

The “FORWARD to Professorship” Workshop

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Abstract

“FORWARD to Professorship” is a workshop that aims to help women and other underrepresented groups in Science, Engineering and Mathematics succeed in obtaining tenure-track faculty positions and in acquiring tenure. The workshop addresses skills and strategies to survive and excel in academia. Participants from wide geographical, disciplinary and career level backgrounds come together for a three-day workshop in May. Participant rating of the activities and the entire workshop experience has been very positive. Several months after the workshop, participants report increased confidence and networking, aiding them in their career development.

1. Introduction

The National Science Foundation (NSF)’s ADVANCE program seeks to “increase the participation of women in the scientific and engineering workforce through the increased representation and advancement of women in academic science and engineering careers.”¹ With this goal in mind, we developed the “FORWARD to Professorship” workshop to address unmet needs of women seeking, interested in or occupying tenure-track assistant professor positions in science, engineering and mathematics (SEM). This workshop was developed from a similar workshop, “FORWARD to Graduate School” that we created and ran from 1998 to 2001, under NSF funding for SEM women at the undergraduate to graduate junction. The current workshop is funded by a NSF ADVANCE Leadership award.

In spite of the fact that women have been attaining doctorates, in general, at higher rates in recent years, their representation within science and engineering faculty remains small². This discrepancy points to obstacles at the employment level for which few new faculty are prepared^{3,4}. Institutional reform may correct some of the more obvious biases on a short time scale but will take a much longer time to fill in mismatches between the academic culture as practiced at most institutions and the professional and workplace lifestyle needs of women faculty.

New faculty members often feel isolated in their departments and lack social interactions with their colleagues^{4,5,6,7}. Sorcinelli⁸ and others repeatedly make the point that collegiality is “key” to junior faculty development. Making the transition from graduate student to full-time faculty member is indeed a daunting and stressful experience^{3,9}. Many graduate students observe their thesis advisors and decide they have no interest in becoming professors. Universities are notoriously bad at stating policies for tenure and promotion. Graduate students have little teaching preparation other than perhaps leading discussion groups. Starting up a research program without funds is a difficult undertaking. Add to these problems the fact that most departmental chairpersons have little if no training in management or organizational behavior.

Women and other members of underrepresented groups in SEM disciplines face added stresses such as what Moody calls the “solo effect”¹⁰: being the “token, novel,” person on the faculty whose behavior and performance may be judged more harshly due to their uniqueness in a more homogeneous group. Women suffer from the well-documented “chilly climate”¹¹ and may experience acute stresses of egregious hazing and sexual harassment¹². There is plenty of evidence^{7,13,14} that women in academic careers earn less than their male counterparts, are promoted less frequently and publish less frequently. They also are sometimes excluded from valuable personal and professional networks of men in SEM fields¹⁵. Women with families also suffer from overwork at home, in comparison with their male counterparts^{16,17}. All together, these factors present significant barriers to women entering the academy.

Several efforts have been recently started to help this situation. The ADVANCE Institutional Transformation projects¹⁸ have jumpstarted many changes in policies and practices at major public universities¹⁹. High level administrators are starting to realize the demographic situation: that fewer white males are available to fill the SEM positions needed. But progress is slow. For the individual woman at a non-ADVANCE institution the lack of information is significant. Furthermore, graduate students are often isolated in their laboratories and have little insight into the faculty search process. For these reasons, a workshop to demystify the tenure-track assistant professor path in SEM fields is sorely needed.

We present here the design, content and outcomes of the “FORWARD to Professorship” workshop. The aim of this paper is to 1) inform the community of the existence of the workshop and 2) appeal to higher education administrators that workshops such as this one are extremely well received by participants and can contribute to increased numbers of female applicants to tenure-track positions, better informed tenure-track professors, and increased sense of community for women faculty members, thereby helping to reduce some of the barriers to women’s advancement in SEM academics.

“FORWARD to Professorship” is a workshop that aims to help women and other underrepresented groups in Science, Engineering and Mathematics succeed in tenure-

track faculty positions. The workshop addresses skills, resources, and strategies to enter, survive and excel in academia. Topics of discussion include how to:

- apply for a position and negotiate salary and startup packages
- navigate the tenure-track process, including
 - an investigation of teaching strategies,
 - securing research funding and
 - engaging in service, and
- achieve a career/home balance in life.

The participants come from wide geographical, scientific and career level backgrounds. Graduate students in their final years of dissertation work, postdoctoral associates, untenured faculty, non-tenure-track faculty and researchers, and professionals in industry come together to share their experiences and learn new strategies to succeed. The workshop includes presentations from experts as well as activities designed to help participants develop their own approaches to their success. A personalized career plan is a desired outcome of attending this workshop. Participants also have the opportunity to discuss issues with administrators in a non-threatening environment.

2. Demographics

As workshop organizers, we strive to make the application process as painless as possible. Applicants are asked to fill out a short (half-page) personal information form, including name, address, and academic background. Registration is free.

The term “application” was not used in the first two years in order to create a welcoming atmosphere for all: we did not want participation to be based on yet another competitive process in a SEM career path. We used the word “registration” for the process of determining the workshop participants. However, because of the overwhelming response we received from applicants, we were forced to choose from among those who asked to attend. Priority was given to persons closest to starting, or already in, a tenure-track faculty position: i.e. graduate students who were not close to graduating were asked to reapply in the following year. Participants reported some confusion (18% in the second year) on their evaluation forms about the application process. Some seemed to think it was a competitive process, when they heard from other participants that some applicants were not admitted to the workshop. While this only happened for a few of applicants the perception was detrimental to the atmosphere of the workshop. In the third year, currently underway, we have changed the wording to an “application process” and we indicate that it is only needed in the event of over-subscription and the priorities are clearly stated.

Sometimes women can not participate if there is no child care. In order to facilitate the logistics for participation, we offered to arrange child care for participants. In the first year, we had three inquiries and provided child care for one two year-old child. Several participants brought their husbands along to care for their young children. In the second year, we had no inquiries for child care. Although this is a difficult service to supply, particularly in the litigious environment we live in (many institutions do not want to assume the liability), we feel it is a necessary one if we are going to truly try to advance women higher into the academic ranks. In the event of liability problems, independent

childcare agencies that routinely provide caregivers to out-of-town guests can be used. These can be found through the Internet, university childcare referral services or through hotels that offer babysitting services.

The workshop was advertised on email list-servs of science, engineering and mathematics societies and groups (e.g. WEPAN, systems, SWE), by direct mailings to societies (e.g. ASEE, ASME, AWG (Association for Women Geoscientists), AWM (Association for Women in Mathematics), Women in Cell Biology (part of ASCB), NSBP (National Society of Black Physicists), AISES (American Indian Science and Engineering Society)) and to all ADVANCE Institutional Transformation awardees. Response was from a diverse set of institutions: many elite Research I institutions as well as much smaller institutions and industry; from a diverse career level set: from Master's students to associate professors, including industry professionals, postdoctoral associates, tenure-track and non-tenure-track academics; from a diverse set of disciplines: mathematics, physics, biology, chemistry, astrophysics, many areas of engineering, including chemical, civil, environmental, mechanical, biomedical, electrical, computer science, etc. Over the first two years, the participants were 63% engineers and 37% scientists (including mathematicians). 91% of the participants were female, while 9% of the participants were male, two thirds of those being spouses of female participants. 39% of the participants were from underrepresented groups in SEM (including Asian women, African-American, Hispanic and Deaf participants of both sexes). There were 34 participants each year.



Fig. 1 Workshop participants came from varied disciplinary, ethnic and career level backgrounds.

There were 20 presenters each year. These were 48% engineers, 48% scientists, 4% other academics. The presenters included mostly SEM professors, at the associate or full level, chairpersons and deans and two postdoctoral associates. Seventy five percent of the presenters were female, 25% male. 10% of our presenters were from underrepresented groups, one (5%) Deaf and one (5%) African-American. The proportions were similar in both years.

3. Program Elements

3.1 Setting the Tone

The three-day workshop is designed to address the critical aspects of a modern-day tenure-track science, engineering or mathematics faculty position. The three traditional legs of a faculty member's responsibilities, namely research, teaching and service, are discussed in a general way on the first evening. Acknowledging that these are the three main areas of accomplishment upon which a faculty member's performance is evaluated, we also discuss the many challenges of interacting with other academics and setting up an academic career for oneself. Furthermore, one of the main aims of the workshop is to

create a community of women in science, engineering and mathematics, so much of the first day's events are aimed at creating a collegial and supportive atmosphere. Hence, the first evening consists of a welcome and discussion of logistics, a brief description of the environment in which the workshop occurs, an overview of the challenges of a SEM tenure-track faculty's early career, an ice-breaker for participants to get to know each other, and then a dinner and keynote speech.

In order to facilitate a sense of community, an icebreaker was used. The participants were asked to find someone they did not know. They were to learn unique facts about that individual and then share one with the group. Specifically, we wanted "uniqueness". Too often in this stage of the participants' career, there is a tendency to feel your identity is linked solely to those areas you will be evaluated on: your credentials, your grant dollars and/or your academic pedigree. Participants reported finding it fun and freeing to be defined by something other than career plans.

The keynote speakers for the first nights of each year were personable women who are models of what it means to achieve and be successful. The speakers described their individual journeys - professional and personal - in a lighthearted way that enabled the participants to hear that even these talented, successful leaders struggled at various stages along their academic career path. The speakers gave a balance of places where sheer determination was required as well as places where there were surprises and unforeseen opportunities and perhaps more than a little "dumb luck". After the keynote address, the speakers mingled with participants to provide informal discussion and mentoring. These conversations lasted late into the evening.

A unique component of the workshop is the representation in and of the Deaf community. The Deaf community is especially underrepresented in SEM areas. Furthermore, with the



Fig.2 Signed communication was used throughout the workshop.

establishment of Americans with Disabilities Act (ADA) law, universities see more deaf students than ever before. Exposure to the richness and diversity of the Deaf culture is beneficial for all future professionals. The workshop is hosted on the campus of Gallaudet University – a liberal arts university where the undergraduate program is for deaf and hard of hearing individuals. This gives the non-deaf individual a unique look at the technology and culture surrounding the Deaf community. All of the conference/hotel rooms include close captioning, alarms that vibrate, TTYs, and doorbells that

“flash”. The workshop was facilitated by sign language interpretation at all times. There was also a deaf presenter. The novelty (for most participants) of communicating by sign language also helped to create a sense of community.

During the course of the workshop, participants get to know each other better and start to network through shared meals and activities. Participants who are willing are matched to share accommodations. Accepted applicants are asked to read a book and participate in a

book discussion at lunch on the second day. We have used the biography of Rosalind Franklin, *Rosalind Franklin: The Dark Lady of the DNA* by Brenda Maddox²⁰ for this purpose. This account of Franklin's personal and professional struggles and successes details some of the very pertinent issues for women in science and engineering careers such as: how to find collaborators, how to choose a specific area of research, how to deal with competing or collaborating personalities in the pursuit of science, how to negotiate for salary and resources, and how to balance a personal life with a scientific one. We use the reading assignment as a way to get applicants thinking about these issues before they arrive at the workshop. Also, the lunchtime discussion provides a structure for participants to share experiences and information in an informal way. By the end of the third day many new networks and friendships are made. After the workshop an email list of participants is distributed.

3.2 Key Elements

As noted above, the workshop described the three "legs" of academia: Research, Teaching, and Service. Success in each of those areas is vital to obtaining tenure. However, as we looked at the entire path of our target group - from entry into a tenure track position to evaluation of performance in that position to becoming tenured - other elements also needed to be covered. These included writing and interviewing skills for obtaining a position, negotiation when receiving an offer (e.g. for startup packages), dealing with life situations (dual career issues and family or other personal life balance), understanding the differences between larger and smaller institutions and looking at the process from an administrator's perspective. Below are brief descriptions of how the workshop addressed all of these key elements.

Regarding the key element of "Getting the Job," the first way one interacts with an institution is via writing: the letter, the resume and the research and teaching statements. The participants spent time writing and brainstorming to prepare themselves for this first step. Discussions included: what to say, what not to say, how to say it, and how to tailor your statement to the specific institution to which you are applying. This section also included material regarding interviewing. A lighthearted, but open discussion of "sticky" interview questions allowed participants the ability to share experiences, bring up concerns and brainstorm together.



Fig.3 The workshop program includes time for individual writing exercises.

The next step on the path to tenure is the offer. The session on negotiation was enlightening for both the participants and the presenters. Many participants did not realize they could negotiate. Areas where negotiation has been successful went beyond salary negotiations. Strategies and stories of experiences were shared about startup funds, lab space, grace period for service or advising, etc.

The session on research included presenters from various granting agencies and research institutions. These individuals gave participants information regarding the obtaining of funding before and after procuring a position, writing strong proposals, interacting with program officers, differences between federal and non-federal agencies, and issues of patents, technology transfer and ownership.

The session on service addressed various concerns regarding the amount and types of service as well as the varying requirements of service for different institutions. The sessions touched on the types of service that are considered significant, the emphasis or lack of emphasis on service depending on size and type of institution, time commitments, and knowing who to ask about service requirements. Also, this session focused on the ever present and all-important trap to avoid: over-commitment.

The teaching session modeled various pedagogic techniques. The presenter moved between presenting information about teaching styles and using the participants as a mock class. By using this format, participants were able to measure their own reactions and to begin to look at the strengths and weaknesses of some popular teaching techniques as well as issues arising in a time of high technology, incredible student diversity, and non-traditional learners. The participants left with the important questions of teaching: what do you as the student want to know, what do you as the faculty member want your students to know, and how much should each (student or faculty) be expected to bring to the discussion?

Once one is in a tenure-track position (or perhaps before), life issues often arise. The session entitled “Having It All” was a safe place to look at the crosspoints of professional and personal lives. This session included information about dual career situations (what do you do when you and your spouse are in the same profession or same field), having a family before, during and/or after tenure, and having life activities whether or not you have a family. Specific data was presented by the authors of the Report on the Dual-Career-Couple Survey²¹, a survey of couples in physics. Other presenters shared their experiences in searching for faculty positions as part of a dual career couple. And many presenters as well as participants discussed options for balancing family and work responsibilities. Career breaks are also discussed with the aim of crafting a path that would lead back to an academic career after the full-time employment interruption.

The final session of the workshop was a meeting with chairs and administrators from various colleges and universities. This was a very highly rated component of the workshop. Participants were eager for a time and place to ask administrators about situations (how things might be perceived if...) and perspectives. Participants felt it was “safe” to ask questions in this type of setting, questions that they “don’t dare ask” in their own departments.

Details of the workshop program are given on the workshop website: www.seas.gwu.edu/~forward/advance.



Fig.4 Meeting with administrators is a popular activity of the workshop.

A resource list of publications related to the different topics discussed is also available at this website under the “Resource List” link.

3.3 Evaluation

Participants were asked to fill out an evaluation form at the end of each of the three days of workshop activities. The participants were also sent an email evaluation and inquiry six months after the workshop. Telephone interviews of the participants from each of the first two years are currently underway but results of these will not be reported in this paper.

On-site evaluation forms are fairly detailed. They ask participants to rate each session and ask for recommendations for improvement, suggestions on change of focus and content, and suggestions for powerful speakers. They also ask for ratings of the application process and logistics for the conference, accommodations, meals and general programming. The evaluation forms leave space for personal comments on each subject. Participants may recommend colleagues for us to personally invite to the workshop in the following year by furnishing their contact information on the evaluation form. Participants are asked on the first night to state their expectations prior to arriving at the meeting. On the last day they are asked to rate the activities in relation to meeting their needs and expectations.

We also make use of anonymous index cards on which participants are asked to state 1) a single expectation for the three-day event and 2) a life or career goal for the next five years. Some of the responses are shared with the whole group in order to, again, build community and to show participants what their peers are thinking in a non-threatening way. This type of socialization rarely occurs in academic departments. Participants are asked to review their responses at the end of the workshop and indicate whether their expectations were met or not.

A short reflective email survey was sent out to participants six months after the workshop. Participants are asked to recall a single most memorable event of the workshop. They are also asked to relate any specific event in their career that made use of materials or information gained at the workshop. We also inquire about their career progress.

4. Participant Response

The response from participants has been overwhelmingly positive. The following quote is typical of unsolicited emails received after the workshop.

“I must say that the experience has reinforced my decision to enter academia and I feel more knowledgeable about how to proceed. I'm already sharing what I've learned with my colleagues here at MIT and the information is being well received. I'll be sure to keep you posted on my PhD completion.”

In the following data, 40 responses were collected from the participants of both years (2003 and 2004). No appreciable differences were noted in the responses from one year to the next.

In the final day evaluation forms, participants rated the overall workshop experience highly: 4.9/5 (where 1 is poor, 2 fair, 3 average, 4 good and 5 excellent). The organization, the selection of speakers and the activities in relation to meeting the participants' needs and expectations were also highly rated as shown in Table 1. 100% said they would recommend this workshop to their friends and colleagues. And many did! Participants either listed their colleagues' names and addresses on the evaluation form or sent us emails with this information later. We also received emails from participants' friends and colleagues shortly after the workshop asking to be notified as soon as the next year's application process started.

Workshop Component	Average Rating
Organization of the workshop	4.8/5
Selection of speakers	4.6/5
Activities	4.5/5

Table 1: Last day evaluation form ratings of the organization of the workshop, the selection of speakers and the activities in relation to meeting the participants' needs and expectations. Rating system is on a five point scale as follows: 1 is poor, 2 fair, 3 average, 4 good and 5 excellent. Average ratings from 40 responses over years 2003 and 2004 are given.

When, on the last day, participants reviewed their index cards from the first night, and answered the question whether their single listed expectation was met, 94% of the respondents said "yes". These expectations covered a broad range, from specific skills to general improvement in self-confidence, as described by these examples:

- "I would like to learn techniques for not feeling overwhelmed by funding, publication and conference opportunities and requirements",
- "a deeper understanding of the pros and cons of being a professor",
- "encouragement from other women professors and colleagues that it is possible to become a professor and be a mother",
- "I would like to get a renewed sense of empowerment (I'm currently burned out)",
- "improve my job applications".

A key component of the workshop is the inclusion of women at different career stages. As mentioned in some of the participant responses, seeing how other women have dealt with difficult decisions or situations in their career paths provides encouragement to persevere in academia.

Detailed comments on the evaluation forms reflect the high approval rating and sense of empowerment that many participants felt. Some are given here:

- "Probably the most inspiring and confidence building thing I've ever done as far as science goes."

- “Worthwhile overall in terms of time spent - both in terms of things learned and people met.”
- “The reflection activities are fantastic - will really help if I complete the other activities later.”
- “It really changed my view of myself and my possibilities as a scientist (for the better of course).”
- “My key take-aways: collaboration, confidence, set goals, become a world expert in your field, different learning styles.”

The detailed comments also showed that the participants found the workshop experience to be a unique opportunity to find out information about life in academia, as shown by these examples:

- Did the presence of the chairs enhance the session? “Yes. I have a lot of questions but I dare not ask [my chairman].”
- “I came here thinking I had to go into industry because I wouldn’t have a life.”
- “Provides information nowhere else available.”

Informal comments revealed some striking observations. In the negotiation session in the first year, for example, the speaker invited the participants to brainstorm together and make a list of negotiable items for the terms of their tenure-track positions. Many participants commented that they had “no idea” they could negotiate for such things as “graduate teaching assistantships”, space, etc.

As organizers of the workshop, we learned the power of a sincere keynote speaker. Maria Klawe, Dean of Princeton’s Engineering School, gave an honest and sincere keynote speech on the first night of the first workshop. Participants rated her talk 100% excellent at the meeting. Six months later, 70% of the email survey respondents mentioned her talk as one of the most memorable events of the workshop.

5. Outcomes

Several positive outcomes were reported by participants at different polling times. At the workshop, participants reported that the experience of being in a room with so many other women scientists and engineers was very uplifting. Most had never experienced this feeling before.

One year after the first workshop, we received news that one of our participants, a woman of color, had graduated with her PhD in Engineering. She attributed this success to the support she received from workshop participants and speakers and the “telephone bridge” discussion group that continued after the workshop. Before she attended the workshop she was considering dropping out of the doctoral program she was in.

One participant was in a career-interruption, caring for her young children. Through her participation at the workshop, she formulated a job concept for herself and encourages those in full-time career interruptions to help themselves while awaiting their time to get back into the full-time academic setting. She has set up a Career Breaks in Physics

website²² and has written an article on the subject in the American Physical Society's Newsletter for the Committee on the Status of Women in Physics²³.

In terms of success in obtaining tenure-track positions, no final numbers are reportable at this time. However, a recent informal survey (n=15 out of 64) gave the following results:

- 40% of the respondents had applied for a tenure-track position
- 27% were already in or committed to a tenure-track position at the time of the workshop
- 20% were yet not ready to apply (still students or in postdoctoral positions)
- 7% were in non-tenure track but used workshop information to get promotions
- 7% said they were not applying for tenure-track positions and
- some participants indicated at the workshop their intention to switch to a tenure-track rather than non-tenure-track career path.

The workshop speakers themselves reported unexpected outcomes. One presenter from a prestigious university said: "Wow, I never thought I could give a talk like that." (i.e. a non-science talk). Another speaker realized after the "Having It All" session that she had been living in a two-body (dual-career-couple) problem for 30 years! Some male presenters found themselves considering for the first time the very real challenges of women in tenure-track positions. All presenters were very positive about the workshop experience and agreed to return when asked. The presenters were also flexible in working with the organizers to change the content and/or delivery of their workshop components.

The "FORWARD to Professorship" workshop model has been adapted by The University of Maryland, Baltimore County's ADVANCE program for their Faculty Horizons workshop. The Advance Program at the University of Puerto Rico, Humacao is also planning a workshop based on the present model.

6. The Future

The workshop will be held for the third time in May 2005. Some changes will be made to the program based on evaluations at the meetings and responses to the email surveys six months after the meetings. The recommendations were mainly to be more hands-on for certain topics, such as interviewing or negotiation skills, although only a handful of participants indicated this desire. However, since the beginning of our workshop planning, we have also wanted a more practical approach to the negotiation topic. Negotiation experts are, not surprisingly, excellent negotiators and many potential speakers requested a large fee that we could not afford. We continue to work on this dilemma. A planned change for 2005 is to have participants spend more time on the development of a personal career plan.

Due to the "underrepresentation" of certain groups, it has been difficult to find presenters from these groups. While only 10% of our presenters have been from underrepresented groups, we are striving in the third year to increase this proportion. We have chosen a keynote speaker and a second night dinner speaker, both from underrepresented ethnic groups.

The need persists for this type of workshop. Every year we have been oversubscribed and, with a greater percentage of women obtaining PhD's in SEM fields, the request for information and details on how the tenure-track career path unfolds grows. Participants have asked for greater involvement throughout the year. The telephone bridge is one way to achieve this but participants feel a physical rather than virtual meeting would be beneficial. However, time is precious for most SEM academics. Some participants complained that the workshop should have been on the weekend so as not to interfere with their work. Many admitted that they could probably not afford more time during the year devoted to such a gathering. One way to do this might be to have networking sessions at large scientific meetings. However, the breadth of disciplines represented at the FORWARD workshop makes it hard to find a suitable venue.

We hope to help establish and sustain a community of tenure-track faculty in science and engineering from the group of participants from all three workshops. Some of this nurturing is enabled by a telephone bridge where participants can call in and take part in a group discussion. Other efforts are aimed at providing information for professionals taking a career break for family reasons as to how they can keep up some affiliation and reenter the academic scene at a later time.

7. Conclusion

The “FORWARD to Professorship” workshop is a highly rated networking and information-gathering opportunity for women in or interested in tenure-track science, engineering and mathematics (SEM) academic positions. Key to the success of the workshop is a welcoming and open atmosphere where participants feel “safe” to ask any question. The breadth of represented disciplines and levels of career attainment in SEM academics are also important. Finally, a good mix of speakers and topics relevant to *all* the facets of life in academia is necessary. The need for this type of experience is evident and persists. The workshop format can be replicated and adapted. We hope to continue to offer this workshop for many years to come, or until it is no longer needed!

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