DIVERSITY, EQUITY, AND INCLUSION STRATEGIC PLAN

2021-2025

Carnegie Mellon University
College of Engineering

Diversity, Equity, and Inclusion Strategic Plan

Background

In 2017, the College of Engineering developed a diversity, equity, and inclusion (DEI) strategic plan that focused on recruitment. To execute this plan, the college strengthened its relationship with The National GEM Consortium, a consortium of universities and corporations that share the goal of increasing the number of underrepresented groups earning graduate degrees in science, technology, engineering, and mathematics (STEM) and recruited students at professional engineering conferences such as the National Society of Black Engineers (NSBE), the Society of Hispanic Professional Engineers (SHPE) and the Society of Women Engineers (SWE). These relationships enabled the college to significantly increase the number of underrepresented minoritized (URM) students who applied and were accepted to Carnegie Mellon University (CMU) for graduate school. Additionally, Carnegie Mellon became a partner institution in the President's Postdoctoral Fellowship Program (PPFP), a program that was created to diversify the professoriate by providing recent PhD recipients who were outstanding scholars with postdoctoral research fellowships, professional development, and faculty mentoring. The College of Engineering accepted four fellows in the inaugural year of the program and three fellows in the second year. This investment diversified the pool of candidates seeking faculty positions and resulted in the hiring of additional faculty from historically underrepresented groups in the College of Engineering.

Development of a New DEI Strategic Plan

Building on the progress of the previous plan, the College of Engineering entered a new diversity, equity, and inclusion strategic planning process in the fall of 2020. This process was led by Jonathan Malen, Interim Associate Dean for DEI, and the College of Engineering DEI Committee. Alaine Allen, Associate Dean for DEI, later joined and assumed leadership of the efforts. To develop the plan, input was gathered from college surveys, demographic benchmarks, the services of Dr. Damon A. Williams' consulting team, previous internal studies at CMU (1–4), and prevailing literature. The college surveys included 17 department-run listening sessions following George Floyd's murder, a web-based college-wide survey focused on the state of racial equity and inclusion in the college (220 responses), leadership interviews across the university to understand context and connectivity, and an inventory of ongoing and aspirational DEI activities within the college. Dr. Williams' team complemented these surveys with input from targeted focus groups (138 participants) and an open-ended web-based survey (122 responses) that more broadly solicited feedback on all forms of diversity. Dr. Williams' team also performed a programmatic benchmark study to compare our practices with those of nine peer institutions. The results of the college surveys, demographic benchmark, and programmatic benchmark are discussed below.

College Climate and Inclusion Challenges

College surveys indicate that despite positive momentum in recruitment, current members of our community including women, URMs, individuals who identify as LGBTQIA, and community members with disabilities face unique challenges. Surveys and focus groups indicate that college members want more professional development opportunities, communication of actions, and accountability regarding DEI. Faculty and staff seek meaningful ways to engage with DEI efforts and look to improve the college climate and broaden DEI efforts to include various races, gender identities, nationalities, abilities, sexual orientations, and economic levels. These efforts should be addressed mindfully, without overburdening members of our community from historically marginalized groups.

Demographic Trends in the College of Engineering

Demographic trends for students, faculty, and staff are shown in Fig. 1. Subplot (a) shows the trends for undergraduate and graduate students from 2016-2020. Trends in percentage of URM (%URM) are shown for both the total graduate population and the domestic graduate population, because the College of Engineering has a large population of international students (69% in 2020) for which racial designations are not applied. Since 2016, the %URM for graduate (domestic) students has approximately doubled from 2.7% (11.4%) to 6.0% (19.5%). At the Pittsburgh campus alone, the %URM is slightly higher at 6.5% (4.9% MS and 9.0% PhD) in 2020. These recent gains resulted from the GEM fellowship program and active outreach to URM applicants propelled by the 2017 strategic plan. In the future, we will continue our active outreach to URM applicants who apply to the GEM Fellowship, also known as GEM data mining. Other demographic trends among students are comparatively flat.

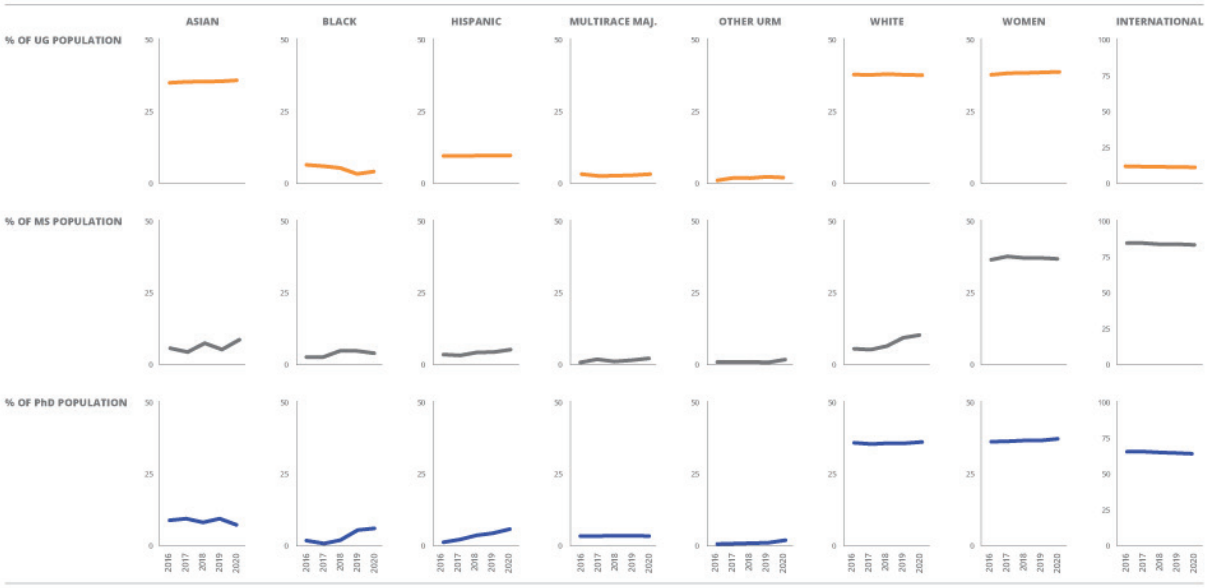

Figure 1a: Demographic trends of students in the College of Engineering including Pittsburgh and Silicon Valley campuses.

Subplot (b) shows trends for staff and faculty from 2015-2020. Engineering staff have gender parity but have a low %URM, despite growth from a minimum of 2.2% in 2016 to 5.4% in 2020. The percentage of women (%women) faculty at all tracks (tenure, teaching, research, special) has increased steadily from 17% in 2015 to 24.4% in 2020. In 2019, American Society of Engineering Education (ASEE) ranked Carnegie Mellon No. 10 among 297 institutions with the highest number of female tenure track (TT) faculty (5). The percentage of TT women at the assistant professor level has increased from 26% in 2015 to 46.3% in 2019, and the percentage of TT women at the associate professor level has increased from 16.2% in 2015 to 25.0% in 2019. Additionally, there has been an increase in the percentage of TT URM faculty. The percentage of Black TT faculty has grown from 0.7% in 2016 to 3.3% in 2020, and the percentage of TT Hispanic faculty has grown from 1.4% in 2016 to 2.6% in 2020.

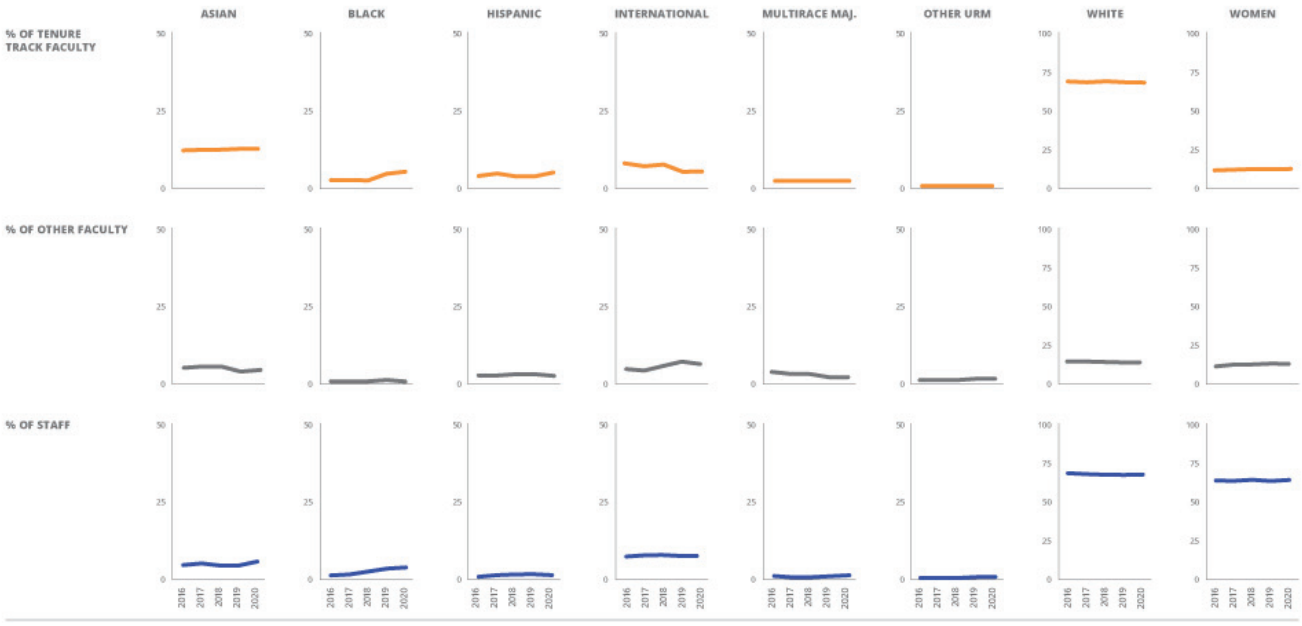

Figure 1b: Demographic trends of personnel in the College of Engineering including Pittsburgh and Silicon Valley campuses.

Demographic Benchmark Against Other Colleges of Engineering

A benchmark study was performed to compare the College of Engineering's demographics against peer institutions. These peer institutions were chosen based on their U.S. News & World Report rankings, excellence in DEI activities, comparable size, and/or regional similarity. This list includes The Massachusetts Institute of Technology, University of Rochester, University of Michigan, University of California-Berkeley, Rensselaer Polytechnic Institute, Georgia Institute of Technology, University of Pittsburgh, University of Florida, and Stanford University, all of which are organized randomly and presented without labels (except for CMU) in Fig. 2.

Demographic data for each of these schools was retrieved from an ASEE database for 2019 [1]. ASEE incorporates computer science into its data for engineering colleges. For CMU, we report the College of Engineering with the School of Computer Science (SCS) to provide a direct comparison, and without SCS because we only directly influence Engineering. In Fig. 2a we show a comparison of the College of Engineering against the benchmarked schools in %URM among undergrads, domestic graduate students, all graduate students, and tenure track (TT) faculty. Segments specify Hispanic, Black, and Native American & Pacific Islander (Indigenous) populations. [2] In Fig. 2b we show a comparison of the College of Engineering against benchmarked schools in %women among undergrads, all graduate students, and tenure track faculty. The top segment of the bar highlights women who are also part of the URM population.

1. Our scope is limited because ASEE only tracks tenure track faculty data (not research and teaching tracks) and does not track staff.

2. Multiracial people are excluded because the ASEE database does not specify minority/majority. CMU data in Fig. 1 includes multiracial minorities, but in Fig. 2 does not.

Engineering has implemented new strategies to improve faculty diversity over the past several years as demonstrated by Fig. 1b, but we trail all other benchmarks in %URM among tenure track faculty as shown in Fig. 2a. Furthermore, a 2018 internal report of the Carnegie Mellon University faculty experience by Babcock & Chow indicates that women and URM faculty are leaving CMU at higher rates than their counterparts, pointing to aspects beyond compositional diversity that need attention (3).

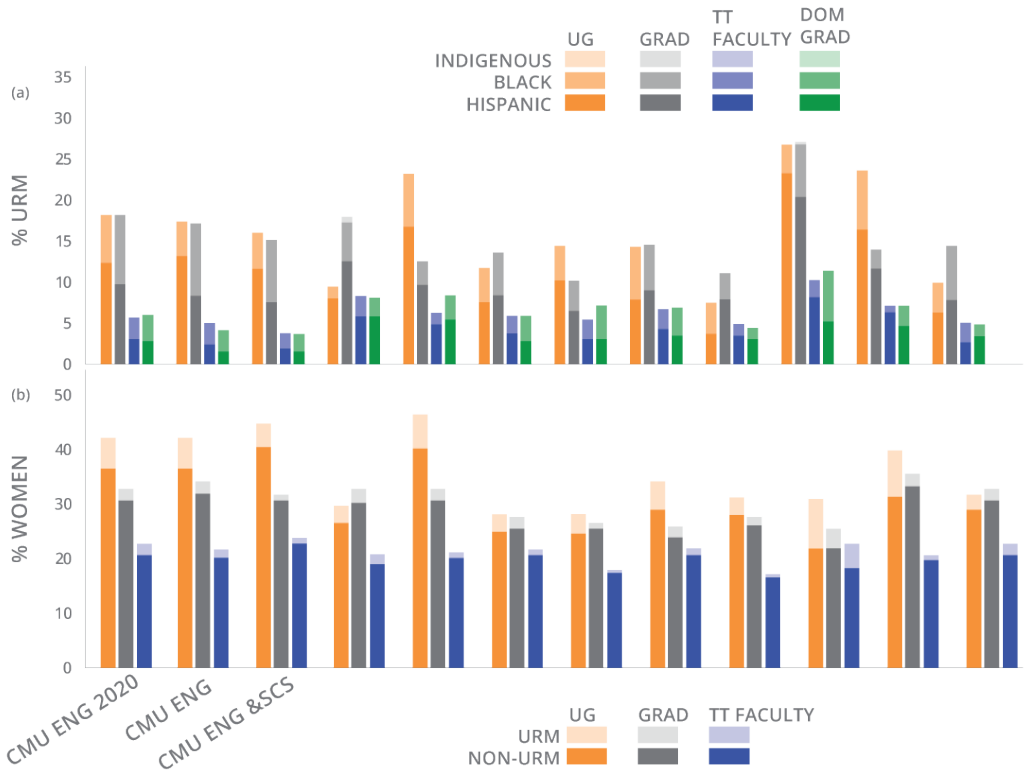

Figure 2: Comparison of 2019 ASEE data for CMU Engineering vs. select benchmarks and CMU Engineering 2020. College of Engineering data includes Pittsburgh and Silicon Valley campuses.

The following conclusions can be drawn, where CMU rankings are based on "CMU Eng" only:

- From Fig. 2a, %URM of TT faculty in 2019 was ranked 10/10. Despite the increase in %URM TT faculty in 2020, recruitment of URM faculty is thus our highest priority.
- From Fig. 2a, %URM at graduate level is ranked 6/10 for total population and 2/10 as a function of domestic population. Recruitment of URM graduate students remains a high priority.
- From Fig. 2a, like most institutions our URM undergraduate population is primarily Hispanic; yet our graduate student URM population is approximately 50% Black and 50% Hispanic.
- From Fig. 2a, %URM at undergraduate level is ranked 3/10 with an undergraduate population that is 5.4% Black. This ranking is comparable to other schools in the list of benchmarking institutions.
- From Fig. 2b, according to the benchmarking comparisons, intersectionality (e.g., women and URM) is a challenge at all universities.
- From Fig. 2b, %women at undergraduate, graduate level and tenure track faculty level are 2/10, 4/10, and 5/10, and comparable to top benchmarks in all three categories.
- From Fig. 2a-b, nationally the %women and %URM decrease successively from undergraduate to graduate level to tenure track faculty.

Degrees Awarded in the College of Engineering

DEI progress in engineering is not only measured by the diversity of students enrolled in undergrad and graduate programs and the representation of faculty and staff, but also by the percentage of degrees granted to various demographic groups at each level (5). Figure 3 illustrates the pattern of BS, MS and PhD degrees awarded between the years of 2016 and 2020. We will compare this information to the ASEE national percentages of engineering degree recipients for each demographic group in 2019, the most recent year of comparison data.

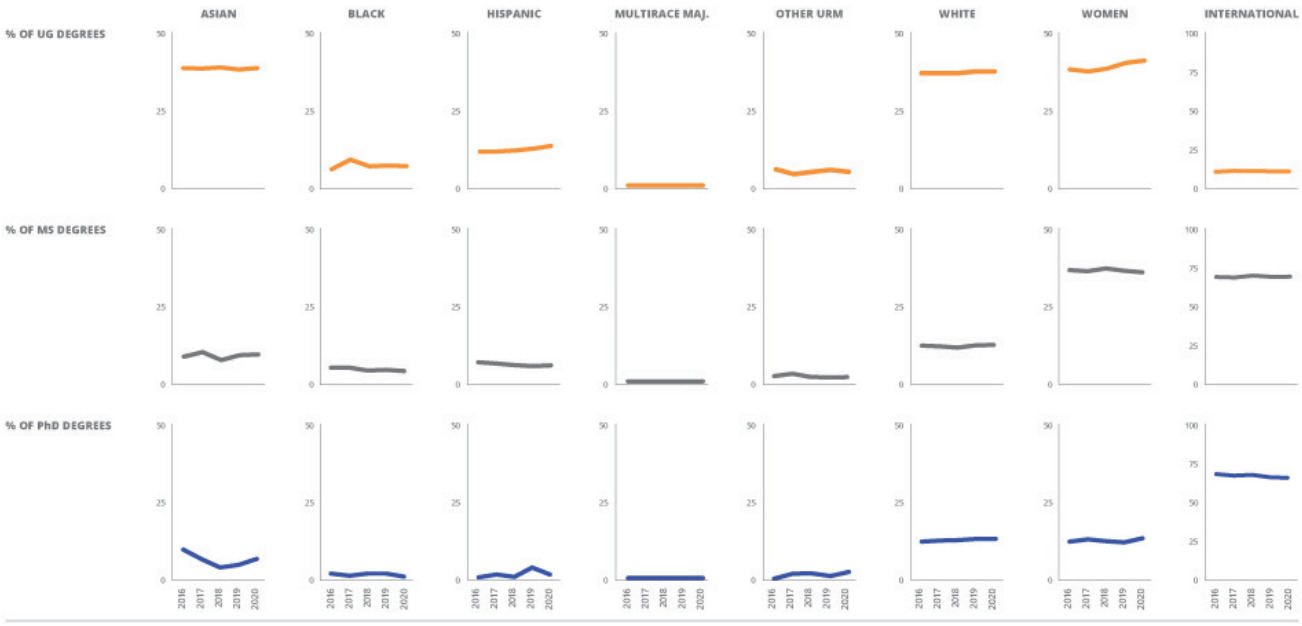

Figure 3: Demographic trends in degrees granted by the College of Engineering both at both Pittsburgh and Silicon Valley campuses

CMU experienced a steady increase in the percentage of Latinx and women graduates at the BS level for the past five years. In 2016, Latinx students received 8.6% of the total engineering baccalaureate degrees and that percentage increased to 10.3% in 2019. This number compares to the 2019 ASEE percentage of Latinx graduates at the BS level of 12.1%. By 2020, the Latinx population represented 13.8% of the baccalaureate degree recipients for CMU engineering. For women, the percentage of graduates at the BS level grew from 36.6% in 2016 to 37.4% in 2019, which compares to the ASEE national percentage of women engineering baccalaureate graduates of 22.5%. By 2020, the percentage of CMU women earning baccalaureate degrees in engineering was 43.0%. While our percentage of Black students earning BS degrees in engineering has been relatively flat, our average percentage of Black undergraduates earning BS degrees in engineering degrees has consisted exceeded the ASEE percentage of Black graduates for all engineering schools. In fact, 7.7% of our 2019 BS degree recipients in engineering were Black compared to 4.4% of the Black BS degree recipients nationally. However, in 2020 the percentage of Black baccalaureate degree recipients at CMU was 4.3%. Finally, the percentage of international students earning BS degrees in engineering at CMU continues to increase in all years except for 2020 While the 2019 national percentage of international students earning BS degrees engineering was 11.1%, the percentage of international students earning BS degrees in engineering at CMU was 18.5%.

At the MS level, international students and women are well represented among engineering graduates. The percentage of MS degrees awarded to international students was 73.9% in 2016 and 72.0% in 2019, which compares to an ASEE national percentage of 53.6%. The percentage of MS degrees awarded to women in Engineering (32.4%) exceeds the 2019 ASEE national average of 27.3%. In 2020, the percentage of CMU women earning MS degrees in engineering was 34.9%. The percentage of Black and Latinx MS graduates is consistently below the ASEE national average. In 2019 the percentage of CMU Black graduates was 2.26% and Latinx MS graduates was 2.63%, trending below the 2019 ASEE national averages of 4.8% and 9.2% respectively.

International students and women are well-represented among CMU PhD degree recipients. According to ASEE, the national percentage of international PhD degree recipients was 56.4% in 2019 and the CMU percentages were 60.1% in 2019 and 65.1% in 2020. Additionally, the representation of women among PhD degree recipients (27.9%) is also higher than the 2019 ASEE average of 24.1%. The 2019 percentage of Black PhD recipients was .78% in comparison to the 2019 ASEE national percentage of 3.9%. The 2019 percentage of Latinx graduates at the PhD level was .78% in comparison to the 2019 ASEE national percentage of 6.10%. In 2020, the percentage of Black and Latinx PhD graduates at CMU was 1.55% and zero, respectively.

Focus of New DEI Strategic Plan

In 2019, the College of Engineering participated in the inaugural ASEE Diversity Recognition Program and was granted a Bronze-level recognition (5) for diversity programming, which is the highest-level of distinction awarded among all schools. While this recognition was an important accomplishment, much can be learned from institutions with a more mature approach. The University of Michigan and University of California-Berkeley stood out in their use of institutional structure, communication, professional development, and accountability to elevate DEI in their engineering colleges. Many other benchmarked schools are at similar developmental stages as CMU, so it will be important to learn from their successes as we navigate this formative era for DEI in the academic landscape. The focus of this new plan will build on the success of our previous plan. We will establish a college structure that grows our capacity to be a leader regarding DEI, and we will intentionally focus on inclusion within by adding new programmatic actions based on current demographic trends and research. We will also continue efforts to diversify the faculty and recruit URM graduate students. The information below provides a framework, as well as details regarding this plan.

Definitions

As an engineering college with global influence, we understand that diverse perspectives lead to creativity and innovation. We also recognize that when we intentionally recruit and engage everyone, including individuals from groups historically underrepresented in engineering, we can harness our collective strengths and perspectives to increase impact and reach. Therefore, we value diversity, equity and inclusion and define these terms as follows:

> **Diversity**:
> *Diversity is recognizing difference and valuing that every individual is unique. This uniqueness is shaped by race, color, national origin, sex, handicap or disability, age, sexual orientation, gender identity, religion, creed, ancestry, genetic information, belief, veteran status, socioeconomic level, and other life experiences.*

Equity:
Equity is intentionally eliminating barriers and mitigating biases that prevent full participation and access to resources and networks for underrepresented groups across our faculty, staff, and student populations.

Inclusion:
Inclusion is the active, intentional, and ongoing process to increase awareness, empathetic understanding, and sense of belonging. Inclusion results in broadening perspectives and intentionally engaging historically marginalized groups to make our community a better place for all.

Values

As members of the Carnegie Mellon University, College of Engineering community, we are committed to excellence, innovation, being genuine, diversity, respect for others, integrity, trusting and being trustworthy. *To support these values and advance this strategic plan, we embrace the three dimensions of cultural humility (6) which align with our definitions of diversity, equity and inclusion:*

1. *Lifelong learning and critical self-reflection.*
2. *Recognizing and mitigating power imbalances.*
3. *Maintaining a respectful community and strong partnerships through institutional accountability.*

Mission

To achieve academic and professional excellence through diverse representation fostered by an equitable and inclusive culture that enables students, faculty, and staff to reach their full potential.

Figure 4 illustrates the three objectives that support this mission and focuses on several high priority "Big Bet" initiatives within the college, as defined by the benchmarking work of Dr. Damon Williams' consulting team. These include - College Infrastructure, Accountability, Graduate Student Recruitment, Faculty Recruitment, Staff Recruitment and Student Inclusion activities. Based on the literature and research completed as a part of this planning process, these initiatives will have the most significant impact to advance our DEI goals.

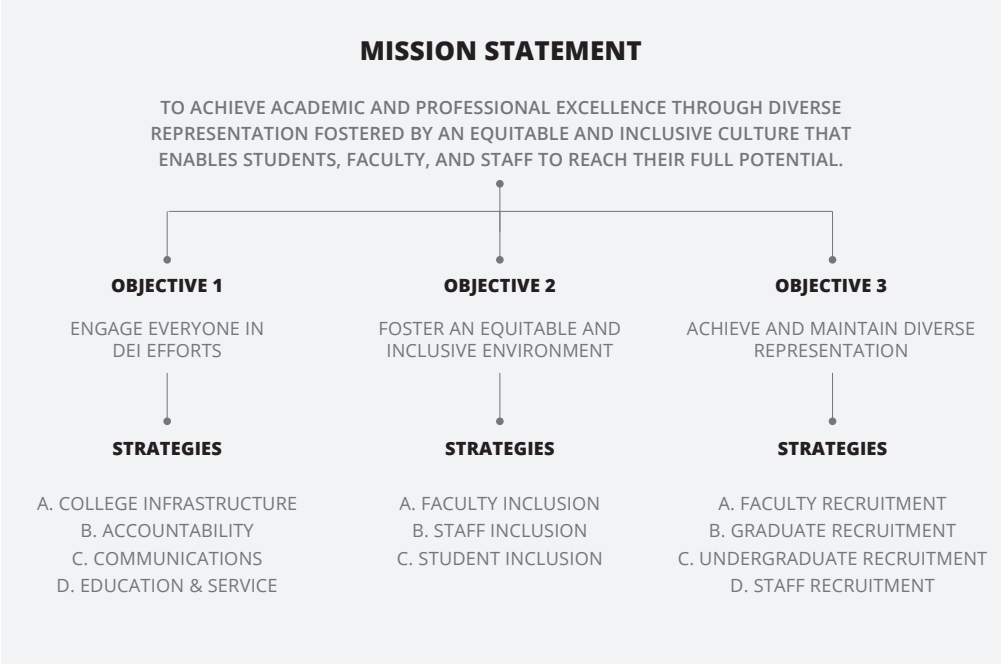

Figure 4: Structure of the strategic plan

The DEI plan's key objectives and corresponding strategies are detailed below. The final section, following the description of each objective and its strategies, is a table that lists proposed actions and will serve as a roadmap for implementation.

OBJECTIVE 1: ENGAGE EVERYONE IN DIVERSITY, EQUITY, AND INCLUSION EFFORTS.

To engage everyone in DEI efforts, we propose a college structure that builds on the installation of an inaugural full-time associate dean for DEI (AD-DEI), establishment of departmental DEI taskforces, establishment of a DEI student advisory committee and an external advocacy board, and college-level staff and support for DEI. The strategies under this objective focus on the college infrastructure, accountability, communication, and education and service.

A. COLLEGE INFRASTRUCTURE

The organizational structure of DEI leadership in the College of Engineering is represented in Fig. 5. The AD-DEI interacts with many other offices centrally and within the college, e.g., the (newly established) Vice Provost for DEI, the Eberly Center, and the Center for Student Diversity and Inclusion (CDSI), as well as engineering-specific groups such as the staff administrative professionals' group and a new college level student advisory committee. The AD-DEI will work with other leaders in the College of Engineering to identify an external advocacy board composed of alumni, corporate representatives and professionals focused on DEI.

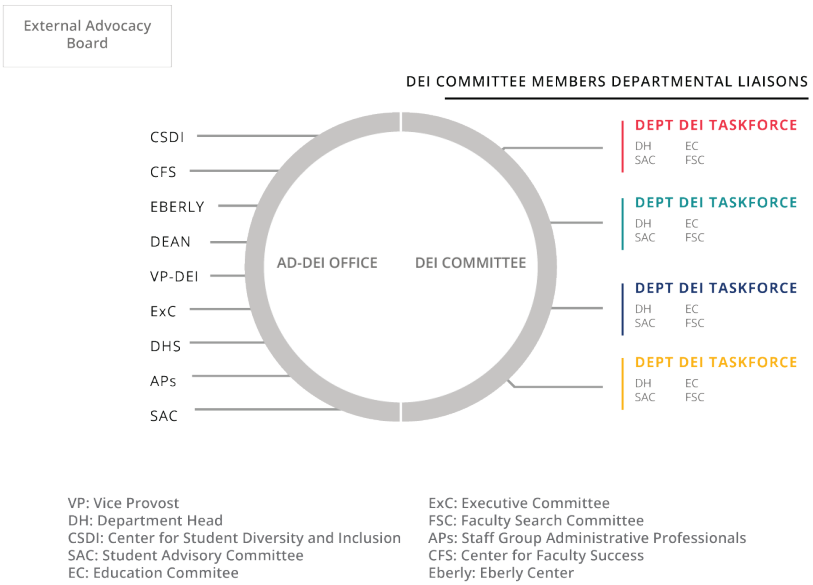

Figure 5: Organizational Structure of DEI in the College

The DEI committee is formed from faculty or staff from each department that serve as liaisons to their respective DEI taskforces. By design, the DEI committee represents leaders for many of the recommended college-level actions, and it will be key for the AD-DEI to empower them with specific roles and responsibilities. The departmental DEI taskforces will be composed of students, faculty, and staff, and will engage with the department's student advisory council, education committees, and faculty search committee (or their equivalents). The departmental DEI taskforces should update their strategic plans based on their own priorities and the recommended actions in this plan.

Given the importance of DEI initiatives, the AD-DEI will be resourced with a small staff. The specifics and size of this staff are to be determined, but we recommend one staff member supporting programming and/or student initiatives in the offices, one staff member for administrative support, and a fractional staff member responsible for communications, in coordination with the college's marketing and communication functions. These roles support the recommended actions within this plan and enable optimization of the service contributions of DEI committee members.

The specific actions that should be taken in this area are:

1. Establish and staff the AD-DEI Office.
2. Establish department-level DEI taskforces and work to make DEI an integral part of all relevant college and department committee's work.
3. Create a college-wide DEI student advisory committee.
4. Create an external DEI advocacy board.
5. Work with the AD for Advancement, AD for Research, Chief Partnerships Officer, the Engineering Research Accelerator, and faculty to raise funds for DEI programming.
6. Develop and/or optimize systems to communicate with prospective faculty, staff, and students.

B. ACCOUNTABILITY

Accountability is key to institutionalize DEI efforts and track success. Accountability actions will ensure that important dimensions are tracked, incentivized, and connected with academic excellence. Therefore, we will track the academic and/or professional progress of students, staff, and faculty as well as their engagement with DEI efforts. Student metrics could include enrollment, persistence, academic performance, graduation rates, plans after college and other relevant data such as engagement in internships, research, and study abroad experiences. Additional metrics for doctoral students could include progress on qualifying exams, number of publications, number of conference presentations. For faculty, it is important to track representation, publications and grants, and progress in the promotion and tenure process. For staff we will track demographics, professional development, retention, advancement, and engagement in committee work pertaining to the DEI mission. We will measure other metrics as determined by departmental taskforces, department heads and the college DEI committee. These metrics should be reported in an aggregated and disaggregated format to provide insight regarding the academic and professional progress of students, faculty, and staff. Finally, the college should structure a format for faculty to include all DEI-related service contributions in their promotion and tenure (P&T) casebooks. We also recommend that leadership appointments within the college consider contributions to DEI as part of the selection criteria.

The specific actions that should be taken in this area are:

1. Track academic and professional progress metrics at the college and department level.
2. Incorporate DEI reporting in faculty, staff, and student advisory committee meetings.
3. Appoint a college-wide ombudsperson.
4. Create DEI events to discuss progress and priorities, welcome feedback, and celebrate contributions.
5. Revise faculty course evaluations (FCEs) and syllabi to address inclusive practices.
6. Incorporate DEI service contributions in the P&T criteria.
7. Recognize the inclusive practices and DEI service contributions of staff members.

C. COMMUNICATIONS

Communications and engagement around diversity are key to shaping the narrative regarding the importance of DEI on campus and to the broader public. Given the growing value of diversity among academic institutions and the fact that institutional success correlates with diversity (7, 8), communicating progress and value in the diversity space is key to our overall excellence. In this regard, our actions intend to provide multiple touch points to infuse DEI content into social media, webpages, leadership presentations, and emails to broadly engage students, faculty, staff, and the surrounding community. Given the importance of communication and the specialized skillsets it demands, we recommend that a Communications staff member be partially dedicated to DEI communications.

The specific actions that should be taken in this area are:

1. Work with Marketing and Communications to develop college-wide messaging that communicates the importance of DEI in the College of Engineering.
2. Enhance the college DEI website to make it a more central repository to communicate programs, events, etc.
3. Utilize social media and other communication approaches to convey DEI messaging.

D. EDUCATION AND SERVICE

Education and service are essential to build an appreciation of diversity and to facilitate an inclusive community throughout our campus. Discrimination has a complex history in the United States, and recognition of the challenges related to this history may not be obvious or intuitive for everyone. Educating students, faculty, and staff on these topics can build cross-cultural understanding and help us to embrace the unique experiences, perspectives and needs of our diverse community. To reach everyone, education, or professional development (PD), could come in multiple forms including web-based, group, experiential learning, and curricular additions. Professional development is particularly important for students, faculty, and staff who are in leadership roles, advise students, and participate in recruitment, e.g., members of the departmental DEI taskforces, faculty search committees, and staff administrative professionals. Leadership within the college should offer PD sessions during regular faculty and/or staff meetings and retreats. Integrating Engineering PD efforts with university-level activities is also important.

All Engineering undergraduates are currently required to complete three semesters of experiential learning. These experiences offer growth and development outside of formal coursework. We recommend modifications to the course description to require that the experience includes a component related to DEI, regardless of whether the student holds a leadership position. Examples of acceptable activities, which should also be added to course syllabi, include participation in college-sponsored outreach to underrepresented and underserved groups, Center for Student Diversity and Inclusion (CSDI) seminars, and DEI book clubs. A streamlined approach, such as a web-based form, will be created to nominate and track activities that fulfill this requirement.

When inclusive pedagogy is used in engineering courses, it provides the students with a greater connection to the course material by elevating voices that are historically underrepresented and highlighting the relevance of the material. The Eberly Center is a resource on campus that provides faculty with support to develop or enhance their courses. One of the initiatives in this Center is the Provost's Inclusive Teaching

Fellowship. By participating, faculty members learn to promote DEI in their course curriculum, cultivate a sense of belonging within their classes, and utilize relevant teaching strategies to engage students from multiple backgrounds. During the 2020-2021 academic year, three of the 11 fellows are Engineering faculty members. Each department should start by identifying two undergraduate courses, preferably at the introductory and sophomore level and two graduate-level, preferably core courses that would infuse diversity. Incentives could be offered to faculty who consult with the Eberly Center and who develop more inclusive teaching practices.

DEI climate surveys and listening sessions, together with current literature (9), suggest that community outreach could satisfy multiple important objectives by providing our own students with perspective on the diverse backgrounds and experiences of K-12 students in the region. Creating useful educational programming that engages K-12 students in science, technology, engineering, and mathematics (STEM) would not only be beneficial academically, but it would also improve CMU-Pittsburgh community outreach relations. This connection to the Pittsburgh community aligns with President Jahanian's commitment to "expand access, opportunity and economic empowerment in the Pittsburgh region and reverse the undeniable trends of racial injustice and inequality". Additionally, the National Science Foundation (NSF) review criteria of proposals includes Broader Impacts that can be supported by community outreach to underserved and underrepresented populations.

The specific actions that should be taken in this area are:

1. Build on existing optional DEI professional development programs for faculty, leadership, staff, and students and promote the importance of lifelong learning and critical self-reflection. Additionally, include speakers from diverse backgrounds and intentionally include at least one technical speaker from an underrepresented community per year and per department.
2. Infuse inclusive teaching pedagogy into the engineering curriculum by adjusting two undergraduate courses and two graduate courses per department.
3. Provide DEI service opportunities for faculty and staff, and experiential learning opportunities for students by working with the appropriate people and offices.
4. Create a process for faculty to learn about and engage in outreach efforts to support broader impacts in their proposals.

OBJECTIVE 2: FOSTER AN EQUITABLE AND INCLUSIVE COMMUNITY.

College listening sessions, surveys, and anecdotal feedback indicate that some current members of our community, including women, URMs, individuals who identify as LGBTQIA, and community members with disabilities have experienced culture that leaves them feeling as though they do not belong. We aim to improve the climate and foster an equitable and inclusive community by providing professional development for faculty and staff, strengthening the mentorship program for undergrads, developing a Success Academy for PhDs, and creating a dedicated space that will foster community, particularly for groups historically underrepresented. Additionally, we plan to support faculty and staff inclusion through mentoring and other programming hosted by the AD-DEI office.

A. FACULTY AND STAFF INCLUSION

In a competitive academic environment, cultivating a supportive and inclusive culture requires intentionality. Therefore, our task is to adjust the culture by adopting practices that foster collaboration and belonging and that lead to an increase in the retention of faculty and staff. Some of these changes come by communicating shared values, offering professional development, hosting community building activities and providing service recognition opportunities. These activities can take place during regular faculty and/or staff meetings and at retreats. As stated previously, professional development is an important key to inclusion and should be championed by faculty and staff members who serve as department heads, hiring managers, supervisors, recruitment representatives, advisors, departmental committee representatives and in other college leadership roles. Group professional development or an established professional development framework offers accountability to all members of the group because they are collectively made aware of the information conveyed.

Additionally, the AD-DEI will develop connections and collaborations with other institutions and organizations that promote the sharing of best practices and diversity research on a national level. Other changes will come by partnering with existing initiatives at the campus and national levels to create programming that provides mentoring and social connection for faculty and staff. The AD-DEI will also serve as a coach to faculty and staff members as they navigate DEI-related challenges in the College of Engineering. Finally, The AD-DEI can collect lessons learned from faculty and staff who leave the university to identify and address any possible retention challenges.

Mentoring has been found to be a successful strategy to support faculty members' success and satisfaction. Mentoring increases research productivity (10), improves teaching effectiveness (11), and promotes a more positive organizational climate (12). Both the NSF ADVANCE (13) and the NSF INCLUDES Aspire Alliance (14) provide guidance on promising practices for recruiting, hiring, and retaining faculty through mentoring and other supportive approaches. Many of these promising practices highlight the use of mentor networks, which could be particularly beneficial to faculty from underrepresented groups. One of these frameworks can be adopted and applied to our procedure for recruiting, hiring, onboarding, and retaining faculty (13, 14).

Inclusion promotes retention, but environments that overlook employees and strain work/life balance can hurt retention efforts. The Engineering DEI office will partner with Human Resources (HR) and the Vice Provost for DEI to promote college and university-level practices to support staff wellness and work/life balance. The AD-DEI will also work with HR and the Senior Director of Organizational Development in the College of Engineering to develop mentoring and leadership development opportunities for staff.

The specific actions that should be taken in this area are:

1. Promote the work/life balance resources available on campus to support faculty and staff.
2. Adopt a comprehensive framework like NSF ADVANCE, NSF INCLUDES Aspire Alliance or the Association of American Colleges & Universities (AAC&U) Project Kaleidoscope to enhance the mentorship and leadership development of faculty and administrators.
3. Partner with other campus units, centers, and departments to build an inclusive community that supports, mitigates barriers and bias, and provides a sense of belonging for staff.

B. STUDENT INCLUSION

Diversity alone does not inherently lead to an inclusive culture (15). In the CMU Voices Study of Inclusion and Climate Experience, Black, Hispanic, Multiracial, non-binary, and transgender individuals disagreed with the notion that their culture was valued by the CMU community (16). Other benchmarking reports indicate that students with disabilities have similar experiences. Such a climate may lead to inequitable practices, as well as social and academic exclusion. This concern is evidenced by the disproportionate drop out and stop out rates of underrepresented groups from STEM programs nationwide (17, 18). Student success among marginalized groups hinges on a variety of factors pertaining to a sense of inclusion and belonging in both academic spaces and beyond the traditional classroom (17). Prospective students from groups historically marginalized may also be less likely to enroll if there is the perception of an exclusive, inequitable, or unwelcoming climate. It is everyone's responsibility to strive for a more inclusive community, which requires the same level of emphasis and strategy as recruitment.

The specific actions that should be taken in this area are:

1. Develop relevant programming such as an Intergroup Dialogue Program for Engineering.
2. Coordinate programs and events with the Center for Student Diversity and Inclusion (CSDI), the Student Academic Success Center, Disability Resources, and other pertinent offices.
3. Promote and support student-led college- and university-wide DEI groups and programming (e.g., NSBE, o-STEM, SASE, SHPE, SWE, DEI book club).
4. Create a success academy for incoming PhD students to seed their success.
5. Develop departmental peer and/or alumni mentoring programs for students.
6. Identify a space in the college that nurtures a sense of belonging for students from historically underrepresented groups.

OBJECTIVE 3: ACHIEVE DIVERSE REPRESENTATION AMONG FACULTY, STAFF AND STUDENTS.

We strive for diverse representation in the College of Engineering. Demographic benchmarking against peer institutions serves as a reference regarding our progress but does not limit our goal. Presently, we are competitive in gender diversity, but behind top peers in racial diversity, especially for faculty and graduate students. While there is gender equity among our staff, much work is still needed to achieve racial diversity. Recruitment is an ongoing process and maintaining a diverse pool of candidates is a promising practice to increase the diversity of faculty and students, as noted through our existing recruitment strategy. Therefore, we recommend developing a database to maintain faculty, student, and staff contacts gathered from diversity-related events (outreach, conferences, networking) for recruitment purposes.

A. FACULTY RECRUITMENT

There is ample evidence that seeing and interacting with role models, teachers, and mentors who "look like you" promotes student success, (19–22) encourages participation, and improves sense of belonging and inclusion. The CMU community has expressed a desire to see more underrepresented faculty on campus. Thus, having a diverse and engaged faculty is critical to attracting and retaining a diverse and successful student body. Furthermore, faculty of diverse backgrounds and perspectives bring value to research teams and generate more innovative approaches and ideas (23–25). Our recommendations will add accountability to the faculty hiring process, improve the President's Postdoctoral Fellowship Program (PPFP), and create a college-wide future faculty workshop.

The specific actions that should be taken in this area are:

1. Use research-based and systematic faculty hiring approaches that engage the Dean and Associate Dean for Faculty, Graduate Affairs, and Strategic Initiatives at each step.
2. Partner with the Provost's Office to strengthen and support the President's Postdoctoral Fellowship Program.
3. Create new and continue to support existing future faculty development workshops to introduce top PhD and Postdocs to the College of Engineering.
4. Recruit faculty at diversity-focused conferences (NSBE, SASE, SHPE, SREB, SWE, etc.).

B. UNDERGRADUATE RECRUITMENT

While the admission of undergraduates takes place through the University Office of Admissions, the college and individual departments should play a role in broadening the engineering pathway for underrepresented and underserved students by focusing on outreach activities, building relationships with partners who influence Pittsburgh and regional students, and engaging admitted students. This focus aligns with President Jahanian's commitment to recruit more students from underserved communities, particularly within the Pittsburgh region (1). This focus will also help to increase the exposure and access that local students have to CMU, empower current CMU engineering students to serve as role models and mentors, and eventually increase the diversity of the undergraduate population enrolled as engineering majors.

The specific actions that should be taken in this area are:

1. Expose historically underrepresented and underserved students at the pre-college level to engineering through outreach activities, teacher engagement and partnerships with programs.
2. Work with faculty and staff to develop a scholarship program for local students from the Pittsburgh area.
3. Have faculty, staff, and current students contact admitted underrepresented students.
4. Build more college activities into the Celebration of Diversity Weekend (university-level DEI visit activity).

C. GRADUATE RECRUITMENT

This part of the plan outlines a vision for recruitment that will help to further diversify the graduate student population in the CMU College of Engineering. Diversity leads to better research collaboration with unique perspectives and has been shown to increase publication impact (26). Demographic benchmarks shown in Fig. 2 indicate that CMU Engineering is ranked 6/10 in %URM (5.5%) and 4/10 in %women (31.4%). However, other top institutions in our benchmarking list are only marginally better than CMU in the %women graduate students (2nd is 31.8% women). Therefore, we will focus on building the capacity to recruit a more diverse class and developing partnerships with institutions and organizations that include a high population of students from underrepresented groups. These efforts will expand our pool of future applicants and diversify enrollment in CMU engineering graduate programs.

The specific actions that should be taken in this area are:

1. Continue working with the National GEM Consortium for recruiting.
2. Improve the holistic admissions review process for graduate admissions.
3. Host diversity-focused events during MS and PhD visit weekends.
4. Hold recruitment events that will enable us to engage underrepresented students.
5. Host recruitment booths at NSBE, SHPE, SWE, o-STEM and other relevant conferences.
6. Form partnerships with minority-serving institutions (MSIs) for recruitment purposes.
7. Expand and coordinate summer research experiences for undergraduate students.

D. STAFF RECRUITMENT

In a diverse community, it is important to have staff members that support and reflect diverse perspectives. Engineering staff function in critical roles that contribute to academic excellence within the university community, but the relative attention paid to their recruitment presents an area for improvement. According to Figure 1b, the CMU engineering staff has gender parity but is just 5.4% URM. Even President Jahanian's (1) emphasized the need to recruit, retain and develop Black and other underrepresented faculty members. Therefore, our recommendations focus on recruitment strategies that will increase staff diversity. Allegheny County, which largely represents the Pittsburgh region, is 13.4% Black and 2.3% Hispanic (27). In 2019, the city of Pittsburgh released a report highlighting racial and gender disparities in the city, particularly for African Americans who represented 23% of the population (27). According to the 2019 City of Pittsburgh Gender Equity Report, Black women's poverty in Pittsburgh is higher than 85% of other similar cities and, despite Black men from Pittsburgh being better educated than 60% of comparable cities, they are generally employed in lower paying jobs (28). Considering these statistics and the commitments of the university, we will work to attract and recruit a more racially diverse workforce.

The specific actions that should be taken in this area are:

1. Partner with department heads and staff administrators to incorporate DEI-relevant training into the staff professional development experience.
2. Work with college and campus HR to post staff positions to job sites that engage a diverse population of candidates.
3. Work with college and campus HR to identify promising practices that can be used to increase the diversity of the College of Engineering staff and offer career advancement opportunities for all staff.

Implementation Plan And Success Indicators

The office of the associate dean for DEI along with the college DEI committee will lead the implementation of this strategic plan and work in partnership with the departmental DEI taskforces. Members of the college committee have divided into four working groups: Faculty Recruitment and Retention, Graduate Student Recruitment and Retention, Staff Recruitment and Retention, and Student Inclusion.

The table below outlines our proposed actions, provides numerical references that correspond with placement in the plan, and indicates alignment with the broader CMU plan to confront racism and promote diversity and inclusion. Each table illustrates the status of each action, showing if it is already Established, Existing but in need of strengthening, or designated as Nascent. Furthermore, the table lists the area that is responsible for the action (college, department, university, or all), the success indicator and the priority level (Phase 1-3) beginning on 5/1/21. Phase 1 is months 1-18, Phase 2 is months 19-36, and Phase 3 is months 37 – 56.

OBJECTIVE 1 IMPLEMENTATION AND SUCCESS INDICATORS

OBJ	CMU PLAN ALIGNMENT	ACTION	STATUS	PHASE	RESPONSIBILITY	SUCCESS INDICATOR
1A1		Establish and structure AD-DEI Office.	Existing	1	College	Empowered committee
1A2		Establish department-level DEI taskforces and work to make DEI an integral part of their work.	Existing	1	Department	Dept plans in place
1A3		Create a college-wide DEI student advisory committee.	Nascent	1	College	Established committee
1A4		Create an external DEI advocacy board.	Nascent	1	College	Established board
1A5		Work with the AD for Advancement, AD for Research, Chief Partnerships Officer, the Engineering Research Accelerator, and faculty to raise DEI funds.	Nascent	1	College	Funds contributed to college for DEI
1A6	A8	Develop system to track and communicate with prospective faculty, staff, and students.	Nascent	1	College	# of applicants for undergrad, grad school, faculty, or staff positions; diversity of applicant pool
1B1	C2	Track success and professional progress metrics at the college and department level.	Nascent	1	College	Reports
1B2	A8	Incorporate DEI reporting in faculty, staff, and student advisory committee meetings.	Nascent	1	Department	Climate survey responses
1B3		Appoint a college-wide ombudsperson.	Nascent	1	College	# and nature of student complaints (as a baseline)
1B4	A4, A6	Create DEI events to discuss progress and priorities, welcome feedback, and celebrate contributions.	Nascent	2	College	# of participants who attend the diversity event
1B5	B6	Revise faculty course evaluations (FCE) and syllabi to address inclusive practices.	Nascent	3	Department/ College	FCE and Climate survey responses

OBJ	CMU PLAN ALIGNMENT	ACTION	STATUS	PHASE	RESPONSIBILITY	SUCCESS INDICATOR
1B6		Incorporate DEI service contributions in promotion and tenure criteria.	Nascent	2	College/University	Established changes to P&T, annual review update.
1B7		Recognize the inclusive practices and DEI service contributions of staff members.	Nascent	2	Department/ College	# of participants who engage in inclusive practices and DEI service.
1C1	A8	Work with marketing and communications to develop college-wide messaging that communicates the importance of DEI in Engineering.	Nascent	1	College	Communications protocol for DEI in Engineering
1C2	A8	Enhance the college DEI website to make it a central repository to communicate programs, events, etc.	Existing	1	Department/ College	Enrollment in DEI PD; PD feedback; climate surveys
1C3	A8	Utilize social media and other communication approaches beyond email to convey DEI messaging.	Existing	1	Department/ College	Enrollment in DEI PD; PD feedback; climate surveys
1D1	A4, A6	Build on existing optional DEI professional development for faculty, leadership, staff, and students; include diverse speakers.	Existing	1	Department/ College	% of college participating in PD
1D2	A1	Infuse diversity content into engineering courses.	Nascent	2	Department	Climate survey responses
1D3	A1	Provide service or experiential learning expectations related to DEI.	Existing	1	Department/ College	Climate survey responses
1D4	C4	Create a process for faculty to learn about and engage in outreach efforts to support Broader Impacts in their proposals and to help develop early career faculty.	Nascent	2	College	# of faculty who participate in engineering outreach programs

OBJECTIVE 2 IMPLEMENTATION AND SUCCESS INDICATORS

OBJ	CMU PLAN ALIGNMENT	ACTION	STATUS	PHASE	RESPONSIBILITY	SUCCESS INDICATOR
2A1	C3	Promote work-life balance resources and guidelines (e.g., limit meeting time range, limit off hour emails) to support faculty and staff.	Existing	1	College	Empowered committee
2A2	A6, C3	Adopt a comprehensive framework such as NSF ADVANCE, NSF INCLUDES Aspire or Project Kaleidoscope to enhance the mentorship experience and leadership development of faculty and administrators.	Nascent	1	Department/ College	% of participants in PD; PD feedback; increased satisfaction in working at CMU; improved climate surveys; retention of marginalized groups

OBJ	CMU PLAN ALIGNMENT	ACTION	STATUS	PHASE	RESPONSIBILITY	SUCCESS INDICATOR
2A3	A6, C4	Partner with other campus units, centers, and departments to build an inclusive community that supports, mitigate barriers and bias, and provides a sense of belonging for staff.	Nascent	1	College	Established board
2B1	B5	Develop relevant programming, such as intergroup dialogue, for the College of Engineering.	Nascent	1	College	Student participation; annual survey results; undergrad 4-year graduation rates; advisor feedback
2B2	B5	Coordinate programming and events with the Center for Student Diversity and Inclusion (CSDI), the Student Academic Success Center, etc.	Existing	1	College	Student participation; annual survey results; undergrad 4-year graduation rates; advisor feedback
2B3	B5	Promote and support student-led DEI groups and programming (e.g., NSBE, o-STEM, SHPE, SWE, DEI book club).	Established	2	College	Participation; undergrad 4-year grad rates; grad student graduation rates; surveys; advisor feedback
2B4		Create a success academy/ transition program for incoming PhD students to seed their success.	Nascent	1	College	Student participation; qualifying exams, graduation rates; survey results; advisor feedback
2B5	B5	Develop departmental peer and/ or alumni mentorship programs for students.	Nascent	2	Department	Student participation; undergrad 4-year graduation rates; grad student graduation rates; annual surveys; advisor feedback
2B6		Dedicate a college space for events that celebrate diversity and inclusion.	Established	2	College	Participation; undergrad 4-year grad rates; grad student graduation rates; surveys; advisor feedback

OBJECTIVE 3 IMPLEMENTATION AND SUCCESS INDICATORS

Obj	CMU Plan Alignment	Action	Status	Phase	Responsibility	Success Indicator
3A1		Use research-based and systematic faculty hiring approaches that engage the Dean/Associate Dean at each step.	Existing	1	Department/ College	Diversity of faculty applicant pool
3A2	C1	Partner with Provost Office to strengthen and support the President's Postdoctoral Fellowship Program.	Existing	1	College/ University	# of participants who apply and/or hired because of participation
3A3	B3	Create new and continue to support existing programs for engineering postdocs.	Nascent	2	Department/ College	# of participants who apply and/or hired because of participation
3A4		Recruit future faculty at conferences like NSBE, SHPE, SWE, SREB.	Existing	1	Department/ College	# of participants who apply and/or hired because of participation
3B1	B1, C4	Expose historically underrepresented and underserved pre-college students to engineering through outreach, teacher engagement and program partnerships.	Existing	1	College	# of students, faculty & staff who engage in outreach; # of outreach participants from underrepresented communities.
3B2	B1, C4	Work with faculty and staff to develop a scholarship program for local students, possibly underrepresented and/or underserved from the Pittsburgh area.	Nascent	3	College/ University	# of local URM and women who apply to CMU
3B3		Have faculty and students contact admitted underrepresented students.	Nascent	2	College/ University	# of admitted students who commit to CMU
3B4		Build college activities into Celebration of Diversity Weekend (university-level DEI visit activity).	Existing	1	All	Recognition of College efforts in DEI
3C1	B3	GEM Mining	Established	1	Department/ College	% matriculation of admitted GEM Fellows

Obj	CMU Plan Alignment	Action	Status	Phase	Responsibility	Success Indicator
3C2		Improve holistic review strategies to include non-quantitative measures and include more students from diverse backgrounds.	Existing	2	Department	# of graduate students admitted; satisfaction with grad students
3C3		Hold diversity events during PhD and MS visit weekends.	Established	1	Department/ College	% matriculation of students attending diversity events
3C4		Hold recruitment events targeting underrepresented (URM and women) students.	Established	1	Department/ College	# of students admitted from these events
3C5		Have recruitment booths at national conferences (e.g., NSBE, SHPE, SWE, o-STEM).	Established	1	Department/ College	# of students admitted from these events
3C6		Form partnerships with minority serving institutions (e.g., the Fisk-Vanderbilt Bridge program and Howard-CMU joint PhD).	Nascent	3	College	# of students in these partnerships
3C7		Expand and coordinate summer research for undergraduate students.	Established	2	College	# of students admitted from summer research
3D1	C3	Partner with administrative professionals to share best practices to diversify staff pool.	Nascent	1	College	# of administrative professionals trained in and utilizing best practices
3D2	C3	Use inclusive job posting sites and equitable interview practices.	Nascent	1	College	% URM in applicant pools and/or hired
3D3	C3	Adopt similar accountability practices used in faculty hiring for staff hiring.	Nascent	2	College	% URM in applicant pools and/or hired

Diversity, Equal Employment Opportunity, and Statement of Assurance

The College of Engineering DEI Strategic Plan is rooted in Carnegie Mellon's longstanding commitment to equal opportunity, diversity, and affirmative action. As an institution, Carnegie Mellon has long been committed to the principle of equal employment opportunity that is free of unlawful discrimination and where employment decisions are made in an unbiased manner. As an institution, Carnegie Mellon has been equally committed to, and has embraced, diversity as a core value and one of utmost importance to the continued growth and vitality of the University, and to its continued growth and vitality Mellon's Strategic Plan 2025, which identifies as a part of the core mission of the University "attracting and retaining diverse, world-class talent." Nothing in this Strategic Plan should be construed as a preference, quota, set-aside, or as a floor or ceiling for any group, and nothing in this Plan supersedes Carnegie Mellon's commitment to equal opportunity employment and merit principles.

The plan set forth above is consistent with the commitments made in the University's Statement of Assurance. Specifically, Carnegie Mellon University does not discriminate in admission, employment, or administration of its programs or activities based on race, color, national origin, sex, handicap or disability, age, sexual orientation, gender identity, religion, creed, ancestry, belief, veteran status, or genetic information. Furthermore, Carnegie Mellon University does not discriminate and is required not to discriminate in violation of federal, state, or local laws or executive orders.

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