

Moving Towards Data-Driven Departmental DEI

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Motivation and Background

Faculty and staff can and do influence the climate of a department and achievement of students. Research shows the positive effects of choosing to implement evidence-based teaching practices like active learning and inclusive teaching [1], and having a growth mindset in relation to the abilities of students [2]. However, research also shows that the local climate in a department could cause students of color to be driven from STEM [3], or that a chilly climate could have a disproportionate impact on female students [4]. And while the focus of Diversity, Equity, and Inclusion (DEI) efforts tends to be on women and under-represented minorities (URMs, defined as non-white, non-Asian), populations with representation at or above the demographics of the general population (typically Asian and Jewish students) face their own challenges [5], [6]. Additionally, part of supporting all students includes not alienating majority populations. In this paper, we provide an update on recent efforts in the Mechanical Engineering and Applied Mechanics (MEAM) Department at the University of Pennsylvania (UPenn) to address these issues. Most of our initial efforts in this area have focused on the undergraduate population as well as its intersection with faculty and staff [7]. More recently, MEAM has formalized a “DEI Scholars” program in which both undergraduate and graduate students are active participants in our DEI efforts and receive funding for their work. Our goal is sharing these early efforts may encourage others to take on similar endeavors, and will also provide a reference point for future work of ours in this area.

Demographics

The updated demographics of the MEAM department undergraduate student body (Table 1), graduate student body (Table 2), and full-time faculty and staff (Table 3) are shown below. This includes recent hires that started in January 2022.

Table 1: Current demographics of undergraduate student body. Note that unreported refers to only race/ethnicity.

| | Freshman | Sophomore | Junior | Senior | Totals |
|--------------------------------|----------|-----------|--------|--------|--------|
| Total | 63 | 59 | 64 | 58 | 244 |
| Male | 42 | 39 | 47 | 36 | 164 |
| Female | 21 | 20 | 17 | 22 | 80 |
| American Indian/Alaskan Native | 0 | 0 | 0 | 0 | 0 |
| Asian or Pacific Islander | 24 | 21 | 20 | 23 | 88 |
| Black, non-Hispanic | 3 | 1 | 5 | 4 | 13 |
| Hispanic | 5 | 3 | 5 | 2 | 15 |
| White, non-Hispanic | 24 | 29 | 24 | 22 | 99 |
| Other | 0 | 0 | 0 | 0 | 0 |
| Multiple race-ethnicity | 4 | 1 | 7 | 4 | 16 |
| Unreported | 3 | 4 | 3 | 3 | 13 |

Table 2: Current demographics of graduate student body. Note that unreported refers to only race/ethnicity.

| | Graduate |
|--------------------------------|----------|
| Total | 207 |
| Male | 172 |
| Female | 35 |
| American Indian/Alaskan Native | 0 |
| Asian or Pacific Islander | 116 |
| Black, non-Hispanic | 4 |
| Hispanic | 3 |
| White, non-Hispanic | 64 |
| Other | 0 |
| Multiple race-ethnicity | 15 |
| Unreported | 5 |

Table 3: Current demographics of full-time faculty and staff. Tenured faculty include associate and full professors, tenure-track faculty are all assistant professors. Non-tenure-track faculty include lecturers, senior lectures, and professors of practice at all levels (assistant, associate, full). Race/ethnicity data at the department level was not available at the time of submission.

| | Tenured & Tenure-track Faculty | Non-tenure-track faculty | Staff |
|--------|--------------------------------|--------------------------|-------|
| Total | 24 | 7 | 10 |
| Male | 19 | 5 | 6 |
| Female | 5 | 2 | 4 |

The demographic data for the School of Engineering and Applied Sciences (SEAS), within which MEAM is one of six member departments, is available on line as of 2021 [8].

Mission

MEAM formed a DEI Task Force in 2020. The overarching goal of MEAM’s DEI Task Force is to realize sustained action on diversity, equity, and inclusion across all aspects of MEAM, including undergraduate and graduate education, research trainees, faculty, and staff. The task force engages with the MEAM Department to help move the department from being reactive to proactive on DEI challenges and issues, and to make MEAM a leader among all ME Departments in overcoming DEI challenges.

The specific objectives of the task force are:

1. To identify and address key issues related to DEI in MEAM now and throughout the year
2. To develop a longer-term action plan for DEI in MEAM by studying and learning about the issues; developing solutions including by learning from other departments and institutions; and charting a course for MEAM to take to greatly improve diversity in MEAM and to foster a fully inclusive culture and an equitable community and faculty and staff.

To accomplish this, the Task Force is pursuing a multi-pronged approach that includes the following themes.

1) Build community (Focus: Undergraduate students)

The culture and community of the department plays a critical role in retention, graduation and achievement of the students. Through various events, both curricular and extracurricular, the Task Force aims to build community by increasing interactions between students, faculty, and staff at all levels. The goal is to make all students, regardless of gender, race, or socio-economic status feel welcome, heard, respected, and able to reach their full potential.

2) Support faculty professional development (Focus: Faculty)

As mentioned earlier, implementing evidence-based teaching practices like active learning and inclusive teaching [1], and having a growth mindset in relation to the abilities of students [2], leads to better student outcomes.

3) Implement & revise departmental support structures (Focus: Faculty & Staff)

Representation matters, as do institutional support structures. Issues ranging from hiring to undergraduate awards will be under scrutiny to make sure our efforts as a faculty support a diverse student body

DEI Scholars

Towards the end of 2021, the MEAM DEI Task Force focused on getting more student input to better enable the first theme of building community above. However, since the Task Force did not want to ask already overwhelmed students to commit to unpaid labor on behalf of the department, and contribute further to the well-known “minority tax” [9] (in this case, for students), the Task Force decided on a DEI Scholars program in which students would receive a grant in exchange for their ideas, work, and leadership. This idea was directly inspired by the success of SEAS’ Electrical and Systems Engineering Department initiating such a program the previous year. The full application can be seen in Appendix A. The initial goal was to fund up to three \$2,500 scholarships over the 2022 calendar year (or half awards of \$1250 for those whose time remaining at Penn was only one semester). DEI Scholars would pursue a project to advance DEI efforts in MEAM, and would become full members of the MEAM DEI Task Force. However, there were so many applicants (19 in total) and good ideas, that another stage was added to help narrow down the applicant pool (see Appendix B for follow-up communication). Again, the Task Force was faced with several strong applications that could be roughly sorted into three themes: 1) Mentoring programs, 2) A DEI minor, and 3) Recruiting & community building. The Task Force decided to award three \$2,500 scholarships to the three strongest applicants (DEI Scholars) but also chose to award smaller grants of \$250 each to one or more “DEI Associates” whose proposals fell in the same general thematic area as the DEI Scholars to create small teams of students aligned with the same goal. Additional volunteers for each team will be solicited to broaden participation. The Task Force also assigned a faculty mentor to each of the student teams. The group of DEI Scholars and Associates will form the new MEAM DEI Student/Postdoc Advisory Board.

Future Plans

As mentioned in our earlier publication [7], to find out if any of these DEI efforts work, the Task Force needs to look for evidence they work [10]. With the DEI Scholars program and some new faculty hires in place, the DEI Task Force will be able to work towards making progress on the other branch of the mission: faculty professional development. A broader goal of this effort is to track the evolution of the climate in the department as well as the demographics of the students, faculty, and staff. Although the numbers in Tables 1-3 provide a baseline description of the composition of the department at this point in time, this is really a snapshot of a dynamic and evolving population that would likely be better captured through ecosystem metrics [11]. Through this and many complimentary efforts, the Task Force plans to put in place a framework through which students, faculty, and staff can co-create a climate that fosters access and inclusion and leads to retention and success for all students.

Appendix A: MEAM Diversity, Equity, and Inclusion Scholarship Application

Thank you for your interest in promoting Diversity, Equity, and Inclusion within the MEAM Department! We are currently seeking undergraduate students, graduate students, and postdocs to serve as the inaugural class of Diversity, Equity, and Inclusion (DEI) Scholars.

DEI Scholars will receive a grant in the amount of \$2,500. DEI Scholars are expected to attend MEAM DEI Task Force biweekly meetings usually (1 hour in length) and dedicate at least 1 hour/week to DEI initiatives.

DEI Scholarship application deadline is Friday, November 5th, 2021.

For more information, please see this letter from the DEI committee:
<https://www.me.upenn.edu/diversity-equity-inclusion/>

Question:

- 1) Email
- 2) First and Last Name
- 3) Preferred Pronouns
- 4) Email (Used as primary contact)
- 5) Affiliation
 - a. MEAM Undergraduate
 - b. MEAM Master's Student
 - c. MEAM Ph.D./PhD Affiliate
 - d. Post Doc
 - e. Other
- 6) Why would you like to join the MEAM Task Force on Diversity, Equity, and Inclusion as a DEI Scholar?
- 7) Please list any affinity group affiliations you have within SEAS or the Engineering community, e.g., National Society of Black Engineers (NSBE), Society of Hispanic Professional Engineers (SHPE), SWE (Society of Women Engineers).
- 8) Please describe your past involvement in promoting social justice and DEI issues. (This could be activism, personal experience, self-learning, etc.).

- 9) Do you have any ideas for new initiatives that the department should adopt? DEI Scholars will have an opportunity to promote new ideas as part of the DEI Task Force. The Task Force welcomes all ideas and may reach out to students regarding their proposals even if they are not DEI Scholars.
- 10) Do you have any additional comments or feedback to share? Is there anything else you would like us to know?
- 11) Please include a reference (peer, staff, or faculty reference) to speak to your experience and passion for this work. Please include their name and email address.

Appendix B: Follow-up Communication for DEI Scholarship Applicants

Thank you for submitting a MEAM Diversity, Equity, and Inclusion (DEI) Scholarship application! Your application was shortlisted by the selection committee. Before making the final decision, the committee is asking all shortlisted candidates to provide two additional pieces of information.

1) Please record a brief (no longer than about 5 minutes) video of yourself describing what you think are the most important DEI issues in the MEAM department. The video can be recorded in Zoom or any other software and returned to me as a link or attachment. The video does not need to be formal or involve special effort; the goal is for the committee reviewing your application to hear from you directly and personally, without requiring a live interview.

2) On your application, you were asked to describe ideas for a new initiative that the department should adopt to promote DEI. Please submit a short document (0.5 to 1.5 pages long) providing more detail on your proposed initiative (you can update your proposed idea if you have a better one now) and your plan for its implementation, including an estimated timeline that would begin in January 2022, and would be completed no later than Dec. 2022. The timeline can be free-form text or a short bullet list with the most important tasks, and the time periods for these tasks to be performed. Please note whether you expect additional funding or resources would be necessary from the department to implement this initiative and, if so, provide a rough estimate of how much would be needed (e.g., dollar amounts, staff time, etc.). Please also mention how the initiative helps to address one or more of the DEI issues you describe in the video from point 1 above.

Please let me know if you have any questions. Congratulations on advancing to this stage of the Scholarship application.

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