

Penn Engineering Diversity Plan

May 31, 2012

1 Introduction

Penn Engineering remains strongly committed to initiatives that support the University's efforts to achieve an educational and employment environment that is diverse in race, ethnicity, gender, sexual orientation, interests, abilities and perspectives. Penn Engineering exemplifies the University's commitment to diversity outlined in the Penn Compact. We strive to attract a diverse community of students and faculty, to provide an accessible, rigorous engineering education, and to improve our local and global communities through engineering.

We recently went through a thorough review of the diversity in the school and the effectiveness of existing programs. This document outlines the efforts and measures we plan to undertake to further improve the diversity throughout the Penn Engineering faculty and student body.

2 Faculty

Penn Engineering compares favorably with other peer institutions in the hiring of female faculty. It is worth noting that two of the six department chairs are women. Women are also prominently represented on school and university committees and lead three of eight research centers. The fraction of African American/Black, Native American or Alaskan Native, or Hispanic Latino is less than 6%. Although disappointing, this percentage is not too different from the number at other engineering schools. Anecdotal information on representation of Lesbian, Gay, Bisexual and Transgender (LGBT) faculty shows that we are well represented in the faculty and within the leadership of the school.

2.1 Faculty pipeline

The education and training of leaders in engineering and technology is an important component of Penn Engineering's mission. In this regard, it is important to increase the participation of women and underrepresented minorities in the field of engineering, to broaden the pipeline so that a wide range of people can take advantage of the intellectual and economic opportunities that these fields provide. We must accordingly place emphasis on the broadening of the pipeline at all levels: (a) undergraduate students; (b) graduate students; (c) postdoctoral fellows; and (d) assistant, associate and full professors. Efforts to establish and strengthen the pipeline will increase the number of people who are prepared for graduate work or faculty positions and will benefit the field at large and ultimately benefit Penn Engineering by diversifying the workforce.

Our efforts to increase diversity will have five facets:

1. Identifying people with the right skills who can benefit from our educational and research programs

2. Recruiting candidates to our programs and our school
3. Training students to maximize their capabilities
4. Mentoring students and faculty to make sure that they are aware of the opportunities that the field affords and that they are prepared to compete for them.
5. Outreach to middle/high school students to demonstrate the value of STEM Careers for women and underrepresented minorities.

Penn Engineering proposes establishing a standing Faculty Diversity Committee (FDC) which will be charged with advancing our efforts in the area of diversity. The committee will meet regularly and will closely monitor and review relevant statistics regarding our school including:

- The number of women and URM who applied, were admitted, matriculated and graduated from our undergraduate programs
- The number of women and URM who applied, were admitted, and participated in relevant REUs (Research Experience for Undergraduates) in Penn Engineering
- The number of women and URM who applied, were admitted, matriculated and graduated from our graduate programs.
- The number of women and URM who applied for faculty positions, the number who were offered positions and the number who accepted those offers.
- The number of women and URM who entered STEM higher education (not just at Penn) as a result of outreach efforts

A number of programs which specifically address the goal of broadening participation are already in place in the school and a few of these are briefly described below.

2.2 Faculty Searches

The relatively small numbers of underrepresented minorities in the overall applicant pool and the fierce competition between top engineering schools and industry for the most highly qualified candidates pose significant challenges in our efforts. Our school-wide standing faculty committee, which will consist of diversity advisors from each department, will address these challenges. The chair of the committee will serve as the School's diversity officer. Each departmental diversity advisor will be an ex-officio member of that department's search committees to ensure that all search procedures are followed in a broad manner in efforts to attract a more diverse pool of applicants. The committee will develop procedures and best practices related to faculty diversity and oversee the collection of diversity-related data on departmental faculty searches as a metric for measuring our progress in increasing diversity. In addition, the school will raise funding for six target of opportunity hires in the next three years to advance the strategic objectives of the school.

2.3 Faculty Mentoring and Development

Penn Engineering has established guidelines for faculty mentoring. These mentoring guidelines

mostly focus on untenured faculty. They involve the assignment of a mentoring committee for each junior faculty and the committee reports to the chair. We will formalize these guidelines and create a policy for all departments to provide uniformity in our mentoring practices. Mentoring will be broadened to include tenured associate faculty and even full professors if they feel the need for it.

The Deputy Deans for Research and Education will organize workshops will address promotion guidelines, tips on prioritizing teaching, service and research, and faculty leadership. In addition, the Deputy Dean for Education will organize an Engineering Faculty Teaching Forum that brings together faculty to discuss a wide range of issues connected to teaching and learning.

Finally, it is necessary to establish a university-wide resource to help spouses/partners of faculty candidates find jobs. Often department chairs do not have the resources to play “head-hunter.” Even if they do have the connections to companies and universities, these connections are primarily in engineering. A university resource would help us recruit candidates by providing their spouses/partners with employment opportunities in the Philadelphia area, including within the university.

2.4 Increasing Diversity in Hiring Faculty

The FDC, which is charged with advancing our efforts in the area of diversity, will work within their departments to ensure faculty searches are conducted in more broadly defined areas, rather than in narrowly focused, specific research foci. This will increase the number of persons from underrepresented groups in the applicant pool.

The school will also make available funds for retention of women and underrepresented minority faculty.

Greater effort will be made to recruit underrepresented groups by explicitly communicating the University’s support for a diverse faculty during the candidate’s visit. This will be facilitated by departmental Diversity Advisors, faculty who are knowledgeable about the University’s procedures, benefits, and programs that specifically support diversity and who are able to draw in other members of the Penn community who may be able to help in the recruitment.

We will encourage the University to establish a university-wide resource to help spouses/partners of faculty candidates find employment. A university resource would help us recruit candidates by providing their spouses/partners with employment opportunities in the Philadelphia area, including within the university.

3 Students

The fraction of women in our undergraduate student population is rising steadily and at a little below 35%, this number is well above national averages. Our numbers are particularly impressive in computer science, electrical engineering and mechanical engineering which have

traditionally been male-dominated disciplines. An area of concern for us is our limited success in recruiting African American/Black and Hispanic Latino students.

3.1 Mentoring and Training Students

Penn Engineering is dedicated to doing more for all its students with special attention to underrepresented minorities and women. Career development seminars, workshops on applying to faculty positions, and short courses that teach students to lecture will benefit all students, while serving underrepresented minorities and women.

3.2 Support of Women

Penn Engineering has established many efforts in recent years to support and advance women in engineering. Advancing Women in Engineering (AWE) runs programs designed to attract female students to science in engineering as well as programs that help with recruitment and retention of students. In particular, the Girls in Engineering, Math and Science (GEMS) Camp, a one-week hands-on summer program for girls entering 7th-9th grade is very successful. AWE runs a pre-orientation for incoming women engineering students. Tracking these students we have found that women who participate in pre-orientation are less likely to transfer out of Penn Engineering than women who do not participate.

There are several recent successful initiatives in the department of Computer and Information Science. The Women in Computer Science (WICS) conducts a daylong program for young women in high school that allows them to explore computer science as a possible field. A National Center for Women and Information Technology (NCWIT) daylong program for high school teachers and guidance counselors helps them encourage female students to pursue careers in computer science.

Every department now has a Grace Hopper lecture series that attracts women in leadership positions in academia and in industry.

The student-run Society of Women Engineers (SWE) is very active in the school. Last year SWE started Girls in Engineering And Related Sciences (GEARS) Day for high school students. This daylong program offers hands-on workshops for students to get an introduction to different engineering fields. In addition to the workshops, the high school students get to meet and ask questions of professional members of the Philadelphia SWE chapter in addition to the undergraduates in SWE.

AWE and SWE also offer a peer mentoring program. Students are broken up into groups of 3-5 students. Each group generally has a freshman, a sophomore or junior, and a senior or graduate student. This allows for mentoring to happen on multiple levels and gives many students the opportunity to be both a mentee and a mentor within the group. In addition to our monthly large group meetings with the mentors and mentees, each group is encouraged to meet on their own.

3.3 Support of Underrepresented Minority

Penn Engineering's office of Multicultural Programs is the main organization for providing support for URM students at Penn. This office coordinates the Philadelphia Region Louis Stokes Alliance for Minority Participation (AMP), which provides undergraduate research experience to motivate minority students to graduate studies in a STEM field.

Penn Engineering is the site for a number of undergraduate research programs. While admission to these programs is broad-based, there is a special focus on attracting URM students. In particular, there are three programs that receive external funding for undergraduate research:

- Nano-Bio Interface Center (NBIC)
- General Robotics Automation Sensing and Perception (GRASP) Lab
- Summer Undergraduate Fellowship in Sensor Technologies (SUNFEST)

Student-run societies including the Society of Hispanic Professional Engineering and the National Society of Black Engineers are quite active in the school.

The Academic Programs Office in Penn Engineering also organizes a number of outreach programs targeting elementary, middle and high school students. Recent efforts have led to many outreach programs in the Philadelphia school district in which over 75% of the students are URM. Two student service clubs, Engineers Without Borders and CommuniTech, run mentoring programs for Philadelphia middle and high school students throughout the academic year.

The GRASP Laboratory runs the Penn FIRST LEGO League competitions in coordination with the Academic Programs Office, attracting 50 teams from middle schools in Philadelphia/Camden/Southeast PA region for the annual championship tournament, and engaging hundreds of teams in regional qualifiers. This includes training to the coaches and teachers involved in mentoring students, and deploying undergraduates to mentor teams. GRASP also runs a mentoring program for University City high schools to help students with challenges in programming, mechanics, electronics, design and robotics.

Research centers such as GRASP and NBIC organize events designed to publicize research and educational programs to high school students. The GRASP National Robotics Week Open House attracts over 200 students and teachers from the Philadelphia area. NanoDay at Penn is an annual event offering demonstrations on nanoscale science and engineering and guided tours of labs.

3.4 Recruiting URM and Female Graduate Students

The Associate Director for Graduate Admissions in the Academic Programs Office attends

recruiting events annually: National Society of Black Engineers (NSBE) National Conference, Society of Hispanic Professional Engineers (SHPE) National Conference, Mexican American Engineers and Scientists (MAES) Symposium, National McNair Scholars Research Conference and Graduate School Fair, American Indian Science and Engineering Society (AISES) National Conference, Advancing Hispanics/Chicanos & Native Americans in Science (SACNAS), Grace Hopper Celebration Annual Meeting, and both the national and regional conferences for the Society of Women Engineers. In addition, the Academic Programs Office participates in a weeklong trip to the University of Puerto Rico along with several Ivy+ universities. An additional outreach effort includes participation in the Leadership Alliance Summer Research-Early Identification Program to recruit more students of underrepresented backgrounds to Penn Engineering's summer research programs.

The REU and other summer research programs are important vehicles to attract minority students to Penn through which we are able to recruit many top students to our graduate programs.

We plan to work with the office of the Vice Provost for Education to plan faculty visits to HBCU institutions and establish research collaborations that will allow us to recruit outstanding undergraduate students to summer research programs and later to our doctoral programs.

3.5 Increasing the Diversity of the Student Body

We propose three initiatives to help increase the diversity of the applicant pool, and the yield and retention of URM candidates.

First, we propose to make available introductory math, physics and engineering courses through online education tools like Coursera (www.coursera.org/penn) to students who may not have the opportunity to take the courses at their high schools. We are already teaching introductory calculus courses that are accessible to juniors in high school interested in engineering. We will invest in courses in mechanics and in introduction to engineering to attract students to Penn and to make it possible for students to take advanced courses and “level the playing field” across different high schools.

Second, it is necessary to increase our investment in the Penn Pre-Freshman Program (PFP) that allows engineering students to take math and physics courses that they may not have had the opportunity to take in their high schools and get acclimatized to Penn. The number of available seats in the PFP needs to be increased by a factor of two or three to accommodate all the students who need the program.

Third, we will design a program for underrepresented minorities that will include a pre-freshman, non-academic experience similar to that provided by AWE.

All three programs are critical for increasing the diversity of the student body and will require investment by the University as well as the School.

At the graduate level, there is a need to increase the funding for fellowships available to underrepresented minorities to encourage faculty to take risks with applications from students that show great potential for success, but may not be as well prepared for graduate school as others who may have attended better undergraduate institutions.

4 Conclusion

Penn Engineering students, faculty and staff are dedicated to attracting, retaining and serving diverse populations across the world. It is our intention that the Diversity Plan will continue to evolve as we assess our progress and adapt new ideas and programs that will strengthen diversity throughout the faculty and student body.