVALUATION FINDINGS: ALL PARTICIPANTS

Results presented in this section discuss ALL participants' responses before the workshop (Time 1) compared to their outcomes after GCW (Time 2).

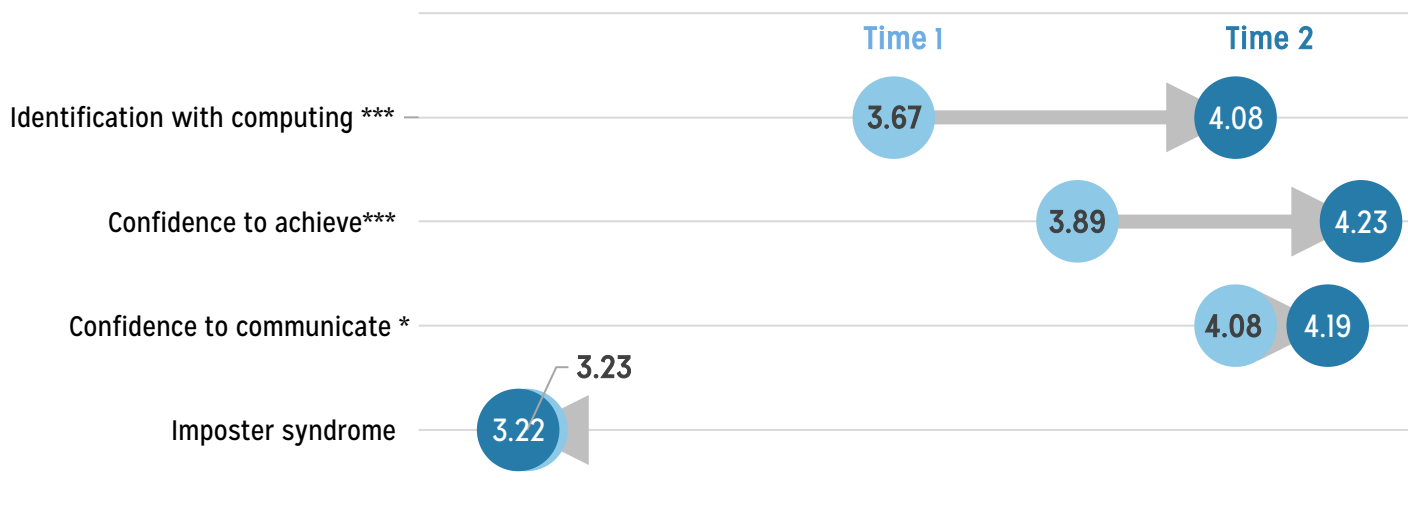
Identification with Computing, Confidence, & Imposter Syndrome

Participants showed significant improvement in their identity in computing and self-efficacy.

Utilizing composite measures where individual items are averaged, we present the results reflecting participants' average levels of **identification with computing, confidence to succeed and persist in the field of computing, confidence in their professional communication skills, and their experience of imposter syndrome** at both Time 1 and Time 2.

- Results indicate that there were statistically significant mean differences from Time 1 to Time 2 in their computing identity, confidence in their successes, and confidence to communicate professionally.

Figure 1. Attendees showed stronger identification in computing, confidence in academic achievement, and confidence in their communication skills between **Time 1** and **Time 2**.



Notes: Values represent mean responses for each composite item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests. N for all measures = 113-123. (n) = number of responses included in analysis. *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$.

Computing Identity. Table 2a presents the changes from Time 1 to Time 2 in the individual items related to identification with computing.

- Overall, participants demonstrated significant improvement in their sense of belonging in computing.

Table 2a. Identification with computing as individual items.

▲ / ▼ = significant increase/decrease; ▲/▼ = no significant increase/decrease

	Time 1	Time 2	
Identification with computing			
I see myself as a computing person. ***	3.89 [1.07]	4.39 [0.71]	▲
I feel like I belong in computing. **	3.83 [1.08]	4.22 [0.91]	▲
Computing is a big part of who I am. **	3.75 [1.13]	4.04 [0.93]	▲

Notes: Values represent means [and standard deviations] of each item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests.; *p ≤ .05; **p ≤ .01; ***p ≤ .001.

Imposter Syndrome. Table 2b shows the Time 1 and Time 2 mean scores on the imposter syndrome items. (Notably, lower scores represent agreement with the statement; thus, lower scores over time indicate improvement.)

- Participants' feelings of being an imposter did not change significantly on three of the four survey items measuring this construct.
- They were more likely at Time 2 to report being able to give the impression that they are more competent than they perceive themselves to be in reality.

Table 2b. Imposter Syndrome as individual items.

▲ / ▼ = significant increase/decrease; ▲/▼ = no significant increase/decrease

	Time 1	Time 2	
Sense of imposter syndrome			
I can give the impression that I am more competent than I really am.	2.80 [1.32]	3.03 [1.31]	▲
When others praise me for something I have accomplished, I am afraid I will not be able to live up to their expectations.	3.43 [1.32]	3.39 [1.23]	▼
At times, I feel my success has been due to some kind of luck.	2.99 [1.39]	2.95 [1.24]	▼
I am disappointed at times in my present accomplishments and think I should have accomplished much more by now.	3.71 [1.25]	3.54 [1.19]	▼

Notes: Values represent means [and standard deviations] of each item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests.; *p ≤ .05; **p ≤ .01; ***p ≤ .001.

Confidence to succeed and communicate. Table 2c shows the Time 1 and Time 2 mean scores on the self-efficacy scale.

- Participants showed significant improvement in most of the measures with the following exceptions:
 - Significant decreases were observed in their confidence to articulate thoughtful answers to questions about their work and discussing their work with senior members in their field.
 - No significant changes were observed regarding participants' confidence for finding employment in an area of interest to them.

Table 2c. Self-efficacy in achievement and communication as individual items.

▲ / ▼ = significant increase/decrease; ▲/▼ = no significant increase/decrease

	Time 1	Time 2	
Confidence to succeed "I am confident that I can..."			
be successful in a graduate computing program. **	4.19 [0.87]	4.38 [0.70]	▲
find employment in my area of computing interest.	3.93 [1.04]	4.07 [0.97]	▲
be a capable researcher in computing. ***	3.72 [0.95]	4.30 [0.75]	▲
become an expert in my field. *	3.96 [0.94]	4.09 [0.91]	▲
publish in tier I conferences and journals in my field. *	3.82 [1.10]	3.98 [1.05]	▲
be an effective mentor. *	4.04 [0.84]	4.21 [0.76]	▲
Confidence to communicate "I am confident that I can..."			
articulate thoughtful answers to questions about my work during a presentation. ***	4.43 [0.82]	4.04 [0.83]	▼
introduce myself to new colleagues/peers at professional meetings. ***	3.97 [1.16]	4.43 [0.60]	▲
clearly communicate technical problems and solutions to a range of audiences. ***	3.71 [0.99]	4.06 [0.75]	▲
discuss my work with senior members of my field. **	4.35 [0.82]	4.12 [0.80]	▼

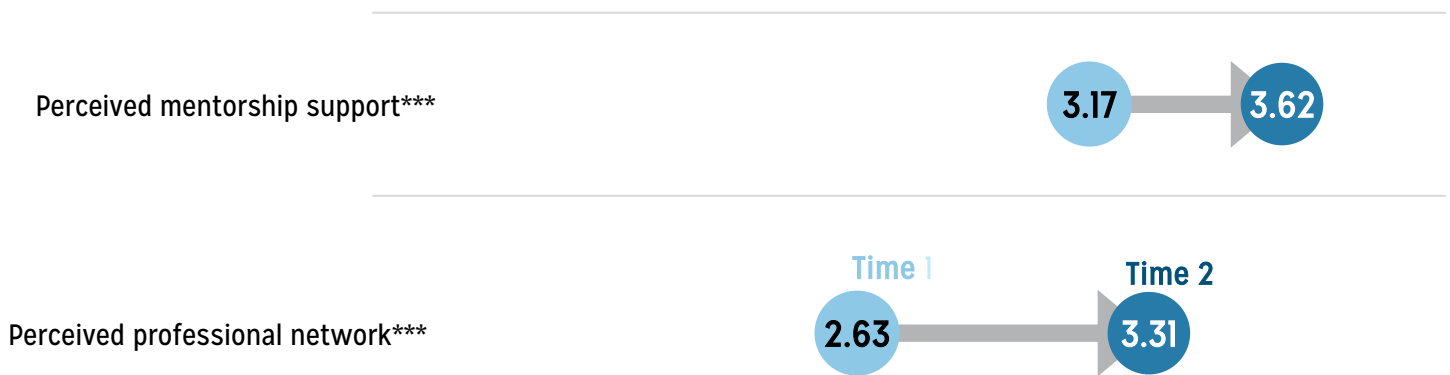
Notes: Values represent means [and standard deviations] of each item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests.; *p ≤ .05; **p ≤ .01; ***p ≤ .001.

Professional Support

Participants showed significant improvement in their social support system.

Another goal of GCW is to cultivate a supportive community for participants through mentorship and peer networking. These vital sources of social support were assessed by having participants rate the extent to which they received support from mentors (**perceived mentorship support**) and from individuals with whom they engage professionally (**perceived professional network**).

Figure 2. Attendees showed significant improvement in their professional support between **Time 1** and **Time 2**.



*Notes: Values represent mean responses for each composite item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests. N for all measures = 113-123. (n) = number of responses included in analysis. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.*

Also, CERP present the outcomes of participants' perceived mentorship support and professional network from Time 1 to Time 2 as individual items.

- Participants reported significant change in their perception of mentorship support and perceived professional network from Time 1 to Time 2.
 - For a more detailed breakdown of the analysis by individual items within each composite measure, please refer to Table 3.

Table 3. Changes in all perceived mentorship support and professional network as individual items.

▲ / ▼ = significant increase/decrease; ▲/▼ = no significant increase/decrease

	Time 1	Time 2	
Perceived mentorship support "To what extent do you have a mentor who..."			
helps you improve your computing skills. ***	2.86 [1.36]	3.42 [1.36]	▲
shows compassion for any issues you discussed with them. *	3.56 [1.34]	3.83 [1.19]	▲
shares personal experiences as an alternative perspective to your problems. ***	3.14 [1.39]	3.59 [1.24]	▲
explores career options with you. ***	2.63 [1.32]	3.31 [1.30]	▲
encourages you to do the best you can in your coursework. ***	2.96 [1.38]	3.44 [1.33]	▲
supports your research ideas. **	3.64 [1.28]	3.86 [1.14]	▲
Perceived professional network "To what extent are the following available to you..."			
People with whom you can discuss professional development questions. ***	2.83 [1.20]	3.38 [1.03]	▲
A strong network of peers to interact with at conferences. ***	2.39 [1.29]	3.39 [1.11]	▲
A strong network of mentors to interact with at conferences. ***	2.12 [1.17]	2.89 [1.20]	▲
People who would be excited to learn about your professional successes. ***	2.97 [1.16]	3.50 [1.03]	▲
People with whom you can discuss issues you are having. ***	2.86 [1.10]	3.41 [1.08]	▲

Notes: Values represent means [and standard deviations] of each item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests.; *p ≤ .05; **p ≤ .01; ***p ≤ .001.

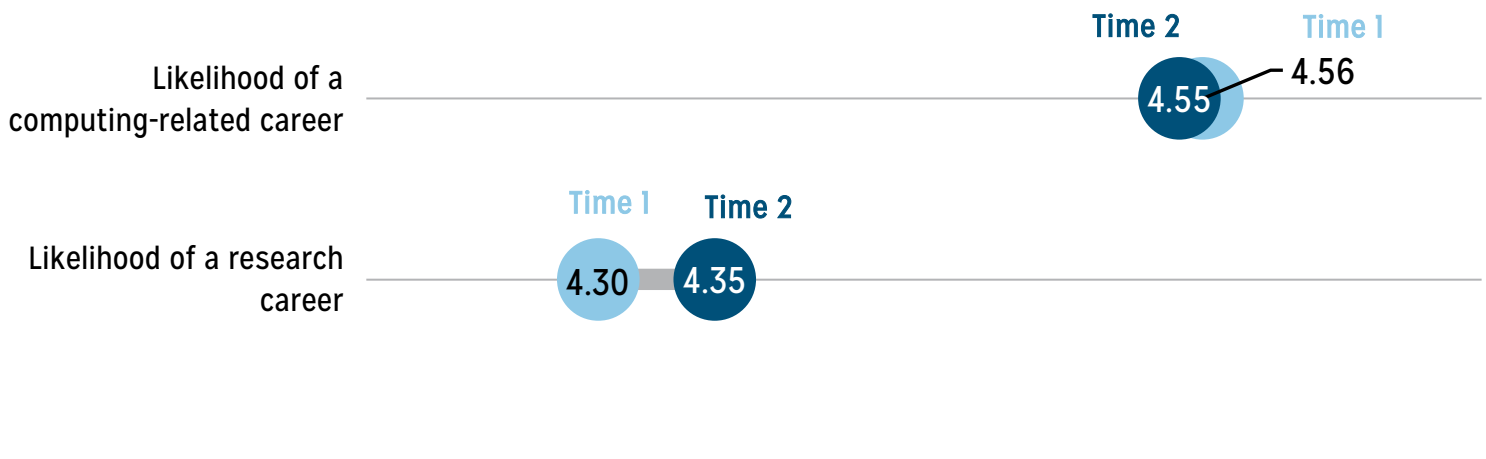
Career Interest

Attendees were more likely to pursue a computing related career than a research career.

Finally, GCW intends to provide participants with opportunities to learn from speakers with a variety of backgrounds and career paths. CERP measured whether the workshop made an impact on participants' broad career intentions. Specifically, participants rated the degree to which it was likely that **their future career would have a computing-related focus** and that **their future career would have a research focus**.

- Participants' beliefs about their future careers did not change after attending the workshop (Time 2) as compared to before the workshop (Time 1).

Figure 3. Attendees showed equal interest in pursuing both research and computing-related career at **both times**.

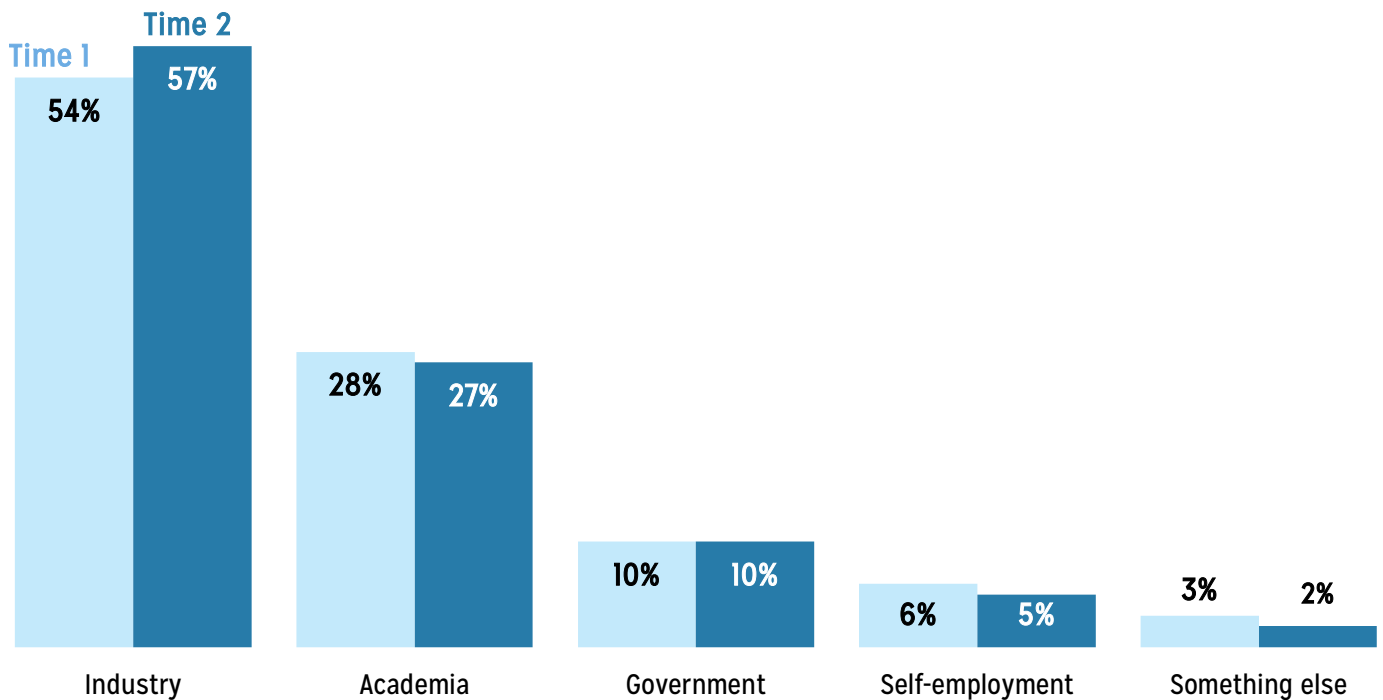


Notes: Values represent mean responses for each composite item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests. N for all measures = 113-123. (n) = number of responses included in analysis. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

Attendees showed more preference to be employed in industry at both time points.

There were no statistically significant changes over time in participants' **preferences for any of the employment sectors measured**, as shown in Figure 4. That is, participants were equally interested in academia, industry, government, self-employment, or something else after the workshop as compared to before it.

Figure 4. Attendees showed more preference towards employment in industry.



Notes: Values represent mean responses for each composite item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests. N for all measures = 109-123. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

Chapter Summary

In this section, CERP examined mean differences from Time 1 (before the workshop) to Time 2 (after the workshop) in several outcome measures. Results indicated that after attending the workshop, Between Time 1 and Time 2, there were significant changes in participants' reports of their identification with computing, confidence to succeed in their programs, and confidence to communicate professionally. GCW attendees were more likely to endorse feelings of being an imposter than they did before attending the workshop. Participants also had stronger perceptions of mentorship support and professional networks after the workshop than they did before it. However, there were no significant improvement in the likelihood of having a computing or a research career, or interest in a particular employment sector over time (e.g., academia versus industry).

INTERSECTIONAL EVALUATION FINDINGS

GCW attracts a diverse range of participants, and it's important to understand how it impacts their educational and academic pursuits across different cultural identities and backgrounds. To achieve this understanding, CERP combined participants' racial/ethnic identity with other demographic variables such as degree enrollment status, disability, first-generation status, and citizenship (Table 4). See Analysis section for more details on the findings.

Table 4. Intersectional Model for Analytical Process

Race/Ethnicity	Other Demographic Variables	Intersectional Model
0 = Non-underrepresented/Asian or White (AW) 1 = Underrepresented/Black, Hispanic, or Native American (BHN) Non-underrepresented or AW includes participants who are Caucasian/European/White, Arab/Middle Eastern, South Asian, East Asian, or Other Asian Underrepresented or BHN includes participants who are African/African American/Black, Hispanic or Latinx origin, Native American/Alaska Native/Indigenous, Native Hawaiian/Pacific Islander.	Degree Enrollment Status	
	0 = Master's Students 1 = Doctoral Students Master's students include participants who are in joint bachelor/master's program	Race/Ethnicity X Degree Enrollment
	Disability Status	
	0 = No disability 1 = One or more disability	Race/Ethnicity X Disability Status
	Citizenship Status	
	0 = U.S. Citizen 1 = Non-U.S. Citizen	Race/Ethnicity X Citizenship Status
First-Generation Status		
0 = Continuing Generation 1 = First Generation	Race/Ethnicity X First Generation Status	

For each intersectional group, we present outcomes that show either a significant interaction, significant post-hoc differences, or both. This comprehensive approach ensures that both statistically significant findings and notable trends are highlighted.

Results indicated that changes in specific workshop outcomes (**sense of belonging**, **perceived mentorship support**, and **self-efficacy**) were influenced by their racial/ethnic identity or other identities, including degree enrollment status, citizenship status, disability status, and first-generation status. This suggests that the workshop had differential impact on attendees based on their demographic background.

In addition to the significant interaction effects, post-hoc analyses revealed notable mean differences in participants' outcomes among specific demographic groups, regardless of survey timing. See the summary of results below.

Race/Ethnicity & Degree Enrollment Status

Mentorship Support

- Looking at overall mean scores, without consideration of statistical significance, Black, Hispanic, or Native American (BHN) doctoral students exhibited the highest sense of mentorship support than all other groups. Asian or White (AW) master's students reported the lowest average mentorship support.
 - o This finding highlights the numerical comparison of the overall mean scores rather than a statistical comparison.
- Comparing significant differences among the groups, AW master's students exhibited significantly lower mentorship support compared to AW and BHN doctoral students.
- Due to low sample size, BHN master's students were not included in the analysis.

Table 5a. Means of mentorship support by racial/ethnicity and degree enrollment.

	Mentorship Support (Mean)	Compared to AW master's women	Compared to AW doctoral women	Compared to BHN doctoral women
Race/Ethnicity and Degree Enrollment				
AW master's women (n = 10)	2.60	Significantly lower (**)	Significantly lower (**)	-
AW doctoral women (n = 91)	3.43	-	Not significant	Significantly higher (**)
BHN doctoral women (n = 9)	3.76	Not significant	-	Significantly higher (**)

*Notes: Values represent mean responses for each composite item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests. ***p ≤ .001; ** p ≤ .01; * p ≤ .05.*

Race/Ethnicity & Citizenship.

Computing Identity

- BHN non-U.S. citizens exhibited the highest sense of computing identity while AW U.S. citizens reported the lowest sense of computing identity, examining the overall mean scores, without consideration of statistical significance.
 - o This finding highlights the numerical comparison of the overall mean scores rather than a statistical comparison.
- Comparing significant differences across the groups, AW citizens exhibited significantly lower computing identity compared to both AW and BHN non-U.S. citizens.
- Due to low sample size, BHN U.S. citizens were excluded in the analysis.

Table 5b. Means of computing identity by racial/ethnicity and citizenship status.

Race/Ethnicity and Citizenship Status	Computing Identity (Mean)	Compared to U.S. Citizen, AW women	Compared to Non-U.S. citizen, AW women	Compared to Non-U.S. citizen, BHN women
U.S. citizen, AW women (n = 36)	3.46	-	Significantly lower (***)	Significantly lower (**)
Non-U.S. citizen, AW women (n = 67)	4.10	Significantly higher (***)	-	Not significant
Non-U.S. citizen, BHN women (n = 8)	4.33	Significantly higher (**)	Not significant	-

Notes: Values represent mean responses for each composite item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

Professional Support

- Examining the significant interaction effect among the groups, changes in the attendee's overall professional networking and support in and outside of their programs were influenced by their racial/ethnic identity and citizenship status.
 - o Overall, all the three groups showed a significant increase over time.

Table 5c. Changes in attendees' perceived professional network over time by race/ethnicity and citizenship status.

▲ / ▼ = significant increase/decrease; ▲ / ▼ = no significant increase/decrease

Race/Ethnicity and Citizenship Status	Time 1	Time 2	
U.S. citizen, AW women (n = 35)	2.50	3.12***	▲
Non-U.S. citizen, AW women (n = 67)	2.73	3.43***	▲
Non-U.S. citizen, BHN women (n = 8)	2.18	3.50***	▲

Notes: Values represent mean responses for each composite item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

Race/Ethnicity & Disability Status.

Computing Identity

- Comparing the overall mean scores, , without consideration of statistical significance,, AW women who have no disability showed the highest sense of computing identity as women who have one or more disability from the same racial groups reported the lowest.
 - o This finding highlights the numerical comparison of the overall mean scores rather than a statistical comparison.
- Comparing the significance across the groups, AW women who have no disability reported significantly higher computing identity compared to women with one or more disability from the same racial/ethnic groups.
- Also, BHN women with no disability also showed significant higher sense of computing identity compared to AW women with one or more disability.
- Due to low sample size, BHN women with one or more disability were excluded from the analysis.

Table 5d. Means of computing identity by racial/ethnicity and disability status.

	Computing Identity (Mean)	Compared to AW women, no disability	Compared to AW women, one or more disability	Compared to BHN women, no disability
Race/Ethnicity and Disability Status				
AW women, no disability (n = 84)	4.00	-	Significantly higher (***)	No significant
AW women, one or more disability (n = 19)	3.34	Significantly lower (***)	-	Significantly lower (*)
BHN women, no disability (n = 8)	3.98	Not significant	Significantly higher (*)	-

Notes: Values represent mean responses for each composite item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

Race/Ethnicity & Generation Status

Confidence to Achieve

- BHN first-generation women reported the highest sense of mentorship support as continuing generation women from the same racial/ethnic groups reported the lowest, examining the overall mean scores, without consideration of statistical significance,
 - o This finding highlights the numerical comparison of the overall mean scores rather than a statistical comparison.
- AW first and continuing generation women exhibited significantly higher mentorship support compared to BHN continuing generation women.
- BHN first-generation women also showed significantly higher mentorship support compared to continuing generation women from the same racial groups.

Table 5e. Means of confidence in their achievements by racial/ethnicity and generation status.

	Computing Identity (Mean)	Compared to AW first-generation women	Compared to AW continuing generation women	Compared to BHN continuing generation women	Compared to BHN first-generation women
Race/Ethnicity and First-Generation Status					
AW, first-generation women (n = 18)	4.20	-	Not significant	Significantly higher (*)	Not significant
AW, continuing generation women (n = 81)	4.05	Not significant	-	Significantly higher (*)	Not significant
BHN, continuing generation women (n = 5)	3.34	Significantly lower (*)	Significantly lower (*)	-	Significantly lower (**)
BHN, first-generation women (n = 6)	4.32	Not significant	Not significant	Significantly higher (**)	-

Notes: Values represent mean responses for each composite item. Responses were given on a five-point scale with higher numbers indicating greater agreement with each item. Statistical significance was determined using paired-samples t-tests. *** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

DISCUSSION & SUMMARY

In our analysis examining changes from Time 1 to Time 2, we found all participants of GCW 2024 reported a stronger identification with computing, confidence to succeed and persist in computing, and confidence to communicate professionally with their peers and mentors. There were no significant changes in their feelings related to being an imposter.

“Thank you so much for organizing and for the opportunity to join! It will definitely be one of the highlights of my year, and I hope to join in future workshops from CRA-WP!” -

- **Grad Cohort for Women 2024 Participant**

Pre- and post-workshop survey respondents also believed that they had stronger mentorship support and a stronger professional network after the workshop as compared to before it. There were no statistically significant changes in their interest to pursue certain career paths; however, attendees favored to pursue a career in the industry.

CERP also analyzed findings by intersectional demographic characteristics of the workshop. The results revealed that attendees' sense of belonging, social support, self-efficacy, and imposter syndrome differed across different backgrounds, combining race/ethnicity, degree enrollment status, citizenship, disability, and first-generation status. Further post-hoc examinations showed significant differences in the outcomes of interest.

One notable finding is the influence of racial/ethnic identity and citizenship status on attendees' sense of professional support. Significant increases were observed among certain groups such as Asian or White U.S. and non-U.S. citizens and Black, Hispanic, or Native American non-U.S. citizens attendees. This implied that there were differences in the overall levels of this outcome based on their racial/ethnic identity and citizenship status. These findings underscore the importance of recognizing intersectionality in evaluating the workshop's impact, as individuals' experiences in receiving professional support or engaging in professional networking vary across different demographic backgrounds. By acknowledging and addressing these intersecting identities, organizers can better tailor workshop content and support mechanisms to meet the diverse needs of participants. This approach not only enhances the effectiveness of the workshop but also fosters a more inclusive and supportive environment for all attendees.

“I really appreciate having the chance to join the event this time, and I also love that the organizer designed different sessions for PhD students at various levels. In summary, I loved this event and would like to attend next year or even volunteer to help with the organization!”

- **Grad Cohort for Women 2024 Participant**

Overall, GCW 2024 made a positive impression on attendees based on the evaluation findings. CERP will conduct a follow-up with past Grad Cohorts participants to measure long-term impact of the workshop.

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