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CHAPTER

10

c0010

# Advancing Toward Professorship in Biology, Ecology, and Earth System Sciences

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## INTRODUCTION

s0010

p0235     Despite advances toward equal representation at the graduate level, women scientists are underrepresented at every stage along the tenure track. The National Science Foundation (NSF) 2011 digest on Women, Minorities, and Persons with Disabilities in Science and Engineering reports that the proportion of female PhD recipients in the sciences has steadily increased over the past decade (NSF, 2011); however, there are obstacles at each career transition from PhD to full professor (NRC, 2009). This is especially true in the biological sciences, where the percentage of PhDs awarded to women has increased to 45%, but the proportion of female applicants in tenure track positions has dropped to 26%. Only 20.8% of tenured faculty are women.

p0240     In the sciences, the fields of ecology and earth systems sciences (which includes geology, oceanography, atmospheric sciences, and hydrology, amongst others) are similar to other STEM disciplines in

terms of attrition, perceived productivity, and representation. In ecology, women have a long history of participation and achievement (Damschen et al., 2005); however, they are still underrepresented in top positions, are paid less (Sakai and Lane, 1996), and publish less than their male counterparts (Primack and Stacy, 1997). Oceanography and other geosciences still lag behind the biological sciences in percentage of PhDs awarded to women (< 30%, but climbing); however, the post-PhD attrition pattern is similar: only 10% of full professors in oceanography or other geosciences at PhD-granting institutions are women (O'Connell and Holmes, 2005).

p0245 The reasons underlying these rates of attrition are complex and merit ongoing scrutiny. Recent work by Ceci and Williams (2011) suggests that, in some cases, women in science may not face overt discrimination, but rather a constrained suite of career choices compared to their male counterparts, particularly those associated with maintaining balance between productive careers and personal life choices. Others suggest that subtle unconscious bias (Moss-Racusin et al., 2012) stemming from cultural stereotypes may affect the perceptions of the competence of women scientists by their senior colleagues. In a nationwide double-blind study of biology, chemistry, and physics professors, researchers submitted identical job applications with male and female names for a lab manager position. Female applicants were consistently offered reduced starting salaries and less access to mentoring than male applicants. The reduced financial security and access to career mentoring (Moss-Racusin et al., 2012) may combine with the constrained suite of choices (Ceci and Williams, 2011) to increase the attrition of women from an academic career path. Indeed, in a recent synthesis of the graduate exit surveys from the University of California (Mason et al., 2013), decreased financial means was cited as a reason why women scientists opted out of their chosen professions more frequently than female physicians.

p0250 Sitting across a café table, two Oregon State University (OSU) graduate students (one community ecologist, one oceanographer) and two tenured professors of forestry met during the spring of 2010 to discuss why there were so few examples of women in senior positions in their departments, and whether there was anything that could be done. They were soon joined by a postdoctoral researcher and graduate student in marine ecology. As scientists, we recognized that multiple factors might combine to elicit a behavior or pattern within a population. Certainly, cultural stereotyping and financial insecurity may play roles, or even interact with gender to prompt women to opt out of careers as tenure track faculty. We also suspected that there were additional characteristics in our natural science disciplines that contributed to the attrition of women from academic science careers. We coined the term *biological,*

*ecological, and earth systems sciences (BEES)*, to describe this set of natural science disciplines in academia that involve field work and interactions with a broad range of stakeholders, stressors that add to the list that affect other academics. We realized the potential value of providing women with practical tools to navigate these common career hurdles in BEES disciplines. We began planning a workshop for an at-risk population—postdoctoral and tenure track, but pre-tenured scientists—who may not already have access to targeted professional development. We focused on issues such as job interviews, negotiation, and mentoring. Recognizing that there are factors driving these patterns of attrition that are unique to BEES careers, we also attempted to interweave skills directed at these factors, including how to structure a successful interdisciplinary research program, communicate with multiple stakeholders, and manage field work. Importantly, these factors are not typically addressed in professional development programming for academic scientists.

s0015

## BEES RESEARCH IS UNIQUE WITHIN STEM DISCIPLINES

p0255

BEES research addresses complex systems, such as conservation genetics of populations, community or ecosystem dynamics, or climate effects on biogeochemical cycles. The nature of this complexity generally requires an interdisciplinary approach. More and more, individuals are seeking graduate training that spans multiple disciplines in order to address interdisciplinary questions and structure interdisciplinary careers. However, despite being at the cutting edge of science, interdisciplinary research is associated with increased investment costs (e.g., Cummings and Kiesler, 2005; Rhoten and Parker, 2004) and potentially decreased disciplinary prestige (Metzger and Zare, 1999). Interdisciplinary applicants may exhibit lower apparent research productivity, perhaps due to the amount of time large, complex projects with multiple collaborators take to come to fruition. Recent PhDs who conduct interdisciplinary research are more likely to be in academia and produce more publications than their counterparts, but for unknown reasons they occupy fewer tenure track positions within academia (Millar, 2013). Hiring committees may seek applicants whose research neatly fits within the bounds of a traditional discipline. Interdisciplinary researchers may have higher rates of opting out during their early careers. Natural affinities for collaboration may increase women's interdisciplinary participation (Rhoten and Pfirman, 2007), but limited access to powerful informal networks and subsequent opportunities (Corley and Gaughan, 2005; Fox, 2001) may increase the likelihood of their leaving.

FORWARD TO PROFESSORSHIP IN STEM

p0260 BEESS research requires communication with a diverse stakeholder community. Natural resources research often requires communication with diverse stakeholders from industry, government, politics, the press, and the general public. How well individual researchers foster and manage relationships among stakeholders is often viewed as a value of the added role of an institution in the community, and thus may be considered in the tenure and promotion process. While it has been argued that women may have natural affinities toward multistakeholder management (Edmunds and Wollenberg, 2001), women scientists may have limited opportunities to build such professional relationships. In general, women academic scientists are under-represented in university-affiliated, multistakeholder research centers (Corley and Gaughan, 2005), consulting and entrepreneurial activities (Haeussler and Colyvas, 2011; Murray and Graham, 2007), and corporate science advising boards (Ding et al., 2012). At least for the latter, demand-side gender-stereotyped perceptions and the unequal opportunities embedded in social networks appear to explain some of the gap (Ding et al., 2012). Thus, the combination of low percentages of experienced female colleagues, the supply-side perceptions, and the mandate of multistakeholder networking may pose a particular challenge for women in BEESS disciplines.

p0265 Research in BEESS disciplines is often field-based, associated with necessary work at sea, wilderness areas, remote field sites, or field stations. Field work presents particular hurdles for academics with families, who must negotiate child or elder care and caregiver time-sharing. For ecologists, fieldwork is associated with increased productivity for men, but not for women (McGuire et al., 2012). Women conducting tropical ecology research receive a greater number of grants, but are awarded less total grant money compared to their male counterparts, suggesting an imbalance in the time devoted to writing funding proposals compared to the relative pay-off (McGuire et al., 2012). Women ecologists are more likely to have a spouse in a demanding career, bring their children and family to field stations, hire assistants to watch children at field stations, and spend less time in the field actively collecting data. Indeed, family responsibilities were among the top three reasons cited for women leaving field-based research positions, with other common reasons being a change of interest or more lucrative endeavors elsewhere (McGuire et al., 2012). While difficult to quantify directly, fieldwork blurs the divide between personal and professional identity, requiring women to reconcile their perception of their own competence with the public's action-hero, male-based stereotype of a field scientist.

p0270 Throughout the workshop design and planning process, we returned to these BEESS-unique factors: interdisciplinary research, multistakeholder communication, and fieldwork. We conducted a 2-day professional development workshop, entitled "Advancing Toward

Professorship in Biology, Ecology, and Earth Systems Sciences (ATPinBEESS),” for assistant professors, postdocs, and advanced graduate students designed to provide skills to help participants succeed and thrive as academic scientists. We also conducted longitudinal research to determine the perceptions of career preparation and challenges of our participants as well as to quantify any effect our programming had on those perceptions.

## WORKSHOP

s0020

p0275 Our workshop began on Monday, April 9, at 5 p.m. with appetizers and a meet-and-greet activity, which were followed by welcome remarks by the ATPinBEESS committee and an opening address by Angelo Gomez of OSU’s Office of Equity and Inclusion (Table 10.1). On Tuesday, April 10, OSU faculty offered professional development sessions from 8:30 a.m. until 5 p.m.; these included a mock tenure panel. After dinner, Dr. Laura Huenneke of Northern Arizona University gave our campuswide keynote address, entitled “Degrees of Freedom: The Seemingly Random Walk of an Academic Ecologist’s Career Path.” Following the keynote, participants were encouraged to utilize the newly-gained networking skills with audience members. A half-day of sessions on Wednesday ended with lunch and concluding remarks at 1 p.m. (Table 10.1).

## SURVEY

s0025

p0280 During early planning sessions, we identified three factors unique to BEESS research, including challenges involved with structuring a successful interdisciplinary research program, communication with multiple stakeholders, and fieldwork (as described previously). We hypothesized that these factors may interact with gender and work-life decisions to constrain career choices available to women in BEESS disciplines. While our priority was to conduct a successful professional development workshop, we sought an additional intellectual product to formalize and further legitimize our efforts. Thus, we augmented the Forward to Professorship survey questions with ATPinBEESS-specific questions and established a longitudinal study in which we polled participants before, immediately after, and 8 months after the workshop. Survey participants provided written feedback regarding their progress and perceptions of current and future success in their current career trajectories.

0010 **TABLE 10.1** General Program: Advancing Toward Professorship in Biology, Ecology, and Earth System Sciences AU:2

	<i>Check-in</i>
<i>Evening 4/9/2012</i>	<i>Welcome:</i>  <i>Angelo Gomez, Interim Executive Director Office of Equity and Inclusion, OSU Icebreaker and Informal Networking</i>
<i>Morning 4/10/2012</i>	<i>Interactive Session Themes:</i>  <i>1. Fostering Productive Collaborations 2. Networking and Preventing Isolation 3. Mentoring 4. Managing Expectations</i>
<i>Afternoon 4/10/2012</i>	<i>Interactive Session Themes:</i>  <i>1. Effective and Progressive Management Skills 2. Fieldwork Challenges 3. Parenting: Knowns and Unknowns 4. Tenure Panel</i>
<i>Evening 4/10/2012</i>	<i>Dinner and Keynote:</i>  <i>Dr. Laura Foster Huenecke Vice President of Research Northern Arizona University</i>  <i>Putting skills to work:</i>  <i>Public networking session</i>
<i>Morning 4/11/2012</i>	<i>Interactive Session Themes:</i>  <i>1. Interviewing 2. Negotiating 3. Work/Life Balance</i>  <i>Workshop close and next steps</i>

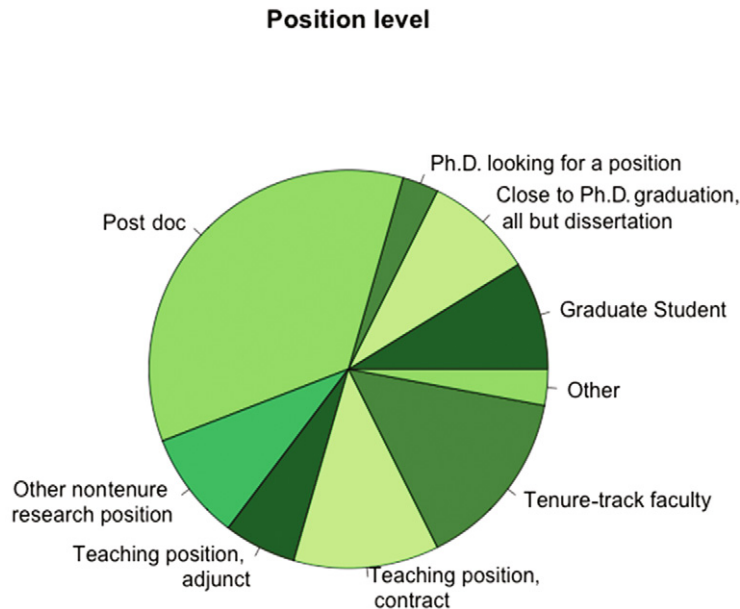
For more specific information regarding session format, leaders and biographies, please see <http://atpinbeess.forestry.oregonstate.edu/>.

## DEMOGRAPHICS

s0030

p0285 We initially targeted newly hired assistant professors and sent direct invitations to contacts from departments related to the BEESS disciplines at colleges and universities across the Pacific Northwest. We advertised on a number of listservs, including Ecology, Earth Science Women’s Network. Interestingly, the overwhelming response was not from assistant professors, but rather from postdocs who found it challenging to advance to tenure track or equivalent positions (Figure 10.1).





f0010 **FIGURE 10.1** Demographics of ATPinBEES workshop participants.

Thus, we modified our programming to include skills to navigate the transition from postdoctorate to assistant professorship, as well as pre-tenure strategies for tenure track faculty (Table 10.1). Participants came from 14 academic institutions in eight US states and Canadian provinces, and from a range of current academic appointments (Figure 10.1). The mean participant age was 34.6 years.

## WORKSHOP CHALLENGES

s0035

### s0040 **Time Commitment**

p0290

Time commitment is a concern for any academic service activity. However, our committee benefitted from its diverse membership, comprised of academics at different stages in their careers, who had experience organizing conferences and/or special sessions. Our committee consisted of three graduate students, a research associate, and two faculty members. While time commitments varied by committee member and by week, the workload was substantial, with graduate students reporting an average of 10 h per week and faculty members reporting approximately 4 h per week over the 8 months. All committee members contributed intellectually and communicated with academic participants

FORWARD TO PROFESSORSHIP IN STEM

(e.g., attendees, workshop leaders, departmental and institutional leaders, and keynote speakers). It was necessary for faculty members to take on fiscal management roles, although graduate students took on additional logistical roles. It is important to note that the ATPinBEES specific longitudinal survey was created in part because we wanted to better serve this unique constituency, but also because we wanted to further legitimize our service activity with a scholarly product.

## LOGISTICAL LESSONS

s0045

p0295 Between the six of us, we had experience planning special sessions at meetings, small scientific meetings/workshops (of approximately 30 attendees), and moderately-sized professional development meetings (100–150 attendees). However, these efforts tend to be sporadic throughout one's career, so the lessons learned from individual planning events often go undocumented. Each workshop goal and target audience is unique and brings its own logistical challenges. We list some of our lessons learned next.

### s0050 **Engaged Participation**

p0300 In their application, scientists were asked to describe their career goals, their professional preparation, and the relevance of attending the workshop. In addition to evaluating their curricula vitae, we wished to understand their personal motivation for applying. We also wanted to ensure that scientists, once selected, were serious about their participation. Often people commit to a free workshop, only to back out at the last minute when personal logistics become challenging. Last minute drop-outs result in lost opportunities for other scientists. We asked selected participants to send us a small deposit in the form of a check (\$50), which we refunded on their arrival. All participants agreed. Only one participant who was selected opted out, but did so prior to sending the check.

### s0055 **Food and Drink**

p0305 Catering logistics go beyond ordering enough food for 30–50 people and staying within budget. These logistics included making decisions on what food to have, where and when (e.g., what choices might lend themselves to networking among participants), to maintaining variety for those with individual dietary requirements (e.g., vegetarian, vegan, gluten-free, kosher), and making calls when snacks were insufficient. During the 3-day workshop, we had a few mishaps with food that

required someone to be designated as the catering contact during every service. We recommend that organizers set aside meals for those with special dietary requirements prior to serving and distribute them to the participants directly. We also recommend that the catering contact verify the quantity of specialty foods (e.g., gluten free).

### s0060 **Conference Supplies**

p0310 We spent time identifying, ordering, and maintaining conference supplies, including items to be distributed to participants and general programming materials. The former included name tags, scratch paper, pens, a folder containing participant contact information, local resources for travel and dining, and workshop schedules. The latter included easels, large notepads, whiteboards, audio-visual preparation, and handouts. This required a priori planning once the main workshop venues were secured. These logistics also required communication and flexibility from the organizers and the participants. For example, we amassed a library of resources to share with participants, but did not wish to print and distribute the materials. Initially, we considered posting Microsoft PowerPoint slides and journal articles on our website, but ran into time and budgetary constraints. Ultimately, we housed the materials on a laptop that was made available during break times for participants to transfer resources via flash drive. An alternative would be to provide a flash drive to all participants with the conference materials already loaded.

### s0065 **Participant Lodging and Travel**

p0315 Our proposal did not include travel allowances for participants, although we fully subsidized participant lodging. We provided participants with letters to their department heads describing the nature of the workshop to facilitate provisioning of travel support from departmental funds to workshop participants.

### s0070 **Securing a Venue**

p0320 With the exception of the keynote address, the entire workshop took place at one location in the College of Forestry at OSU. We worked with the college's administrative staff to review potential venues. Two of our committee members worked with the College of Forestry and the general scheduling desk at OSU to reserve rooms that would meet our needs. These committee members were responsible for reserving rooms, coordinating with classes, as well as shifting needs based on food and beverage delivery, break out groups, and potential audio-visual needs.

It is important to note that two committee members worked within the College of Forestry and thus were able to navigate known resources efficiently, rather than search across the campus.

s0075 **Publicity Materials**

p0325 We benefited from the internal administration at OSU that managed brand identity in our advertisements and were fortunate to obtain pro-bono assistance of a freelance designer who developed a logo for our workshop. University templates were available to design bookmarks, flyers, and posters. These templates were used on the workshop's website (<http://atpinbeess.forestry.oregonstate.edu/>), recruitment email, posters around campus and town, as well as participant materials, including coffee mugs. It is important to note that while we advertised the keynote address widely to the public, the workshop itself was limited to accepted participants.

s0080 **Institutional Approval for Survey (Use of Human Subjects)**

p0330 In order to conduct a survey of workshop participants, OSU required that we submit survey materials to the Institutional Review Board (IRB) before the workshop. In addition to the longitudinal survey materials, OSU's IRB required review and approval of materials developed by the Forward to Professorship program. While we developed the survey materials early in the workshop planning process, we did not initiate the formal IRB process until February 2012, 2 months before the event. We were able to complete the approval process in the time allowed; however, we would suggest initiating much earlier.

p0335 Additionally, the IRB requires that researchers complete an online ethics training module. This 4- to 6-h training helped us design, implement, and analyze our survey data. Regardless of the requirements of individual institutions, we recommend that at least one committee member complete this informative process to maintain standards for implementing survey materials.

s0085 **WORKSHOP OUTCOMES**

s0090 **Workshop Successes**

s0095 ***Qualitative Successes***

p0340 All sessions received positive comments and elicited candid discussions. The welcoming address provided a historical perspective on

advancing participation by women in academia and was well received, and the participants enjoyed the initial ice-breaker activity. A mock promotion and tenure (P&T) committee discussion elicited many comments, including that the P&T process “is obviously the scariest,” but that the session was “helpful,” and without it, “it may have taken a year or so into my position to clue into.” The keynote speaker’s personal story was “reassuring,” and enabled participants to better envision success in their own career progression. Overall comments about the workshop were extremely positive, including one participant’s comment that “so many questions that I didn’t even know to ask were answered!” indicating that there is a great need for the type of information our workshop provided.

p0345 The evaluations also provided suggestions for improving the workshop. Participants felt that the second day, which included an evening talk and networking session, was too long, and would have preferred a workshop evenly distributed between 2 and 3 days, with more breaks, built-in networking time, and more question and answer time. Some participants commented that fieldwork was not necessarily part of their work, and that the session on parenting may not apply to them, reflecting the diversity in BEESS scientists. Topics suggested for future workshops included strategies for self-promotion, overcoming geographic constraints in the job hunt, dual hires, nonacademic careers, conflict resolution, and addressing power differentials.

s0100 **Highlight on Field Work**

p0350 A particularly relevant session on fieldwork challenges resonated with many of the participants. The session presider outlined a hypothesis that, in part, the challenges faced by people with fieldwork-heavy careers may be a symptom of a larger but character-related syndrome: (i) women who choose careers involving fieldwork are additionally choosing to prove they can succeed; and (ii) this need for validation translates to saying “yes” more often than necessary in other parts of the job and life to show competence. As a codicil, (iii) this need to show competence can challenge one’s feelings about one’s femininity. The first premise is built on the feeling that when one imposes her fieldwork onto people with whom one typically collaborates (whether family members, colleagues at the office, or people in other parts of her life), we then feel that, in order to prove that the imposition was necessary, one has to succeed. The second premise is built on our own observations that many of us do work very hard to project competence—which we can show by doing difficult fieldwork well, and by agreeing and coming through on a multitude of projects requested from various sources (from colleagues, friends, and

family, to department heads and deans). Many workshop participants thought this profile was apt, and it generated animated discussions. There were several participants who said they worried that their “phenotype” of femininity would make them appear less competent than they were, and others who felt that they had to adopt a less feminine “phenotype” in order to project their competence.

### s0105 **Quantitative Successes**

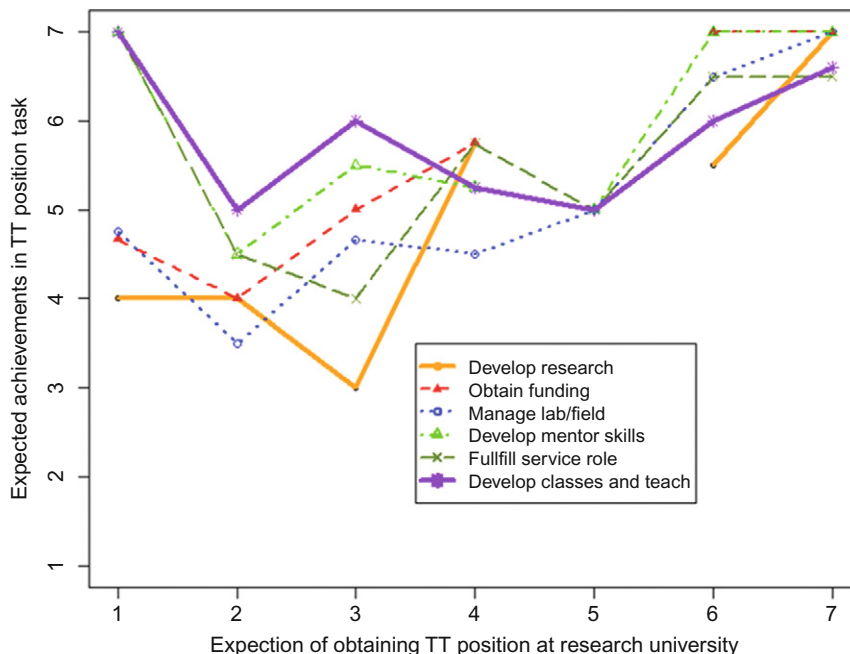
p0355 Workshop participants were a highly-motivated, self-selected group, with a generally high degree of self-confidence. A total of 28 participants completed the pre-workshop survey, and 23 each completed the postworkshop survey and the 8-month survey. Their motivation was reflected in their responses to survey questions regarding their perceived confidence and competence to achieve key career outcomes. Confidence reflects a belief in either one’s innate ability to succeed or a high likelihood of success based on the vicarious experience of peers; competence may reflect concrete examples in their personal history where their skill set contributed to success.

### s0110 **Pre-workshop Survey**

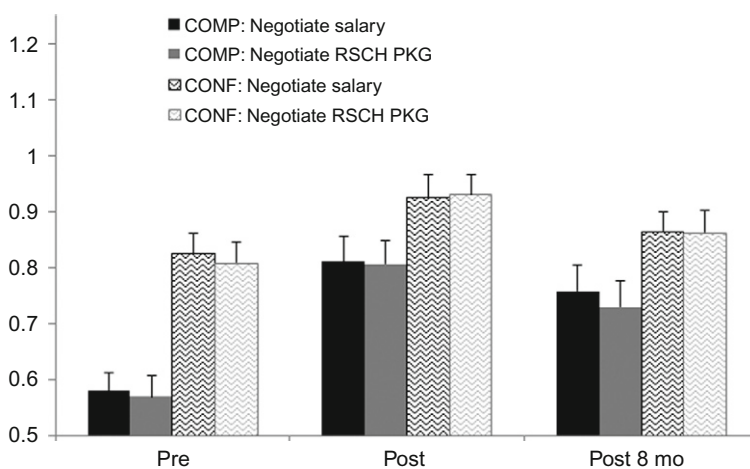
p0360 Pre-workshop survey results suggest different career trajectories based on confidence (Figure 10.2). These pre-workshop surveys show that the confidence to achieve a tenured position was positively correlated with the confidence to write grant proposals ( $r_{1,22} = 0.47, p < 0.05$ ) and also with the participant’s experience doing so ( $r_{1,22} = 0.47, p < 0.05$ ). However, confidence to achieve a tenured position was negatively correlated with time spent teaching ( $r_{1,22} = -0.69$ ). Responses from those who aspired to work in doctoral-granting research institutions were negatively correlated with responses from those who aspired to liberal arts universities ( $r_{1,22} = -0.56$ ).

### s0115 **Perceptions Through Time**

p0365 The results of longitudinal analyses responses reflected that participants’ confidence in their ability to successfully navigate career transitions was variable (Figure 10.3). Participant confidence increased somewhat postworkshop, and then fell to near pre-workshop levels at the 8-month postworkshop survey. However, participants’ sense of competence rose dramatically after the workshop, and maintained their relative gain even 8 months afterward. This gain could be generated by multiple processes: the workshop experience may have been formative,



f0015 **FIGURE 10.2** Mean pre-workshop confidence. Participants were asked to rate their confidence in achieving various career benchmarks, and their expectation of obtaining a tenure track position at a research institution. Response maximum score was 7 (“Very likely”) and minimum 1 (“Not at all”).

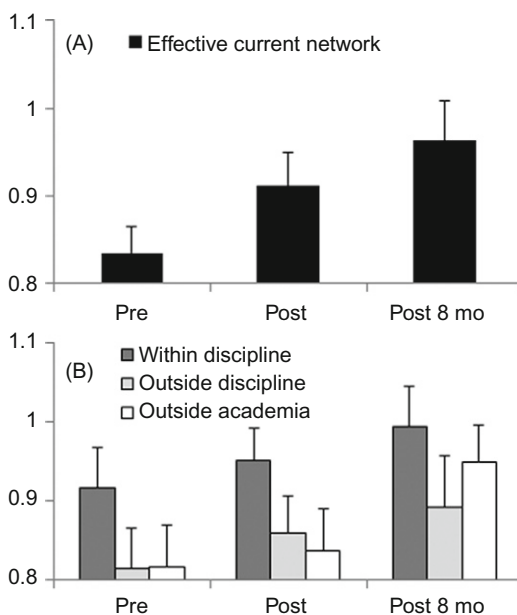


f0020 **FIGURE 10.3** Mean (+standard error) perceptions of confidence (CONF) and competence (COMP) of workshop participants in successfully negotiating their salary and research packages (RSCH PKG). Participants were surveyed before the workshop (Pre), immediately following the workshop (Post), and 8 months later (Post 8 mo). Several categories were queried across research and teaching skill sets. Normalized response score maximum (“Very much”) was 1.2, minimum 0 (“Not at all”), with the mean across all questions being approximately 0.8 for confidence, and 0.7 for competence.



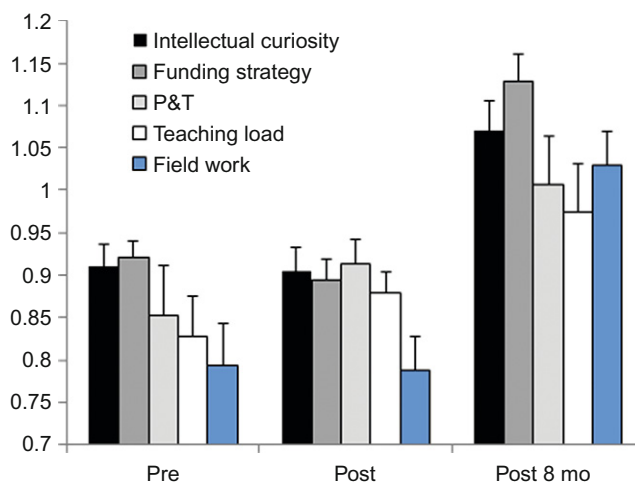
the participants may have continued to seek professional development opportunities after the workshop, or a combination of both. Importantly, workshop participants may have formed professional and or personal networks, whereby peer-to-peer interaction resulted in a significant and sustained positive effect.

p0370 The benefits of mentorship and positive role models in all fields of STEM cannot be underestimated. Prior to the workshop, 43% of participants had a mentor at their home institution. 8 months later, 65% of participants responded that they had a mentor. Informal peer networks (IPNs) can also fulfill some mentorship roles, such as access to critical information, as well as providing emotional and social support. We cannot know whether participants sought mentorship outside of a transparent, formal relationship, or whether their IPNs fulfill all of these critical roles. However, there was an increase in perceived effectiveness of current networks immediately following the workshop (Figure 10.4A), suggesting that participants made valuable personal contacts or shifted their perspective on existing relationships at their institutions.



f0025 **FIGURE 10.4** Mean (+standard error) effectiveness of personal network (A) and breadth of professional network (B). Time periods are as in Figure 10.4. Participants were asked to rate the effectiveness of their current network in helping them achieve their career goals. They were also asked to rank their level of comfort in approaching experts within their discipline, outside their discipline and outside of academia. Normalized response maximum score was 1.2 (“Very effective or Very comfortable”) and minimum 0 (“Not at all”).





f0030 **FIGURE 10.5** Importance (mean + standard error) of different factors in driving research questions over the next 5 years. Time periods are as in Figure 10.4. Participants were asked to rate the importance of several factors in driving their research questions, including intellectual curiosity, strategies to secure long-term funding, promotion and tenure requirements (“P&T”), teaching loads, travel and field work requirements, and requirements by collaborators or stakeholders (data not shown). Normalized response maximum score was 1.2 (“Very much”) and minimum 0 (“Not at all”).

p0375 Participants, in general, were quite confident in communicating with people within their discipline (Figure 10.5), much less outside their discipline, and even less with nonacademics. Given the multistakeholder nature of BEESS research, this pattern was concerning. However, immediate postworkshop scores increased moderately, with larger increases 8 months postworkshop, particularly with nonacademics. Future workshops may wish to solicit presentations from agency leaders as well as nongovernmental organizations (NGOs), not simply as career alternatives, but to recognize the growing community of potential collaborators that may be encountered in a successful career. Incorporating communications training, such as those provided by the American Association for Advancement of Science (AAAS; <http://www.aaas.org/communicatingscience>) or the Communication Partnership for Science and the Sea (<http://www.compassonline.org>), may go a long way toward improving participant confidence in communicating with different audiences.

## LESSONS LEARNED

s0120

p0380 Participants’ chosen research topics were motivated more by intellectual curiosity and less by the challenges and travel requirements of

fieldwork. Participants were asked to rank the categories of factors that will shape their research over the next 5 years (Figure 10.5). These categories included: intellectual curiosity, strategic decisions to secure funding, P&T requirements, teaching load, fieldwork or travel requirements, requirements of collaborators, and requirements of shareholders. Decisions regarding research appeared to be internally driven. External factors such as collaborator or shareholder requirements ranked relatively low and are not shown. When compared with pre-workshop surveys, postworkshop results revealed increases in influence of P&T and teaching requirements, but not fieldwork. Fieldwork requirements ranked relatively low compared to intellectual curiosity, funding, and other job requirements until the 8-month postworkshop surveys, in which all factors tended to increase. Importantly, at least within the pre-workshop survey responses, fieldwork scores were negatively correlated with intentions to start families and the relative importance of maintaining personal relationships. We recognize that the relative importance of personal relationships and decisions regarding reproduction may shift dramatically in time, especially relative to life stage and career. Our results suggest that researchers are making complex decisions and sacrifices in order to balance the demands of field work with other career requirements.

### s0125 **Work-Life Balance is Individually Defined**

p0385 Our programming had three sessions that fell under the category of work-life balance, as determined by initial feedback from participants in the pre-workshop survey. The first was directed toward managing intrinsic and extrinsic expectations, the second was a specific session on parenting in academia, and the last was a broader session on work-life balance, both in terms of social structures within academia, and institutional and national policy. The first addressed, at least partially, how to manage one's schedule with many concurrent obligations. This session also covered strategies of how to overcome the imposter syndrome, or the tendency for high achieving women to feel like they do not deserve or belong in their positions. The second session facilitated a discussion of strategies to manage the conflicting demands of parenting and field research, travel, and academic obligations. The last session was designed to give participants a sense of what "family-friendly" policies were already in place at academic institutions and how participants might gauge the climate of future home institutions or effect positive change in their own institutions.

p0390 While all sessions were well-received, unexpected discussion emerged from the parenting session. Session leaders brought their own

parenting philosophies, co-parenting and assistance (i.e., nannies, grandparents, etc.) strategies, and shared them with the group. However, some workshop participants had no plans to have children and some had experienced increased workloads due to a co-worker's family obligations. In general, the group wanted to see work-life balance defined outside of parenting. Questions that arose included: can academia honor the interests of the whole person? Can "balance" be achieved without the assistance of extended family or independent wealth? Does recognizing family obligations and whole-person health of those with family obligations come at the expense of those who have decided not to have children? In the end, we recognized that all parts of the phrase, "work-life balance," are self-defined. Participants agreed that the concept of work-life balance ought to apply to everyone, and consider faculty without children or spouses. We also recognized that while unwritten allowances for family time may burden other faculty members, formal policies (such as family leave or delayed tenure clocks) within departments and across institutions will be ultimately helpful for all, regardless of how one individually defines "work-life balance."

## POSTWORKSHOP EFFORTS

s0130

p0395 In addition to preparing this chapter, postworkshop efforts have included analyses and presentation of survey results at scientific meetings, manuscript preparation, coordination of networking and reunion activities of workshop participants, and a social media presence. We identified key characteristics of BEESS disciplines and collected information from workshop participants regarding their experience and perceptions on how these characteristics interplay with other career choices through time. In 2012, our group presented a summary of the pre-workshop responses at the Ecological Society of America (ESA) meeting (Boersma et al., 2012). Results from the pre-workshop analyses and from our longitudinal study are also included in this chapter, and a peer-reviewed article describing our findings is in preparation.

p0400 Participants continue to network and have had gatherings at subsequent ESA and American Geophysical Union meetings. These gatherings were coordinated primarily through an open Facebook page. Participants currently continue to post articles of interest and provide social support to one another.

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## NON-PRINT ITEM

### **Abstract**

Multiple factors may interact with gender to convince women to opt out of careers as tenure track faculty. Rates of attrition in academia are particularly pronounced in science, technology, engineering, and mathematics (STEM) disciplines, which include biology, ecology and earth system sciences, or collectively, BEESS. In addition to the stressors that affect other STEM careers, paths in BEESS fields are unique in that they are inherently interdisciplinary, often require field work, and involve interactions with a broad range of stakeholders. We designed and conducted a workshop for an at-risk population of BEESS scientists—post-doctoral and tenure track, but pre-tenured scientists—who may not already have access to targeted professional development. We also conducted longitudinal research to determine the perceptions of career preparation and challenges of our participants, as well as to quantify the effect of our programming on those perceptions.

**Keywords:** Field studies; women in science; interdisciplinary research; scientific culture; tenure track; academia; biology; ecology; earth system science