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The Women in Engineering Graduate Student Steering Committee at the University of Delaware

Dr. Heather Doty, University of Delaware

Heather Doty is an assistant professor of mechanical engineering at the University of Delaware (UD). Dr. Doty teaches undergraduate courses in thermodynamics, statics, dynamics, and statistics and technical communication, and conducts research on gender in the academic STEM workforce. She is co-PI on UD's NSF ADVANCE Institutional Transformation grant, which aims to recruit, retain, and advance women STEM faculty at UD. Dr. Doty is faculty advisor to UD's Women in Engineering Graduate Student steering committee.

L. Pamela Cook, University of Delaware

Pam Cook is Unidel Professor of Mathematical Sciences and Associate Dean of Engineering for Faculty at the University of Delaware (UD). Her research interest is in applied mathematics modeling and simulation particularly of complex, viscoelastic, fluids. She is PI on the University of Delaware NSF ADVANCE IT grant to improve the representation and leadership opportunities of women among the STEM faculty at UD.

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Abstract

The University of Delaware (UD) has had an active Women in Engineering (WIE) program since the early 2000s. The goal of WIE is to foster a warm climate in which all members of the College of Engineering feel welcomed and can be productive. WIE activities have evolved over the years, but in the last decade most of the programming has been planned and executed by the WIE Graduate Student Steering Committee. Sponsored by the dean of engineering and overseen by an associate dean and faculty advisor, the committee is made up of two women graduate-student representatives from each of the seven engineering departments. The committee plans social, networking, and professional-development activities each semester. Examples include a pizza lunch to welcome new women graduate students, “Meet Your Faculty” lunches, career panels, leadership workshops, external speakers, and themed brown-bag lunches. Most activities are open to all women and men graduate students, postdocs, and faculty.

The committee has a formalized structure. Meetings are led by an elected chair and co-chair; the co-chair becomes chair the next year to ensure continuity in leadership. To improve effectiveness, in recent years the committee has become more structured in its operating procedures. For example, in 2015 the committee initiated an annual half-day retreat to orient new members, discuss challenges, and brainstorm new ideas and activities. In 2017 the committee instituted membership term limits and a common process across departments for nominating new representatives. The committee has developed assessment tools to measure the effectiveness of their work.

This paper will describe the origins and evolution of the program and the committee, committee activities and how they align with program goals, progress, challenges, and future plans.

Committee History and Goals

In 2003, only 7% of the tenured/tenure-track (t/tt) faculty and 26% of the graduate students (master’s and Ph.D. combined) in the University of Delaware (UD) College of Engineering (COE) were women. Noting the situation and realizing it needed improvement, the dean at the time brought over a faculty member from the Department of Mathematical Sciences half time to address issues of climate and equity for women. Prof. Pam Cook, an applied mathematician who had just completed terms as department chair, accepted the dean’s challenge to increase the number of women in the college, especially on the faculty. Starting the Women in Engineering (WIE) program was one of her early actions.

The goals and target groups of the program have shifted somewhat over the years, depending on the leadership of the program and the needs of the college. In this paper we focus specifically on the WIE Graduate Student Steering Committee (hereafter the WIE committee), which focuses primarily on graduate students, postdocs, and faculty. As stated on the WIE website (insert link in final draft), the goal of the program is to promote, mentor, and enable the participation of women students and faculty in engineering studies and the workplace in order to promote a healthy institutional climate for all members of the engineering community at UD. To support its goal, the WIE committee provides activities that bring together women and men engineering students, postdocs, faculty, and administrators, as well as external representatives from industry, government agencies, and other academic institutions. Almost all WIE activities are open to men as well as women.

WIE Activities

WIE activities are distributed over the academic year, usually 3-4 per semester. Activities fall into three categories: professional development, networking, or community building.

Professional-Development Activities These activities are designed to build professional skills. Many are led by UD faculty or staff. For example, UD COE faculty have hosted WIE brown-bag lunches on topics including communicating in the STEM workplace, handling rejected papers or proposals, implicit bias, and impostor syndrome. We have collaborated with our university's Office of Career Services to provide workshops on preparing professional resumes and interviewing for jobs. We have partnered a number of times with UD's Office of International Students and Scholars (OISS) to provide a workshop for international students on the visa process after they graduate¹. Finally, while most WIE activities are focused on grad students, we have assembled panels for undergraduates on engineering graduate school: why they may be interested, what are the benefits, what it is like to be a graduate student, and how they should prepare.

We also bring in external speakers to lead professional-development workshops. Examples include one on using social media to build your professional identity and expand opportunities; an AWIS (Association for Women in Science) workshop on work-life satisfaction; and a leadership workshop for STEM graduate students, focusing on communications and negotiations. These external workshops are among our most expensive activities, but they are well worth it. Registration tends to fill quickly, which indicates an ongoing need for this type of information. Post-event surveys of participants indicate a high level of satisfaction.

¹ The workshop for international students was so well attended each year that OISS started offering it regularly throughout the academic year. It is therefore no longer on WIE's annual calendar.

Networking activities provide students the opportunity to meet and learn from role models. These events tend to center on hearing people's stories. Our signature networking activity is an annual career panel, which brings engineers from across the country to campus to talk to students about their jobs and career paths. Panelists provide brief introductions, but most of the session is reserved for audience questions. The discussions are always lively and appreciated by the students.

Another example of a networking event is our "Meet Your Faculty" lunches. Committee members invite two women faculty members per lunch to lead an informal discussion on a topic of their choosing. Conversation tends to center on faculty's career paths, work-life balance, and strategies for an academic career. We are intentional in how we pair faculty, taking into consideration factors such as research discipline, seniority, and anticipated comfort level in leading conversation. The two faculty are chosen from different departments to broaden the appeal of the event to a greater number of students. "Meet Your Faculty" lunches tend to be very well attended. Some have been limited to women, while most have included men as well. Discussions can get quite intimate, depending on the questions asked and the course that the conversation takes.

Finally, we bring in external speakers to give seminars, often co-sponsored with other groups such as UD's NSF ADVANCE Institutional Transformation grant team. Examples from the past several years include Dr. Gilda Barabino (currently dean of engineering at City College of New York), Dr. Kate Stebbe (Richer & Elizabeth Goodwin Professor of Chemical and Biomolecular Engineering at U. Penn), Dr. Judith Singer (James Bryant Conant Professor of Education Senior Vice Provost for Faculty Development and Diversity, Harvard), and Ms. Jean Norvell, Former Product Specialist with W.L. Gore & Associates. Often speakers meet with students over lunch or dinner before or after the talk.

Community-building activities are intended to incentivize grad students, postdocs, and faculty to take a brief amount of time away from work to come together, socialize, and meet new people. Our largest community-building activity of the year is the annual pizza lunch, where we welcome new women graduate students and faculty to the college and give them an introduction to WIE. This is the only event of the year limited to women only. All women WIE committee members personally invite new women graduate students from their departments and walk the new students to the lunch to make sure they know where to find it. Ice breakers get people mingling before lunch begins. Participants then sit for lunch while the committee does a brief presentation describing WIE and its activities. The event finishes off with a team-based trivia competition (with prizes) that gets people talking and laughing with others at their table.

Other social events during the year are intended to sustain and build upon connections formed at the pizza lunch. These events, which include coffee breaks and an ice cream social, are open to

men as well as women. It is significant that the coffee breaks (usually one per semester) are co-sponsored by COE departments. This co-sponsorship ensures that the department chairs are invested in and “reminded” of WIE every so often.

Community-building activities also include training sessions for WIE committee members and their colleague on ways to improve the climate and inclusion of traditionally marginalized groups. An example is an LGBTQ+ ally training that UD’s Office of Equity and Inclusion provided to a small group, at the request of the WIE students.

Some community-building events reach beyond the College of Engineering. For example, the WIE graduate students partnered a couple of times with the UD chapter of the Association for Women in Mathematics (AWM) graduate students for wine tasting to celebrate the end of the fall semester. Students enjoyed meeting other women in STEM and sharing stories of their common and different experiences in different colleges.

Committee Operational Practices

The WIE program has been very successful in sustaining and growing since its formation in 2003, in large part due to the WIE committee’s formalized operating practices. The committee is comprised of two women graduate student representatives per department. The committee had 10 members when it was first formed, but now has 14 (computer and information sciences and biomedical engineering became part of the COE in 2010). The committee is co-advised by an associate dean and a COE faculty member (the authors of this paper currently serve in these roles). The program is largely funded by the dean, who provides an annual operating budget. In recent years, WIE funding has been supplemented by an endowment and alumni gifts.

WIE committee members are nominated for the committee by their department chairs. This nomination process ensures departmental support of the work of the committee. Committee members understand that they are representatives of the dean’s office, and as such they take their roles seriously. The WIE committee meets 2-3 times per semester. Meetings are spent reviewing recent events--what went well and what improvements should be made in the future--and planning upcoming events. We deliberately hold meetings over the lunch hour and provide the meal, which we find increases the students’ availability and incentivizes their attendance.

For the last three years we have held a half-day retreat in the summer or early fall to orient new members, to reinforce the mission of the program and the reason for its existence to all members, and to brainstorm new activities. We cover statistics on women’s representation in various fields at UD and nationally and the role that implicit bias or associations plays in women’s professional experiences in STEM. The first two years the faculty advisors prepared this background information, but the last year the chair and co-chair were eager to do the presentation to their

peers. The retreat is a great bonding experience for the students, who work closely together during the years that they serve together on the committee.

Roles

Departmental Representatives General members of the committee are responsible for carrying out the work of the program, including planning events. Tasks include, for example, choosing event dates, working with a staff assistant to identify and reserve appropriate space and to order catering, working with faculty advisors to book and confirm speakers, developing and distributing advertising flyers, and taking pictures at events. Faculty advisors and staff assistants are available to help and advise, but the students are the ones who do most of the work.

In addition to planning events for the UD engineering community, all department representatives are liaisons, or points of reference, for other women in their departments. Similar to an ombudsperson, WIE members are available to provide their peers guidance or information, or a link to a supportive faculty member. WIE committee members have in the past made critical connections between a student and the dean's office, resulting in interventions that improved the student's situation.

Officers The committee elects officers, including a chair, a co-chair, webmaster(s) and publicist(s). The role of the chair is to plan and lead committee meetings. She prepares meeting agendas, reserves rooms for meetings, and makes sure lunch is ordered. The co-chair assists the chair as needed, takes and circulates meeting minutes, and produces a WIE newsletter each semester. The chair and co-chair together plan the annual pizza lunch.

Other elected officer positions include the webmaster and publicist. The webmaster keeps the WIE website updated with the names, photos and contact information for departmental representatives, a listing of upcoming events, and a history log, including pictures, of past events. The publicist is responsible for developing and stewarding materials such as WIE banners and posters, bookmarks, and other branded giveaways used to publicize the committee and its work.

Advisors The associate dean is the liaison between the WIE committee and the dean's office. She keeps the committee informed of relevant opportunities and activities from the dean's office. She identifies and invites external speakers, especially those who are especially senior or high profile. She mentors and supports the committee members and provides perspective to the group as an administrator and senior faculty member. The faculty advisor supports the students with the day-to-day operations of the committee. She attends all meetings and advises as needed on event planning. She manages the committee finances and interfaces with college staff, such as the communications team, which designs posters and other materials for the group.

Sustainability

A key to the committee's success is its built-in approach to training members for their roles. For example, each WIE event is led by a team of two committee members—one with experience and one without. The experienced member trains the other, who then becomes the experienced member the following year. Most graduate students do not have experience in event planning when they join the committee, and this training technique has worked well. Officers are similarly trained. When the co-chair is elected, it is understood that she will become chair the following year. She therefore receives a year of training in a leadership position before she takes on full chair responsibilities.

Program Assessment

For much of the committee's history, assessment of the program has been informal. Committee members tracked attendance at events and asked their friends and colleagues what they thought went well and what didn't, and reported back at WIE meetings. In this way the committee developed a sense of which activities and events were valuable to the community and which weren't. In the last two years, the committee has collected formal feedback via post-event surveys, which allows them to collect data over time and analyze the success of various programs more systematically.

	<i>Today's event was relevant for me on a personal and/or professional level.</i>	<i>I learned something new and worthwhile today.</i>	<i>This event was worth my time</i>	<i>I would recommend this event to my colleagues.</i>	<i>I gained useful advice today that will be informative for my career.</i>
Pizza Lunch (N=36)	4.4	4.6	4.6	4.9	N/A
External Speaker (N=16)	4.8	4.9	4.9	4.9	4.8
Panel on Global Women (N=10)	4.0	4.6	4.6	4.4	N/A

Table 1 Assessment data indicating positive results from three WIE events during the Fall 2017 semester. Participants were asked to indicate their agreement with the listed statements on a scale of 1 (low agreement) to 5 (high agreement). Numbers in the table are mean responses.

Early data indicate that WIE events are valuable to the community. For example, we collected feedback at three events during the fall 2017 semester: the annual pizza lunch, an external speaker, and a panel of international women talking about being scientists. Participants were asked to indicate their agreement with a number of statements on a scale of 1-5, where 1 indicates low levels of agreement and 5 indicates strong agreement. Table 1 above summarizes the feedback. The numbers in the table are mean responses (out of 5) for each survey question.

The survey response rate is approximately 50% for each event. The quantitative data indicate a high level of satisfaction with the events (average responses range from 4.0 to 4.9).

Qualitative data support and enhance our understanding of the numerical ratings. Most comments from the pizza lunch were themed around the value of meeting new colleagues. An example is: “[The highlight of the event was] getting to know a lot of people and fellow women engineers...”. Feedback on the external speaker largely focused on the speaker’s compelling life story and talent as a storyteller. One attendee wrote, “[A]s a fashion student, thank you for bringing together arts and engineering.” Feedback on the panel of global women focused on what attendees learned from the panelists’ experiences. An example is: “Great insights into a diversity of cultural backgrounds.”

Write-in comments also offer helpful feedback on how we might improve our events. For example, common suggestions indicate that we need to provide microphones for panelists and allow more time for informal discussion with guest speakers. We are incorporating this feedback already into our spring-semester planning.

Evolution of the WIE Program

Program emphasis WIE programming has evolved over time. In response to informal and formal assessment of the program, the WIE students have chosen to decrease the number of social/community-building activities in favor of professional-development and networking events. Coffee breaks get people out of their labs for a half hour, and it keeps the departments involved, but we notice that people tend to come with groups of friends and not mix with others. Although WIE students have tried to organize small activities designed to increase networking, there remains the perception that the coffee breaks are nothing but free coffee and cookies. The WIE committee prefers to be known for hosting events with practical and tangible benefits. They want to provide activities that help students build skills that will help them get jobs. They want to meet practicing engineers who may advise their careers. We still do at least one purely social coffee break per year, but in recent years we have paired the annual ice cream social with another event (e.g., a panel or speaker), to keep the focus professional.

In the last year we have themed some of our programming around multicultural awareness. Like many engineering schools in the U.S., we have a large population of international graduate students, many of whom have been negatively impacted by the actions and attitudes



Figure 1 WIE committee members and guest musicians at a Nowruz-themed coffee break

of our current U.S. administration. This year we hosted two events intended to bring people from different countries together to learn about each other's cultures. A coffee break honored Nowruz, a celebration of the rebirth of earth celebrated in a number of Middle Eastern and other cultures. This well-attended coffee break featured traditional cookies and music (see picture on the previous page). In the fall WIE assembled a panel of international women students and faculty for a discussion entitled, "Global Women Talk Global Science."

Increased budget Notably, over the last several years enhanced alumni gifts and an endowment to the WIE program have allowed us to expand our offerings. For example, we are now able to fly engineers and scientists in from across the country for our career panel. In the past we'd been limited to the local geographic region, which made it difficult to recruit engineers in some fields (e.g., electrical engineering). With our increased budget, in the last few years we've been able to bring in engineers from Texas Instruments and from NASA and arranged for WIE students to have lunch with the panelists for some extra networking time. Similarly, we now offer funding for women graduate students to meet over lunch or coffee with women speakers who come to campus for departmental seminars.

Increased funding has also allowed us to start a "mini grant" program, which we distribute on a proposal basis to women engineering students, postdocs, and faculty. Through this program, we have, for example, funded undergraduate and graduate students to attend and present at conferences and extra living expenses for students doing internships. We require mini grant recipients to write a brief report after their travel letting us know about the experience. Students are always grateful for the travel support that allowed them the professional and networking experience. One former Ph.D. student made the contacts that led her to her current job as an assistant professor at a conference that WIE paid for her to attend. The mini grant funds are not large, but they have the potential to make a positive impact on women's careers.

Operational Changes The coherence and efficiency of the WIE committee ebbs and flows over time. As more departments have joined the COE and the WIE committee has grown, it has become more difficult to train new members and organize in general. For a while membership was turning over quickly and key pieces of information were being lost. The built-in training method was failing and new members were feeling lost and unprepared. In response, we made a number of organizational and structural improvements. We developed written guidelines for how the committee operates, including explicit description of the role and expectation of the WIE representatives. For example, WIE representatives are expected to attend all WIE meetings and events (unless they are traveling or are in class, etc., in which case they are expected to notify WIE leadership of their anticipated absence). We instituted term limits so that we could better anticipate and plan for membership turnover. We provided written instructions and lists of resources and contacts for WIE event planning. We review procedures and expectations at the annual retreat and store everything in a Google folder shared by all members of the committee.

We keep an ongoing log of information for events (e.g., type and quantity of food ordered, whether it was enough or too much, etc.) to make it easier for planning in future years. The process we have developed needs further refinement, but in general it has helped a lot. WIE students feel more informed and supported in their role and tasks are being completed efficiently.

Conclusion: Challenges and the Future

WIE has been an active, successful, and growing program since it started in 2003. However, the percentage of graduate students in the COE who are women has remained at around 25%. During this same time the percentage of women among the faculty has increased from 7% to over 20%. It is clear that more work needs to be focused on recruiting women into our graduate programs. At this point, it is difficult for WIE to have much influence over recruiting, which is done within the departments. In some departments WIE students help by hosting prospective students during campus visits, but we would like to be seen as more of a resource for all departments. One of our ongoing challenges is to involve the departments more in WIE activities (and vice versa--to integrate our work better into the departments).

Something that may help is that in 2016 the College of Engineering formalized an administrative structure to improve diversity in the college. We now have an associate dean for diversity and a number of working groups, including one focused on graduate student diversity. The WIE committee faculty advisor and the graduate student chair are both members of this group, which meets monthly. The regular meetings allows WIE leaders to inform, learn from, and collaborate with others, including departmental directors of graduate programs. As the working group coheres and gains momentum, we hope that aligning our work with others in the college will make a difference in strengthening and diversifying our graduate programs in a number of respects, including race and ethnicity as well as gender. We hope also to collaborate with this group to enhance data collection and analysis college-wide to look more closely at recruitment and especially retention trends among graduate students.

Future Ideas for the future that come up regularly include initiating some sort of WIE award(s), actively partnering with other groups across campus (this is happening now to some extent), and promoting diversity across campus in areas beyond gender. We are continually challenged by the amount of work it takes to provide high-quality events (work that the WIE committee members commit to on top of their coursework and research). At the same time, we find that it is getting more difficult to convince participants that we what offer is worth taking some time away from work. We strive to recruit a diversity of panelists, speakers, and presenters over the course of the year, appealing to all disciplines in the COE so that everyone has something to attend. We have begun using social media (mostly Facebook) to advertise and build community, which we think is helping. We make a constant effort to make all members of the COE community feel included in our events, not just women. Other challenges include access to postdocs, who are not tracked systematically and can unintentionally be excluded from invitations.

From the advisors' perspective, we are confident that WIE contributes to an improved climate in the college. We work closely with the fourteen representatives each year, getting to know them, mentoring them, and teaching them. We have received a number of notes from former representatives thanking us for our contributions to their experience at UD, testimonials to the power of the community that exists within the committee itself. WIE representatives have a high retention and graduation rate (we are aware of only one former WIE representative who left the university without earning her intended degree). We know of a number of former representatives who are working in academic and industrial engineering positions across the country and internationally. Some have returned to campus to serve as panelists for the WIE Career Panel. Whether or not any individual WIE event serves the needs of the broader UD engineering community, we know that the program as a whole is a strong positive influence on those women students who participate most closely. In a population so small, each one matters.