

THE OFFICIAL MAGAZINE OF THE OCEANOGRAPHY SOCIETY

Oceanography

CITATION

Clem, S., S. Legg, S. Lozier, and C. Mouw. 2014. The impact of MPOWIR: A decade of investing in mentoring women in physical oceanography. *Oceanography* 27(4) supplement:39–48, <http://dx.doi.org/10.5670/oceanog.2014.113>.

DOI

<http://dx.doi.org/10.5670/oceanog.2014.113>

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The Impact of MPOWIR

A Decade of Investing in Mentoring Women in Physical Oceanography

By Sarah Clem, Sonya Legg, Susan Lozier, and Colleen Mouw

ABSTRACT. MPOWIR (Mentoring Physical Oceanography Women to Increase Retention) is a US community-initiated and community-led mentoring program aimed at improving the retention of women physical oceanographers in academic and/or research positions. This article describes the MPOWIR program elements designed by the US physical oceanography community, quantifies the participation in these programs, describes MPOWIR's impact to date, and outlines future directions. An examination of surveys to date indicates that MPOWIR, several years after its implementation, is having a positive impact on the retention of junior women in physical oceanography, primarily by giving them a broad professional network and focused mentoring.

OVERVIEW OF MPOWIR

Program History

MPOWIR (Mentoring Physical Oceanography Women to Increase Retention) traces its roots to the spring of 2004 when a handful of women physical oceanographers gathered to discuss the retention of women in the field. These discussions were prompted by the recently released Nelson diversity study (Nelson, 2004), as well as by personal observations of the career trajectories of female colleagues in the field. The Nelson diversity study showed that efforts over several decades toward increasing the number of women entering science and engineering fields had largely been successful, with women receiving on average between 30% and 50% of the PhD degrees awarded (Nelson, 2004). However,

the percentage of women occupying tenure-track positions had not risen commensurably. Across the board, women in science and engineering filled on average only 15–25% of academic positions at the turn of the century. Because the number of women in graduate school had been sufficiently large for at least a decade, the lower percentage of women in entry-level faculty positions could not be attributed to a small pool of potential candidates. Essentially, this analysis quantified what had to date been colloquially termed the “leaky pipeline.”

In 2004, ocean sciences provided no exception to these trends. The proportion of women receiving their PhDs in physical oceanography had approached 35–40% at most major oceanographic institutions; however, the number of women with principal investigator status remained fairly low. A 2005 survey of 16 universities/institutions, as well as two government laboratories, found that women comprised only 19% of physical oceanographers in associate level positions that could reasonably be assumed to be held by those who earned their PhDs between 1991 and 1999. Enrollment data from Joint Oceanographic Institutions (JOI) averaged from 1988–2001 showed that women constituted ~ 35% of oceanography graduate students. These statistics implied that the retention rate for women in academia was half that for men over this time period.

With these numbers and their concern, these women approached program managers and division directors at the National Science Foundation (NSF) and the Office of Naval

“MPOWIR has been a phenomenal resource that I have not found anywhere else. The ability to regularly talk with peers from around the country (and globe) about issues that we all have in common has greatly reduced the feeling of isolation and helped provide perspective on initiating and moving through a career. The connection with senior scientists has greatly expanded my professional network. MPOWIR has most definitely had a significant impact on my confidence pursuing all sorts of opportunities from awards and funding to employment. I feel very fortunate that MPOWIR was starting just when I was at the stage of needing the support the most (nearing the end of graduate school) and has provided so many opportunities over the last several years as I moved through postdoc, research scientist and now assistant professor positions.”

Research (ONR) in the summer of 2004 for the purpose of securing financial support to investigate and subsequently address the issue of retention of women in physical oceanography in academia. The effort quickly coalesced around mentoring. While it was recognized that many factors contributed to the lack of retention of women scientists—competition between family building and career building, competition with career goals of spouse/partner, lack of female role models, and lack of adequate mentoring—it was believed that the latter problem was one that a discipline-based community could most effectively address.

NSF and ONR were receptive to the proposition that funding agencies, with a small investment, could protect their larger investment in the graduate education of women students. Thus, ONR and NSF invited a proposal for a workshop whose goal would be the design of a mentoring program for junior women. The proposal was funded in the fall of 2004. Physical oceanographers from a spectrum of workplaces, as well as from different career stages, were invited to participate in this workshop. Importantly, the organizing committee decided to invite men to participate. Men had been providing the bulk of mentoring in the field for many years and the committee believed it was important to gain from their experience in this endeavor. Such inclusion was a statement that the committee believed the lack of retention for women in the field was not a “women’s issue,” but was instead a community issue.

As a result of these efforts, an NSF and ONR-funded workshop was conducted at the Airlie Center in Warrenton, Virginia, on October 9–12, 2005, with 29 physical oceanographers as participants (Lozier, 2005, 2006). A community-wide survey conducted prior to the workshop provided

important input for the mentoring program design. From the survey and workshop discussions, it was concluded that transitions from PhD to postdoc and then from postdoc to entry-level position were the most vulnerable times for a junior woman in the field.

Having identified how mentoring could help young women in the development of their early careers, workshop participants established five main goals for an effective community-based mentoring program:

1. The program should provide continuity of mentoring from a young woman’s graduate career through her postdoctoral years to the first years of her permanent job.
2. The program should establish a collective responsibility within the physical oceanography community for the mentoring of junior women in the field. Rather than assigning a mentor for each young woman, the aim is to collectively mentor the young women in the field.
3. The program should provide a variety of mentoring resources and mentors on a variety of issues.
4. The program should cast a wide net to avoid exclusiveness.
5. Involvement in this mentoring program should be open to those who self-identify as a physical oceanographer.

In the nine years since this workshop, these goals have been unchanging and have provided a clear mandate for MPOWIR.

In addition to elucidating the goals for MPOWIR, the workshop participants also delineated program elements. To make mentoring accessible to junior women in a wide variety of positions and at different types of workplaces (e.g., research institutions, government labs, universities, industry), workshop participants decided on a multi-prong approach with several elements, each described in detail below.

“ The MPOWIR program has had a significant impact on, and been a positive influence in, my career since 2009. I have benefited from several MPOWIR efforts including the Pattullo Conference, NASA Speaker Series, and a Mentoring Group. Each of these activities provided me with an opportunity to network with junior and senior scientists within and outside my field, discussing research interests and potential collaborations, sharing professional experiences, and providing advice and strategies for professional success. An example of the latter is the advice and feedback I received from my MPOWIR mentoring group and senior scientists at the Pattullo Conference on job offer negotiations that proved extremely useful when discussing terms with my current employer. ”

Following the workshop, funding from NSF, the Department of Energy (DOE), the National Aeronautics and Space Administration (NASA), and ONR was secured for the implementation of MPOWIR program activities in the spring of 2007. Since that time, MPOWIR activities have been ongoing, as documented in the following section. It is important to note that all NSF proposals have been peer reviewed and, as such, have been supported by the community. Early program elements included the Pattullo Conference, a website, and Town Hall meetings. After a couple of years, a NASA MPOWIR Speaker Series and a National Oceanic and Atmospheric Administration (NOAA) MPOWIR internship were added. Thus, at this nine-year mark, funding from five federal agencies has contributed to the success of the MPOWIR program.

In this article, we describe the MPOWIR program elements designed by the physical oceanography community, quantify community participation in these programs, describe MPOWIR's impact to date through self-assessment surveys, and then comment on future directions. A community survey will be conducted in 2015 to examine progress made in the community as a whole following a decade of MPOWIR activities. That survey will consider those who have been involved in MPOWIR and, as a control group, those who have not. While ultimately the success of MPOWIR will be to drive itself out of business, in the interim we believe the program, the community, and the funding agencies are best served by a strong focus on metrics that indicate whether MPOWIR is indeed moving the needle on retention. The main objective of this article is to describe our efforts to date toward that goal.

Program Elements

The core activities of MPOWIR are the Pattullo Conference and the mentoring groups. The biannual Pattullo Conference is named to honor the memory and contributions of the first woman in the United States to receive a PhD in physical oceanography, June Pattullo. She received her PhD from Scripps Institution of Oceanography in 1957 and then went on to a successful research career at Oregon State University, where she is also remembered as a remarkable mentor and teacher.

The Pattullo Conference brings together about 30 junior women participants, who are generally at the postdoctoral level, with about 15 male and female senior scientists for two and a half days of intensive interaction. Junior scientists apply to attend, and selection is made primarily by career stage, with preference given to those at the beginning of their postdoctoral appointments. The aim is to allow every junior female physical oceanographer an opportunity to attend at least one Pattullo Conference during her early career. Senior scientists are invited by the MPOWIR steering committee, with a 90% acceptance rate. The main goals of the Pattullo Conference are:

- To provide junior women with career advice and feedback on their research
- To build community networks with peers and senior scientists
- To build confidence and skills for promoting one's research
- To raise awareness of issues confronting junior women among the senior scientist community

The conference format includes (1) panel discussions on proposal writing and on the identification of funding opportunities, (2) feedback on effective communication

and presentations, (3) workshop activities on negotiations, (4) small group discussions on the next steps in the junior women’s research careers, and (5) a question-and-answer session on the careers of senior scientists. Four Pattullo Conferences have been held thus far, with a total of 98 junior participants and 52 senior scientist participants, some of whom have attended more than once in order to provide continuity and leadership. Travel expenses for all participants have been funded by the supporting funding agencies.

To assess and fine-tune Pattullo Conference programming, MPOWIR conducts a survey of all junior and senior participants. The conference format over the years has evolved considerably in response to these surveys. Based on survey feedback, it is apparent that the Pattullo Conference is a valuable experience for everyone (see Table 1). Nearly every participant said they would “definitely recommend this conference to another junior scientist.” Importantly, the survey indicates

that all conference goals were accomplished. In evaluations and in conversations, many junior women spoke of increased confidence and were impressed by the networking opportunities not only with senior scientists but also with their peers. One junior participant commented, “I am leaving with more confidence in myself and a much better idea of where I want to go in my career and why I want to do it.” Another participant remarked that, “This was a very helpful experience for me as a junior scientist and has definitely increased the likelihood that I will stay in the field.” Many participants state the immediate, tangible benefits of the conference as well: “It provides an opportunity for you to build up your research network, to learn how to apply for funding, and how to manage your time among research and life, etc.”

The Pattullo Conference includes elements important to career success that are not customarily built into most graduate programs or postdoctoral training. During the Pattullo

Table 1. Post-Pattullo Surveys (2008, 2010, 2011, and 2013) of Junior and Senior Scientists

| | Junior Scientist Response | | Senior Scientist Response | |
|---|---------------------------|----------|---------------------------|----------|
| | Average | St. Dev. | Average | St. Dev. |
| Please rate on a scale of 1–5 (poor – excellent) | | | | |
| Networking opportunities | 4.79 | 0.41 | | |
| Professional development opportunities | 4.54 | 0.58 | | |
| Feedback on research | 3.69 | 0.90 | | |
| Please rate on a scale of 1-5 (strongly disagree – strongly agree) | | | | |
| My skills and expertise were used to their fullest | | | 4.37 | 0.59 |
| My time was well spent at this conference | | | 4.83 | 0.38 |
| I had enough information/background about the conference to participate fully | | | 4.54 | 0.50 |
| I would attend another Pattullo Conference | | | 4.89 | 0.32 |
| Please rate on a scale of 1–5 (not valuable – extremely valuable) | | | | |
| Value to current position | 4.68 | 0.53 | | |
| Value to future position | 4.61 | 0.59 | | |
| Overall value | 4.76 | 0.43 | | |
| Perceived value of conference to a junior scientist | | | 4.80 | 0.40 |
| Perceived value of conference to another senior scientist | | | 4.46 | 0.60 |
| Please rate on a scale of 1–5 (definitely not – definitely) | | | | |
| Would you recommend this conference to another junior scientist? | 4.97 | 0.15 | 5.00 | 0.0 |
| Would you recommend this conference to another senior scientist? | 4.61 | 0.55 | 4.86 | 0.42 |

“ I had the chance to attend the MPOWIR Pattullo Conference early in my postdoctoral career, and the successful pathway I followed since then, over the past five years, would certainly have been a less pleasant experience without the continuous support of MPOWIR. The women I met through the MPOWIR network gave me a true living example that it was possible to be a recognized talented scientist and a fulfilled woman. These women that I respect and admire never pretended that succeeding in a male-dominated community was an easy task to achieve. They were all honest about the struggles they had to face as a minority group. But by investing their valuable time to share their experience and reaching out to early career scientists like me, they helped me feel more confident that balancing family and work was possible and that building a support network was key for achieving a satisfying, fulfilling and well-balanced life both personally and professionally. I am very grateful for the practical, emotional, and scientific support I received through MPOWIR as a mentee. As a mentor today, I hope that I can relay part of what I learned so that all the smart younger women that I meet among the students and postdocs don't give up on a career they would like to pursue because they perceive that it is beyond their potential. ”

Conference, there is a significant amount of time for the participants to get to know each other and to talk directly with each of the senior scientists. This activity allows for connections on many levels; while a senior scientist may not be researching the same oceanography topic as a junior scientist with whom he/she is interacting, there may be a shared life experience or career path that provides a mentoring opportunity.

MPOWIR mentoring groups, established in 2008, each consist of about six junior women and two senior women group leaders, who meet monthly by teleconference for confidential mentoring. Group leaders and other group members provide advice and respond to specific questions raised by participants as they encounter issues in their careers. To ensure groups cover a range of topics, and are of benefit to attendees, the junior women are asked to formulate specific goals that they wish to work toward during the coming year. Prior to the first meeting of the mentoring group, each member and mentor leader receives a notebook containing the biography and goals of each participant. These goals, along with other topical issues, are discussed during the mentoring group calls.

Based on the 2011 survey, 100% of mentoring group participants reported that they made progress on their stated scientific, professional, and personal goals. Mentoring groups remain together for two to three years, at which point junior members may join a new group, choose to continue as a peer-mentoring group, or leave the groups altogether. By asking for a commitment of two to three years, and putting a strong emphasis on confidentiality, participants form

long-term relationships, making groups particularly valuable to members negotiating delicate issues in their careers. Sixteen groups to date have involved a total of 84 junior women and 23 senior women as group leaders. New groups are established annually, following an open call for new participants. Currently, eight mentoring groups are operating, with four of the 16 leaders drawn from the ranks of former junior participants.

To evaluate the effectiveness of the mentoring groups, MPOWIR conducts an annual survey. Survey feedback is used to provide guidance to group leaders on most effective practices. As part of this survey, participants are asked what they value about their mentoring groups and what has been the effect of being in a mentoring group on their current positions (Figure 1) along with questions about group logistics and setup. Based on the survey conducted in 2012, all participants rated mentoring group participation as a valuable experience, with particular value placed on feedback on professional development and on personal matters (Figure 2).

Like the Pattullo Conference, mentoring groups complement the training received from a graduate or postdoctoral adviser. These groups serve the dual purpose of focusing on an individual and finding common experiences among the group. As for the latter, many junior participants have commented that hearing about other's experiences has helped them realize that others at a similar career stage experience struggles similar to their own, thus easing their feelings of isolation and providing them with a broader perspective for achieving their goals.

NOAA and NASA support MPOWIR by providing grants to facilitate interaction and networking between junior women and the agency laboratories. NOAA funds internships for female graduate students to spend a summer working with a NOAA researcher at the Geophysical Fluid Dynamics Laboratory (GFDL), the Pacific Marine Environmental Laboratory (PMEL), or the Atlantic Oceanographic and Meteorological Laboratory (AOML) on a project of mutual interest. The internship introduces junior women to the research environment of the lab and exposes the NOAA researchers to promising students in the field. Nine NOAA summer internships have been awarded over the past six years. NASA funds an annual Speaker Series, through which two junior women are invited to present seminars: one each to the Jet Propulsion Laboratory (JPL) and the Goddard Space Flight Center (GSFC). In addition to showcasing their research, the young women interact with NASA scientists during their stay and learn about the lab's mission and research priorities. Ten women have participated in this speaker series over the past

five years. MPOWIR facilitates the annual application process for both programs, while NOAA and NASA scientists make the final selection for their respective programs.

All of the above activities are open only to women who are residents of the United States, who self-identify as physical oceanographers, and who are in the career stage between the final two years of a PhDs and the first two years in a faculty or permanent research position. There is one exception to these restrictions: members of an existing mentoring group may continue to participate even if their career takes them abroad. MPOWIR also organizes several programs aimed at a wider audience, with the goal of developing a supportive community within physical oceanography as a whole. Town Hall meetings organized at the biannual Ocean Sciences Meeting highlight topics of interest to both men and women at many different career stages as well as oceanographers from all disciplines. Past topics for these Town Hall meetings include the balance between work and family, dual career challenges and opportunities, and non-academic paths for

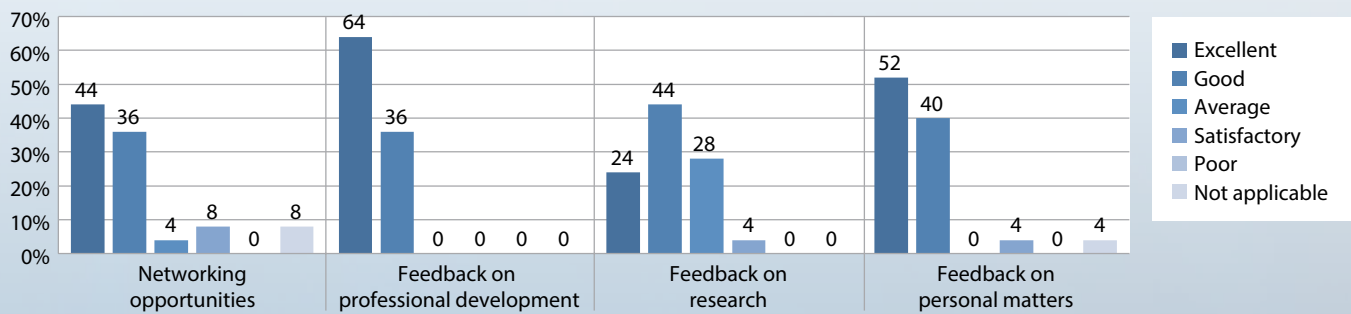


Figure 1. Results of the 2012 survey of Mentoring Physical Oceanography Women to Increase Retention (MPOWIR) mentoring group participants show the value of these groups. Values are shown as percentages.

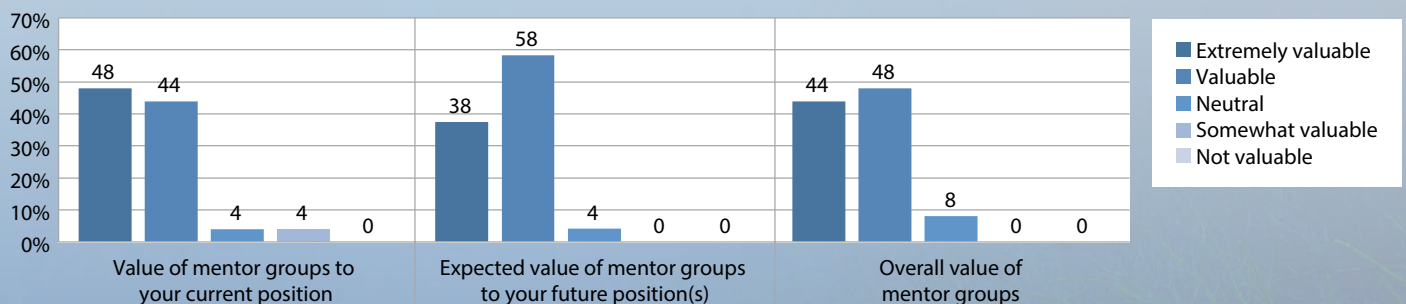


Figure 2. Results of the 2012 survey of MPOWIR mentoring group participants indicate the qualities of different elements. Values are shown as percentages.

oceanography doctorates.

The MPOWIR website (<http://mpowir.org>) serves as a repository for information on the program and mentoring resources, and is the mechanism for junior scientists to apply for participation in the MPOWIR activities described above. A highlight of the website is the MPOWIR blog, which includes job listings, links to articles of interest (such as studies on subconscious gender bias), and short entries written by MPOWIR mentors and participants. Accessible to all regardless of gender or discipline, the website serves as an important gender-neutral resource to the community. The program opportunities are advertised on the MPOWIR website and sent out to an extensive email list of junior and senior physical oceanographers, as well as graduate school administrators. MPOWIR aims to include every junior physical oceanographer who wishes to participate and satisfies the criteria described above.

ASSESSING MPOWIR'S IMPACT

From its initiation, MPOWIR's leadership understood the need to measure the program's effectiveness. Thus, from the start, MPOWIR has used surveys to assess and evaluate the effectiveness and impact of its program elements, as discussed above for the Pattullo Conferences and mentoring groups. Also, a community-wide survey in 2005 aided in the initial development of MPOWIR, primarily by demonstrating the discrepancy between graduation rates for women and the rate at which women occupied research positions in physical oceanography across the United States. A similar community survey will be conducted in 2015 to examine progress made in the community as a whole following a decade of MPOWIR activities. In the interim, we decided to conduct a survey of the first MPOWIR participants in order to get an early indication of whether MPOWIR is making a discernible difference in the career development of those junior women.

2013 Survey Results

The 2013 survey of early participants assessed MPOWIR's impact and provided leadership with insight into program components that junior women have found particularly beneficial. For this survey, we reached out to participants whose first involvement, via a Pattullo Conference and/or a mentoring group, was between 2008 and 2010. The goal of this survey was to determine how the careers of these first participants are evolving after several years of involvement with

MPOWIR programs. There was no control for this survey (i.e., we did not survey a similar group of female physical oceanographers who had not participated in MPOWIR), but comparison with statistics of retention and career progression obtained through earlier surveys prior to the implementation of MPOWIR provides a means of assessment.

Overall, the survey had an 86% response rate with 56 of the 65 contacted participants responding. Of the participants who responded, none were currently working in a field unrelated to oceanography. Two were currently enrolled as students, and all of the others were effectively still working in physical oceanography, with a remarkable 80% conducting research at a university or research institution.

Evidence of What Works

While the initial number of participants retained in the field of physical oceanography is certainly encouraging, transferring this success into lessons for other disciplines and similar programs requires an understanding of the specific skills that MPOWIR has provided to the participants.

As part of the 2013 survey, individuals were asked to rank the extent to which MPOWIR had impacted various aspects of their professional growth. These aspects included efforts to obtain their current position, exposure to professional development skills, broadening of their professional network, mentoring on work and family balance, performance in current position, and raising awareness of mentoring in career development. Participants overwhelmingly indicated that MPOWIR had positively impacted all of these aspects (Figure 3). In particular, an impressive 95% of survey participants expressed that MPOWIR has exposed them to useful professional development skills "to a great extent," and 89% consider MPOWIR to have positively impacted their professional network "to a great extent."

Success in Participant Career Progression

An important part of MPOWIR's mission is to enable participants to move up the career ladder, thus diminishing the "leaky pipeline." As MPOWIR has grown over the past 10 years from a concept (Lozier, 2005) to a flourishing, fully funded program, we can begin to assess whether that goal is being met. Of those participating in the 2013 survey, 55% first became involved in MPOWIR as graduate students. At the time of the survey, only two remained in graduate school. Figure 4 shows the position held in 2013 relative to the

position held by that individual at the time of her initial participation in MPOWIR.

Clearly, MPOWIR participants are moving up the career ranks to tenure-track and research positions (Figure 4). Because the pipeline has historically been “leakiest” at the post-PhD transition, we believe that such retention shows remarkable progress. In our survey, the majority of participants were two years from their PhDs at the time of initial involvement. Their current job positions are well distributed over all post-PhD categories: the greatest percentages of positions held are at research institutions (non-academic) or government agencies (29.3%), followed closely by non-faculty research positions at universities (27.6%) and faculty at research universities (22.4%). The remaining positions held (four-year college faculty, profit or nonprofit company, policy, and graduate students) collectively make up 19%.

An additional indicator of MPOWIR’s success has been its ability to entrain volunteers from the community. Initially, there was a clear divide between junior and senior MPOWIR participants. But now, several years down the road, some of those early junior participants have transitioned into

leadership roles within MPOWIR. In fact, one has recently assumed the role of co-chair of MPOWIR, while several others are now co-leaders of the mentoring groups. The decisions of these young women to contribute to MPOWIR in leadership positions is a testament to the value MPOWIR has brought to their individual careers. Furthermore, this leadership progression and continuity of involvement brings a rich sense of community and a broad perspective to the program. As to the latter point, the career stage spectrum in MPOWIR leadership now stretches from those who have recently transitioned to early career positions to those who are veterans in their positions.

MPOWIR’s Impact on Individuals and the Community

While the program’s impact can be measured by survey statistics, the full impact on individuals may be better reflected by the testimony of the participants themselves. Many junior participants cite MPOWIR as an “exceptional resource” where they have made “lasting connections.” Many note that they are “developing confidence” in themselves as scientists as a result of MPOWIR’s programs, and that they have become

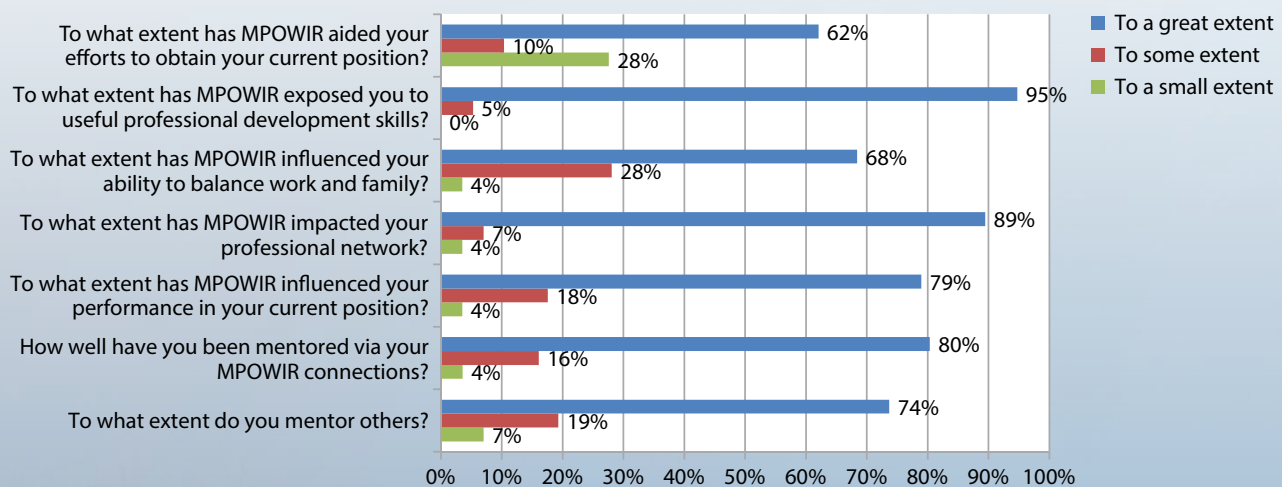


Figure 3. Results of the 2013 survey of MPOWIR participants who first participated in the program between 2007 and 2010.

far more aware of the “importance of mentoring” in their own careers. For example, one person noted that her involvement in MPOWIR provided “tangible role models, proactive mentoring, and an embracing network.” This expression encapsulates an unstated goal of the MPOWIR program: that the junior participants will more likely act as mentors as their careers develop. With this downstream effect, the culture of mentoring that MPOWIR strives to achieve is effectively propagated. The callouts in this article are examples of individual impacts.

In addition to helping junior women physical oceanographers progress in their careers, MPOWIR has provided multiple benefits to the senior participants. In the words of one senior participant, “Participating in MPOWIR activities has been one of the most rewarding experiences in my career.” Both male and female participants in Pattullo Conferences have increased their understanding of the most pressing issues faced by junior scientists today. MPOWIR plays an important role in educating both men and women about subconscious gender bias. In the words of one senior male participant, “As a man, the conference deepened my awareness

of how difficult it can be for the majority to really get how it is for the minority.” Senior participants learn to listen to junior scientists in a new way and improve their ability to communicate with junior women researchers, thereby enhancing their ability to act as effective mentors. This education does not stop with the end of the Pattullo Conference, because senior participants then share their experiences from the conference with other senior scientists at their home institutions.

A female senior participant remarked that a significant benefit of MPOWIR involvement has been the reduction in feelings of isolation. In her words, “learning about the social and psychological research behind gender issues...has legitimized my personal struggles, both external and internal, with gender bias.”

A further benefit of involvement in MPOWIR has been the opportunity to network with talented junior scientists with lots of innovative scientific ideas to share. In the words of one senior participant, “from a scientific perspective, that keeps me up to date with what is relevant and exciting to our young scientists today.” The senior scientists and junior scientists often maintain connections made at Pattullo

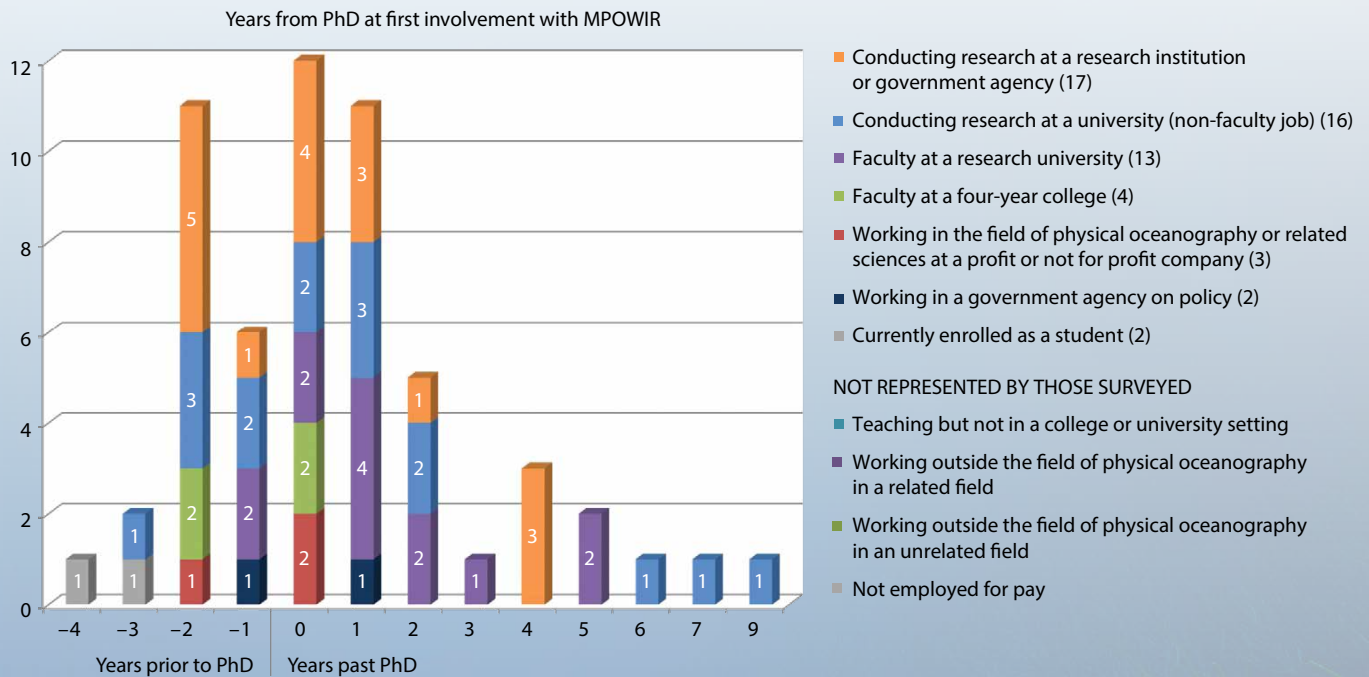


Figure 4. Timeline of early MPOWIR participants’ career progressions based on the 2013 MPOWIR participant survey. The data show the distribution of 2013 career choices as a function of the career stage when the participant started MPOWIR relative to her position in 2013. The x-axis indicates where each participant was relative to PhD completion at the time that she first became involved in MPOWIR. The y-axis indicates the number of individuals at the same career stage and the type of positions held (color) at the time of the 2013 survey. For example, an individual who joined MPOWIR four years prior to finishing her PhD was still enrolled as a student in 2013.

Conferences and in mentor groups and through the NOAA Internships and NASA Speaker Series. These connections can enhance the research and careers of both the senior and junior scientists via opportunities for collaboration and, in some cases, employment.

From the collective survey input and from participation rates for the various MPOWIR program elements, we believe that MPOWIR has benefited the community as a whole and not simply the individuals who have personally participated in those programs. First and foremost, MPOWIR has benefited the community by aiding the retention of those young women who have participated. Secondly, participants at the Pattullo Conferences, in mentoring groups, and at the Town Halls have all been made aware of issues, such as subconscious gender bias and the challenges of work/life balance, that impact the career development of women in the field. Such awareness permeating home departments and institutions will, in time, make a difference in the diversity of the workforce in these departments/institutions. Finally, the community benefits from the strong networks formed between the junior scientists and the senior scientists, as well as from the intragroup networks.

FUTURE DIRECTIONS

Because the overall goal of the MPOWIR program is to increase retention, the ultimate metric of success is a clear quantification of retention improvement. As discussed above, prior to the start of MPOWIR, a survey was taken of all institutions across the country with oceanography departments. An assessment was made of the gender breakdown at the assistant, associate, and senior scientist levels. We plan to conduct a similar survey at the seven-year mark of MPOWIR activities in the spring of 2015 (the 2008 Pattullo Conference is considered the start of MPOWIR activities) to assess the degree to which women have moved into the ranks of assistant scientist/professor. We plan to use the field of chemical oceanography as a control, because it has not had a mentoring program during this time frame, it is a closely related discipline, and its retention statistics were similar to physical oceanography prior to the initiation of MPOWIR.

At this point in time, we do know that since the start of its activities in 2008, MPOWIR has engaged over 130 unique women in its various programs (Pattullo Conference, mentoring groups, NOAA Internship, and NASA Speaker

Series). Of the women who have been involved in MPOWIR, 48% have participated in more than one activity. These opportunities have clearly been beneficial to the careers of the 56 women who were early participants. MPOWIR has received many positive anecdotal responses to programs and offerings, and recent surveys of past participants show remarkable retention thus far. Some key aspects of MPOWIR that we encourage other disciplines to consider in developing their own mentoring program are: the teleconference mentoring groups, which are a highly cost-effective mechanism for providing confidential mentoring outside the confines of a single institution; the involvement of a large group of senior scientists, both male and female, which helps make mentoring an all-community effort and serves to educate the wider community on issues and possible solutions to the leaky pipeline; grass-roots community involvement combined with support from multiple funding agencies to ensure program longevity, which is a necessity for tackling the gender disparity in retention; and a focus on discipline-specific mentoring so that mentors can provide the most relevant information and the most germane networking opportunities. MPOWIR strongly encourages scientists in other fields to adopt a similar community mentoring model and will readily facilitate those efforts. The benefits of such mentoring programs will surely enrich the entire oceanographic community by creating a more diverse workforce.

ACKNOWLEDGEMENTS

The support of the US National Science Foundation, Office of Naval Research, National Aeronautics and Space Administration, National Oceanic and Atmospheric Administration, and Department of Defense for all MPOWIR programs is gratefully acknowledged.

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