What We Know and What You Can Do, Learning How to Turn Gender Research into Diversity Action

Carla Ellis
Moderator
Introducing our Panelists

- Joanne McGrath Cohoon
  University of Virginia & NCWIT
  CRA’s Committee on the Status of Women in Computing Research (CRA-W)
  Retaining Graduate Women

- Telle Whitney
  Anita Borg Institute
  Inspiring Women in Computing

- Lucinda Sanders
  National Center for Women and Information Technology (NCWIT)
  Promoting Innovation through Diversity of Thought

- Carla Schlatter Ellis (moderator)
  Duke University
CRA-W Knows about Mentoring Across the Pipeline

What You Can Do to Retain Graduate Women

Joanne McGrath Cohoon
University of Virginia & NCWIT
CRA-W Board Member
Computing Research Association’s Committee on the Status of Women in Computing Research (CRA-W)
CRA-W mentors across the computing research pipeline

Careful evaluation documents the effectiveness of every program

Program-specific information is at www.cra-w.org
Encourage and support women’s participation in proven programs like those offered by CRA-W

- 86% (458) applied to Grad Cohort for advice on succeeding
To maximize women grad students’ success in computing

Graduate Students

Undergraduates

URMW
DREU
CREU
DLS

GHC Sessions
STARS

Career Mentoring
Workshops (CMW)

CAPP**

Academic careers
Industry/Gov Labs

Discipline Specific Workshops (DSW)
Tapia Celebration of Diversity in Computing**

Longitudinal research into recruitment and retention of women
What is the CRA-W Graduate Cohort Program?

Mentoring

Role Models

Networking

Peer Support
Grad Cohort longitudinal nationwide study

- 236 women in CSE doctoral programs
  - Members of CRA-W Grad Cohort program
  - 2004-2007 first and second year participants
  - Follow-up through 2009
  - Weighted by years in graduate school (opportunity to leave)
- High response rates to annual surveys
  - >95% attendees, >50% non-attendees
- Annual focus group
  - Stratified random sample
Women and men are in CS under different conditions

Gender Blind
- Ignore gender issue
- Ignore context

Status Quo
- Stereotype Threat
- Unintended Bias
- Sexism
- Masked identity

Unequal Outcomes
- Low recruitment
- Low retention
- Hampered advancement

Unequal Outcomes
Most consequential gendered experience external to women - sexism
Cohort Doctoral Women’s Reported Observation or Experience of Sexism

- Observed/ Experienced & Thought of Leaving (TOL)
- O/E No TOL
- No O/E of Sexism

But under reporting is common
There's comments, and it's non-stop. ... [Y]ou pretend like it didn't happen. - 2010

The spoken rule is, of course, 'Sexual harassment is a big deal, go to HR.' But the unspoken rule is you don't. - 2010
I don’t know that a female at my institution is any different than being a male. ... I have not seen a lot of sexism in my institution. ... The professors treat us equally. And exceptions apply, right, and individual interactions with individual professors can be different. But on the whole, everything’s good." - 2010

Psychological processes related to cognitive dissonance and confirmation bias explain why women describe sexism but conclude there is none.
<table>
<thead>
<tr>
<th>Condescending</th>
<th>One of my fellow CS grad students [introduced me by saying], ‘And here is our only girl in the department. We’re so proud of her.’ Male PhD students disregard my statements regarding research even though I have had far more technical research experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disrespectful</td>
<td>...male graduate students who openly express their opinions that the women in the program are more likely to be incompetent than the men My advisor told me that he couldn’t help himself from glancing at women’s chests</td>
</tr>
<tr>
<td>Inappropriate or Hostile</td>
<td>[Male students] frequently and explicitly discussed women and their sex lives</td>
</tr>
</tbody>
</table>
Classmates exhibit sexism

15 men and I am the only woman. The lab is not clean, and they think that I should clean it. – 2009

[A classmate] always says like, ‘Why are you in this field?’ You are women. You can’t compete with me. You can’t be better than men in this field. – 2008

There are a lot of parties going on... and you just invite everybody... So one of the [emailed invitations said] something like “You and your bitches come.” – 2007
I had a teacher say to me...‘You know computers aren’t really for girls. Guys are much better.’ – 2008

[An experienced developer attending a conference] would go to talk to people about serious, technical things that she wanted to build that she’s really interested in, and they just blew her off completely. Just kind of like, “Well, honey, don’t you have to worry about your hair.” - 2010
As a woman I like to wear skirts and make-up. In my department you can’t do it. People would ask if it was a special day. A professor not in my department said I should wear more masculine clothes to get more respect. – 2009

[My head scarf is] a barrier that’s preventing me from hearing anything, or someone looking at me in a bad way ... I was really shocked when I changed the style and I saw the difference in how men ... deal with me and look at me in a different way.

- 2010

Because society tells us you cannot be both feminine and technical
I tend to joke around with my male friends, and I think they’re very respectful. I check out women with them and I make jokes, and I check out guys with them. – 2010

I mean if you want to be part of the guys, you have to accepting about their jokes about women or whatever they’re doing that might not be the most comfortable for me..." – 2010
Sexism reinforces gender boundaries in computing

Makes clear that women are not “one of the guys”
Sexism increases the chances of attrition

Odds of Departure are 21 times greater if sexism is the motivation for TOL
Turn research into action

Prevent sexism to improve women’s retention

- Highly visible proactive policies
  - Zero tolerance
  - Swift corrective action

- Assess conditions and respond

- Women who perceive sexism may benefit from peer support
Will computing allow its daughters, sisters, mothers, and wives to continue experiencing these conditions?
Microsoft Research

Faculty Summit 2010

Anita Borg Institute - Community & Role Models

What You Can Do to Include Women in Computing

Telle Whitney
Anita Borg Institute for Women and Technology
Develop Technical Leaders to increase the impact of women on all aspects of technology.

to increase the positive impact of technology on the world’s women.

Mission

The Anita Borg Institute's key strategies

Showcase Technical Women

Develop Technical Leaders

Change the Culture of Technology

RECRUIT • RETAIN • ADVANCE
<table>
<thead>
<tr>
<th>Scholarship Type</th>
<th>2009</th>
<th>2008</th>
<th>2007</th>
<th>2006</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSF</td>
<td>100</td>
<td>85</td>
<td>75</td>
<td>79</td>
<td>84</td>
</tr>
<tr>
<td>Corporate</td>
<td>96</td>
<td>68</td>
<td>111</td>
<td>79</td>
<td>0</td>
</tr>
<tr>
<td>Academic Underwriter</td>
<td>115</td>
<td>102</td>
<td>98</td>
<td>88</td>
<td>80</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>311</td>
<td>255</td>
<td>284</td>
<td>246</td>
<td>164</td>
</tr>
</tbody>
</table>

\[1\] Includes 50 one-day scholarships to attend “Bridge Day” with the Tapia Celebration of Diversity in Computing.

25% of 2009 scholarship recipients are underrepresented minorities – maintained over 2008
Recruit & Retain: Inspiration, Celebration

- 87% of survey respondents agree or strongly agree that they felt inspired by the role models they saw at Grace Hopper 2009.
- 79% of survey respondents report that the celebration component of Grace Hopper 2009 is very or extremely valuable.
Through comments and suggestions at various technical sessions, as well as simply being surrounded by so many women who are working to succeed, and looking to me for inspiration, I felt a renewed hope for and plans for myself, as well as garnered some suggestions on how to break my "stalemate".

I got a job :)
Getting advice on launching my career from people who have "been there, done that".
Getting interview tips from Microsoft.
An on-the-spot interview!
The career mentoring workshops were very helpful.
### GHC Impact has increased over time in most areas

<table>
<thead>
<tr>
<th>% who agree/strongly agree</th>
<th>2009</th>
<th>2008</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased commitment to tech career (all)</td>
<td>77%</td>
<td>70%</td>
<td>76%</td>
</tr>
<tr>
<td>Increased commitment to tech career (students)</td>
<td>83%</td>
<td>76%</td>
<td>76%</td>
</tr>
<tr>
<td>Increased commitment to tech degree (students)</td>
<td>76%</td>
<td>74%</td>
<td>71%</td>
</tr>
<tr>
<td>Feeling less isolated</td>
<td>72%</td>
<td>70%</td>
<td>65%</td>
</tr>
<tr>
<td>Increased confidence and energy</td>
<td>81%</td>
<td>81%</td>
<td>77%</td>
</tr>
<tr>
<td>Inspiration from role models</td>
<td>87%</td>
<td>89%</td>
<td>85%</td>
</tr>
<tr>
<td>Increased Network</td>
<td>67%</td>
<td>70%</td>
<td>66%</td>
</tr>
<tr>
<td>Past attendees report positive impact on their career</td>
<td>91%</td>
<td>88%</td>
<td>72%</td>
</tr>
</tbody>
</table>
Women in CS: An Evaluation of Three Promising Practices,

*published in* SigC, 2009

Christine Alvarado & Zachary Dodds
Increase our community’s reach and visibility through our online presence.
What can you do?

• Make it possible for women undergraduate and graduate students to attend GHC

• Encourage women colleagues to actively participate in GHC by contributing technical and mentoring presentations to the program

• Reward mentoring activities and technical talks given at venues like GHC that inspire the next generation of women computer scientists in performance reviews or promotion cases
Microsoft Research
Faculty Summit 2010

What NCWIT Knows about Tech Transfer / Research Commercialization

What You Can Do to Promote Innovation Through Diversity of Thought

Lucinda Sanders
CEO, National Center for Women & Information Technology (NCWIT)
Achieving diversity not enough

Making diverse perspectives matter also important

Need indication of extent to which women are participating in the rewarded aspects of IT

Almost half of technical women, when asked, perceive women are “pushed” into organizational execution roles and don’t have equal access to creator roles

Source – The Athena Factor, Hewlett et. al.
Analyzed Patents from U.S. Patent Office, 1980-2005

IT patent categories:

- Communications/Telecommunications
- Computer Hardware
- Computer Peripherals
- Computer Software
- Semiconductors/Solid State Devices

% JP Female Invented
% US Female Invented
25 Year JP Average
25 Year US Average

IT Patenting: Gender Diversity Improves Innovation

Citation Index of U.S.-invented Information Technology Patents

- Communications
  - Female Only Invented: 1.10
  - Male Only Invented: 1.08
  - Mixed Gender Team: 1.07

- Computer Hardware
  - Female Only Invented: 1.18
  - Male Only Invented: 1.14
  - Mixed Gender Team: 1.08

- Computer Peripherals
  - Female Only Invented: 1.26
  - Male Only Invented: 1.27
  - Mixed Gender Team: 1.42

- Computer Software
  - Female Only Invented: 1.25
  - Male Only Invented: 1.29
  - Mixed Gender Team: 1.30

- Semiconductors/Solid-State Devices
  - Female Only Invented: 1.24
  - Male Only Invented: 1.21
  - Mixed Gender Team: 1.30

Note: Numbers displayed vertically are the number of patents filed between 1980 and 2005.

The citation index is a normalized measure of the impact of a particular patent. For example, if a patent has a citation index of 3.51, then the patent has been cited 3.5 times as often as typical patents of the same age and technology class. The citation index is based on the average of all U.S. patents in each technology class invented anywhere in the world.
Little is known about women and IT entrepreneurship.

This study was a re-analysis of Vivek Wadhwa’s original survey of successful high-tech entrepreneurs, this time focused on gender.

- 549 randomly selected founders (40% response rate)
- 41 women (7% of the sample)
- Few differences were found
ONLY statistical gender difference: women more frequently had co-founders who encouraged them (56%)
ONLY statistical gender difference: women’s business partners were more likely to supply funding (29%)
Important Factors in Start-Up Success

How important were the following in the success of your most recent start-up?

- Your prior industry/work experience
  (Statistically significant gender difference at .001 level)
- Lessons you learned from your previous failures
- Lessons you learned from your previous successes
- Professional/business networks
  (Statistically significant gender difference at .001 level)
- Company’s management team
- Your university education
- Availability of financing/capital
- Location
- Advice/assistance provided by company investors
- University/alumni contacts/networks
- Assistance provided by state/region

ONLY statistical gender difference: women rated as more important – prior industry/work experience and professional/business networks
ACM- affiliated Conferences

Over 3000 conferences, workshops, symposia and forums held between 1966 and 2009

- Identified gender for 90% of the 356,703 authors
- Used Genderyzer2 software (Kaye 2009)
- Women’s share of papers varied by conference topic but not by conference size
Women’s Share of Authorship Increased Substantially Over Time

Women % of authors in all ACM conferences & those that existed for 10+ years

Number of conference papers also increased substantially
Together with conference prestige, topic explains 37% of the variation in women’s authorship across ACM conferences.
Barriers to Women’s Participation as Technology Innovators

- Unintended bias – research shows both men and women associate men with science more so than they associate women with science.

- Stereotype threat – women may not view themselves as technology innovators, or technology transfer may seem too risky to them.

As a result,
- Supervisors or others in positions of influence may not look to women when forming research teams, writing papers or starting companies.

*Note* – *more research is needed in this area*
• BA and MBA from Stanford
• VP at Apple Computer
• Venture capitalist, Managing Director of Mobius VC
• Co-founder of T/Maker Company (software company founded in 1983, acquired in 1994) and SkinnySongs
A Technical Innovator Example: “Heidi” and “Howard”

How power-hungry, self-promoting, and disingenuous was Roizen?

1-7 scale (from “not at all” to “extremely”)

© Frank Flynn
A Technical Innovator Example: “Heidi” and “Howard”

How competent and effective was Roizen?

- Competent: Howard (6.75), Heidi (6.25)
- Effective: Howard (7.0), Heidi (6.25)

1-7 scale (from “not at all” to “extremely”)

© Frank Flynn
A Technical Innovator Example: “Heidi” and “Howard”

Would you like, hire, like to emulate Roizen?

1-7 scale (from “not at all” to “extremely”)

© Frank Flynn
What Can We Do to Advance Women in Computing Innovation Roles?

• Understand unintended bias and stereotype threat. Especially critical in computing cultures, where women are severely under-represented in innovation roles.

• Encouragement motivates many women on their paths to becoming computing innovators – *Note that this is not fake praise*. Encouragement in front of other technical colleagues is especially helpful.

• Bring women into your technical networks – conferences, SIGs, entrepreneurial meet-ups, etc.

• Consider women to fill speaking slots for technical topics or as co-authors on technical papers.

• Organizational practices matter – create environments where innovation and diversity of thought are part of the technical culture.
I have three girls on my programming team. (two on one team and one on another team). One of my girls Amanda who I have taught for three years made me cry in my car on the way home (where no one could see me). She solved a recursion problem that I tried to do for about 4 hours and could not solve. Without me pushing for girls on the team I would have just thought she was an “A” student. With a little push she became my brilliant student. I should have pushed her last year. And for the record it wasn’t an all out boo-hoo cry. It was like a single tear that a man would do if there was something in his man eye.
Summary of Actions You Can Take

• Be aware of gender dynamics in your research group and tolerate zero sexist behavior
• Establish highly visible policies and rules of conduct
• Encourage peer support networks to counter effects of isolation
• Support your women students and colleagues to actively participate in events like ABI’s Grace Hopper Celebration, CRA-W Grad Cohort Workshops, and CRA-W Career Mentoring Workshops
• Make opportunities for women to become involved in technical communities
• Motivate women researchers through public encouragement and acknowledgement of their contributions
• Understand the impact of unintended bias in evaluating women’s accomplishments
Dialogue

• In what ways does this resonate with or contradict your experience?

• Have you seen or been a part of efforts to address these issues? If so, what were the successes and challenges?

• What surprises you, if anything, about these findings? What is the most important takeaway for you?

• What results have you observed from different methods of preventing or reacting to sexism?