Report for Birds of a Feather Session ‘How to Build Diverse Teams for More Effective Research’

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Introduction

This BOF was advertised with the description: “Most of us recognize that diverse teams are good for productivity and output. But do you know how to improve diversity and build a more inclusive environment? Have you ever heard of unconscious bias, stereotype threat, or imposter syndrome? Do you ever feel like you aren’t good enough to be in the community or feel like a ‘fraud’? This BoF will discuss the real effects of these three topics on the workplace, providing the audience with an introduction to each theme, how they may affect you, and how they impact employers, employees, advisors, managers, or your peers.”

The BOF was divided into two parts. The first part consisted of short talks on unconscious bias, stereotype threat and imposter syndrome. These talks brought up some recognised ideas and viewpoints on diversity and inclusivity that explain some of the difficulties in achieving equality and diversity. In the second part the attendees were divided into discussion groups (there were 40 attendees so there were 4 groups of 10). The discussion groups had two case studies to consider that had been created for equality and diversity discussions by the Women in Science and Engineering Leadership Institute at the University of Wisconsin-Madison (http://wiseli.engr.wisc.edu/docs/CaseStudies_HHMI.pdf). The case studies were not overly subtle but they acted as a good vehicle for people in the groups to pick topics that were important and meaningful to them. A number of lively discussions were had in each group. The attendees fit a diverse profile as Women in HPC encourages men to join and the discussion groups benefited from this as more viewpoints were included. The BOF overran its time slot as many continued their discussions into the evening.

In addition to the case studies, attendees were provided with a handout with further information for the attendees and links to additional resources (see appendix).

BoF Format:

5.15 pm - 5.25 pm Welcome- Toni Collis, EPCC
5.25 pm - 5.45 pm Unconscious bias - Toni Collis, EPCC
5.45 pm - 6.05 pm Stereotype threat - Lorna Rivera, Georgia Institute of Technology
6.05 pm - 6.15 pm Impostor Syndrome - Joanna Leng, University of Leeds
6.15 pm - 7.00 pm Case study discussion with Q&A
7.00 pm Close

Discussion Topics

1. Unconscious bias

Toni Collis of EPCC, the University of Edinburgh's supercomputing centre, provided a 20 minute introduction to unconscious bias, covering what it is, how it occurs and why. Particular emphasis was given to the difficulties we all face in addressing unconscious bias, how it is different from implicit bias, and how it will be ever present, but that this is not an acceptable reason for not addressing it. Research has shown the unconscious bias is particularly difficult to address in the long term, with many techniques only temporarily lowering bias and that educating people about negative stereotypes can actually increase stereotyping (Lai, 2014 & Lai 2016). This session discussed these challenges and positive steps that can be taken to address unconscious/implicit bias such as understanding where bias' are by taking the tests available at Project Implicit, and making processes anonymous and transparent as far as possible to reduce the impact of stereotyping.

2. Stereotype threat

Lorna Rivera of the Georgia Institute of Technology presented on the key components and effects of stereotype threat for approximately 10 minutes. Since stereotype threat is a bias concept, the topic naturally followed Dr. Collis' presentation on Unconscious Bias. While this threat impacts members of negatively stereotyped groups in such a way that may lead them to underperform when their identity is highlighted, the threat itself is malleable and thus worthy of discussion within the community. Rivera cited seminal research papers on the subject and explained that the threat is situational and "can affect the members of any group about whom a negative stereotype exists (e.g., skateboarders, older adults, White men, gang members)" (Steele, 1997). Research on how to mitigate its effects in ways relevant to the advanced computing community was also presented. The concept has been widely studied resulting in a large body of literature, much of which can be found at www.reducingstereotypethreat.org.

3. Impostor Syndrome

A 10 minute talk on the imposter syndrome was given by Joanna Leng. The imposter syndrome is very common with estimates of 70% of the population having experienced it at some time. The delegates had a similar level with probably just over 70% admitting to having experienced it. The imposter syndrome tends to be experienced just after a promotion, new job or increase in responsibilities so it is a problem for high achievers. It is the result of self doubt which is a lack of confidence in oneself rather than confidence in others or the environment. Some common bad habits that feed into the imposter syndrome are that the sufferer attributes success to external things such as luck rather than internal such as skill; and that the idea of success is set very high by the sufferer and the idea of failure is set very low.

Attendee Feedback

Out of the 40 attendees that we counted there were only 5 who provided feedback electronically. Of these 4 were exceptionally good while 1 was mediocre. Feedback at the event was solicited on paper as we felt we would get a better response rate via paper due to previous experience. Most (35/40, 88%) attendees responded to the paper survey distributed at the event. Respondents rated all items highly, above a 3.97 on a scale of 1 - 5. Specifically, attendees found the BoF met their expectations (Mean = 3.97), would recommend the event to others (Mean=4.47), are interested in attending more WHPC events (Mean = 4.45), and would rate their overall experience as successful (Mean = 4.32). Regarding BoF activities, participants most enjoyed the case study discussion (Mean = 4.70). While Unconscious Bias and Imposter Syndrome were somewhat familiar topics to attendees with 77% (27/35) and 69% (24/35) respectively, of respondents indicating their familiarity, Stereotype Threat was less commonly known at 46% (16/35). Similar percentages for recognizing these biases in themselves and others were indicated. Two thirds (60%) of respondents feel more able to address these three issues following the BoF. While more women attended the event (58%), men were also well represented at 42%. Over half (56%) of attendees work in academia, 15% in industry/private sector, 12% at national labs, and 18% other.

References

Lai, C. K. *et al.* (2014). Reducing Implicit Racial Preferences : I . A Comparative Investigation of 17 Interventions. *Journal of Experimental Psychology*. http://doi.org/10.1037/a0036260

Lai, C. K. *et al.* (2016). Reducing Implicit Racial Preferences : II . Intervention Effectiveness Across Time, *145*(8), 1001–1016.

Steele, C. M. (1997). A Threat in the Air: How Stereotypes Shape Intellectual Identity and Performance. *American Psychologist*, *52*(6), 613–629.

Appendix

See attachment of BoF handout with resources on the aforementioned topics.

SC16 BoF: How to Build Diverse Teams for More Effective Research

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WHPC
WOMEN IN HIGH PERFORMANCE COMPUTING

ABOUT US

The Women in HPC (WHPC) network was created with the vision to encourage women to participate in the HPC community by providing fellowship, education, and support to women and the organizations that employ them.

Through collaboration and networking, WHPC strives to bring together women in HPC and technical computing while encouraging women to engage in outreach activities and improve the visibility of inspirational role models.
Women in HPC is supported by EPCC (www.epcc.ed.ac.uk).

We would like to acknowledge additional support for specific activities from:

- The Software Sustainability Institute through EPSRC grant EP/H043160/1 and EPSRC, BBSRC and ESRC Grant EP/N006410/1.
- The ARCHER Outreach project through EPSRC grant EP/N006321/1.

Examples of research documenting the benefits of diversifying teams.

- **Gender-heterogeneous working groups produce higher quality science.** A study within the National Center for Ecological Analysis and Synthesis found that peer-reviewed publications with gender-heterogeneous authorship teams received 34% more citations than publications produced by gender-uniform authorship teams.[1]

- **Gender diversity at top management levels improves companies' financial performance.** An analysis of 2,360 global companies in a variety of industries found that companies with women on their executive boards outperformed companies with all-male executive boards. Gender-diverse management teams showed superior return on equity, debt/equity ratios, price/equity ratios, and average growth.[2,4]

- **Gender-balanced teams demonstrate greater innovation and productivity.** A study surveyed 1,400 team members from 100 teams at 21 companies in 17 countries. The study found that gender-balanced teams were the most likely to experiment, be creative, share knowledge, and fulfill tasks.[3,4]

1 Campbell LG, Mehtani S, Dozier ME, Rinehart J (2013) Gender-Heterogeneous Working Groups Produce Higher Quality Science. PLoS ONE 8(10): e79147. doi:10.1371/journal.pone.0079147
2 Rohner, U. and B. Dougan (2012). Gender diversity and corporate performance. Technical report, Credit Suisse Research Institute, Zurich.
3 Lehman Brothers Center for Women in Business. (2008). Innovative potential: Men and women in teams, 6.
4 Barker, L., Mancha, C., & Ashcraft, C. (2014). What is the Impact of Gender Diversity on Technology Business Performance? Research Summary, 8.

Common **assumptions** affecting progress towards diversifying teams followed by documented **realities**:

ASSUMPTION. **"There are no women or minorities in our field, or no qualified women or minorities."**
REALITY. Though women and minority applicants may be scarce in some fields, it is rarely the case that there are none. It may help to present actual data on the numbers and percentages of women in your discipline. Such data are available from the National Science Foundation's (NSF) "Survey of Earned Doctorates (SED)" available on its SED Tabulation Engine or from various professional organizations.[5]

ASSUMPTION. **"Recruiting women & minorities diminishes opportunities for white males."**
REALITY. A study examining the experiences of scholars who earned doctorates and won prestigious fellowships (Ford, Mellon, and Spencer) found no evidence of discrimination against white men. Indeed, white men who had some expertise related to diversity had a significant advantage in the job market.[5,6]

ASSUMPTION. **"Women end up leaving our organization anyway due to family obligations."**
REALITY. One large-scale study found that after about 12 years, approximately 50% of women had left their jobs in STEM fields—mostly in computing or engineering.[7] Only 20% of the women who left large private sector companies left to take time out of the workforce. Research suggests that women are not exiting these careers primarily for family concerns—and even when they are, they might have made different "choices" if more flexible options to support these competing responsibilities had been available.[8]

ASSUMPTION. **"It starts early with young girls' interest in math and science…the problem is so massive that I don't believe we can have any meaningful effect."**
REALITY. Despite these larger societal barriers, there are still significant changes that organizations can, and do, make to increase diversity.[9] See resources below for more information.

5 Fine, E. (Women in S. & E. L. I., & Handelsman, J. (Women in S. & E. L. I. (2012). Searching for Excellence & Diversity: A Guide for Search Committees at the University of Wisconsin-Madison. Madison, Wisconsin.
6 Smith, Achieving Faculty Diversity, 4, 95.
7 Glass, J.L., Sassler, S., Levitte, Y., & Michelmore, K.M. (2013). What's so special about STEM? A comparison of women's retention in STEM and professional occupations. Social Forces, 92(2), 723-756.
8 Ashcraft, C., Mclain, B., & Eger, E. (2016). WOMEN IN TECH : THE FACTS 2016 UPDATE // See what's changed and what hasn't.
9 Ashcraft, C., Dubow, W., Eger, E., Blithe, S., & Sevier, B. (2013). Male Advocates and Allies: Promoting Gender Diversity In Technology Workplaces.

Additional resources for **action** and further **study**:

- Characteristics of Scientists and Engineers in the United States with U.S. Doctorates, www.nsf.gov/statistics/doctoratework
- CIC Doctoral Directory, www.cic.net/students/doctoral-directory
- Doctoral Scientists and Engineers Profiles, www.nsf.gov/statistics/doctoralprofiles
- National Center for Women in Information Technology (NCWIT), www.ncwit.org
- NSF – National Science Foundation: Science and Engineering Doctorate Awards, www.nsf.gov/statistics/doctorates
- WebCASPAR and the Survey of Earned Doctorates (SED) Tabulation Engine, https://webcaspar.nsf.gov and https://ncses.norc.org/NSFTabEngine
- Women in Science and Engineering Leadership Institute (WISELI), http://wiseli.engr.wisc.edu/pubtype.php