



COMPUTER SCIENCE & ENGINEERING

Climate, Diversity, Equity, and Inclusion

AY 2022-2023

Annual Report



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Introduction

This report is a public record of statistics and activities intended to provide transparency regarding climate, diversity, equity, and inclusion in Michigan Computer Science and Engineering. The report is suitable for students and community members and includes brief contextual information and background for nuanced topics. Continuing our renewed commitment to transparency, we make this report, and subsequent annual reports, public. [Other reports are available.](#)

Diversity, equity and inclusion are [core values](#) of the University, the College of Engineering, and Computer Science and Engineering. There are legal (e.g., [equal opportunity and treatment](#)), moral (e.g., [ideology](#)), and pragmatic (e.g., engineering is a [creative activity that benefits from multiple perspectives](#)) reasons, among others, to broaden participation in computing. One goal of this report is to help track progress and identify areas for improvement.

Issues and Terminology

Because this is a public-facing document intended for a general audience, we provide a brief introduction to some of the issues and terms.

Diversity, Equity and Inclusion (DEI) concerns are multifaceted. While notions such as race, ethnicity, and gender are commonly considered, [DEI](#) includes all students and community members.

Underrepresented minority racial and/or ethnic backgrounds (**URM**) are context-dependent with respect to computer science in particular and engineering in general. For example, while Asian and Asian-American individuals are a minority group in the United States generally, they are not an underrepresented minority in computing. The [Rackham Graduate School URM definition](#) includes African Americans, Hispanic Americans, American Indians/Native Alaskans, Native Hawaiians/Pacific Islanders (excluding Asian Americans), and multiracial students identifying with at least one of the previously listed URM categories. The term “underrepresented minority” may be seen as problematic because it defines disparate groups with a homogeneous term, which those groups did not choose (see the [Tiffani Williams essay at the CACM website](#)). We use the term because it is the current language of the Rackham Graduate School and the University.

Statistics often distinguish between **sex** (e.g., males, females, etc.) and **gender** (e.g., men, women, etc.), with the latter viewed through the lens of [social construction or identity](#). The latter can be particularly helpful for discussions of LGBTQ+ issues, among other contexts. The National Center for Women & Information Technology provides an accessible summary of the [overall state of gender diversity in computing](#). Historically, the female share of CS undergraduate degrees reached its peak around 40% in the 1970’s, plummeted into the low teens (e.g., 12-15%), and is back up to around 20% in most CS departments. There are outliers, such as Harvey-Mudd College and Carnegie Mellon

University, where female participation in the undergraduate computer science degree program is around 50%.

When measuring participation, we often consider individuals at various stages of a program or process. Broadly, the group of people applying for a position or status (e.g., applying to declare the major, applying to join the graduate program, applying for a faculty position) in a particular year is the **applicant pool**. In the case of faculty hiring, a subset of the applicants will be invited to **interview**. Based on a set of criteria, a subset of applicants will be **admitted** or given an **offer** (e.g., only some who apply to join the graduate program are extended an offer of admission). Of those admitted, a subset will **accept** the offer and join or **enter** the program. Eventually, a subset of those will **complete** the program or otherwise reach a particular milestone (e.g., students may complete the major and obtain the degree, junior faculty may be granted tenure, etc.).

Different measurements at these stages can highlight areas for improvement. For example, when few individuals are present in the applicant pool or when individuals withdraw after an interview or visit, it is typically viewed as a **recruitment** problem. By contrast, if fewer individuals complete the program than begin it, it is typically viewed as a **retention** problem. These distinctions are relevant because they often have different causes or remedies. For example, recruitment issues may be partially addressed through outreach to other schools, while retention issues typically implicate weaknesses in our climate, policies, and support for those already here.

Broadening participation in computing has been an explicit goal of the US National Science Foundation (NSF) for decades. The NSF funded about a dozen alliances to improve our national ability to diversify computing (see the [AAAS report on BPC alliances](#)). Former US President Barack Obama made it a national goal to provide “CS for All” in US schools, and [the CS for All consortium](#) still continues to work toward that goal. Understanding how computer science became so male-dominated, compounded by the underrepresentation of BIPOC (Black, Indigenous, and People of Color) students, remains an open research question today. One of the best empirical studies is [Unlocking the Clubhouse](#) by Jane Margolis and Alan Fisher. A historical treatment is [The Computer Boys Take Over](#) by Nathan Ensmenger.

Michigan Law and Context

Affirmative action broadly refers to [policies designed to help disadvantaged or underrepresented groups](#). In 2006, the [Michigan Civil Rights Initiative \(MCRI\)](#) was adopted by Michigan voters; that initiative, which is codified as Article I, Section 26 of the Michigan Constitution, prohibits public universities from “discriminat[ing] against, or grant[ing] preferential treatment to, any person or group on the basis of race, sex, color, ethnicity, or national origin in the operation of public education, public employment, or public contracting.” The [long-term effects of the law](#) are still being studied.

One implication, phrased informally, is that programs that provide additional help or resources or guide admissions or hiring decisions *cannot* be based on qualities such as race or gender. Programs

that help support student success, such as the [M-STEM \(Michigan Science, Technology, Engineering and Mathematics\) Academies](#) or the [Comprehensive Studies Program \(CSP\)](#), use alternate criteria. For example, CSP's mission includes a focus to "provide academic guidance for, and retain undergraduate students from diverse populations with outstanding potential for success at the University of Michigan" and [any student can apply to join CSP](#).

While affirmative action remains controversial (with multiple [pro](#) and [con](#) arguments, and the Michigan Civil Rights Initiative [passing by a 58 to 42](#) margin), the state law does limit targeted actions that can be taken by the University in general and by CSE in particular. Issues regarding the underrepresentation of particular groups cannot legally be addressed through programs limited to individuals of those particular races, ethnicities or genders. Instead, we seek to address underrepresentation by offering programs and initiatives that focus on issues of diversity or that are intended to improve the experiences of underrepresented groups, but that are open to all without regard to identity. In addition, we recognize that [issues of climate, diversity, equity, and inclusion affect us all](#) and that efforts should improve the experiences, and support the success, of all students and community members.

Trends and Comparisons

In many places in this report, we provide high-level direct comparisons to the previous year with the searchable heading "*Changes from previous year.*" CSE's annual transparency reports [are published](#) and admit direct, and eventually longer-term, comparisons.

Undergraduate Program

Information about the CSE undergraduates is available at various points throughout the program.

Undergraduate Major Enrollment

The [Office of the Registrar's Enrollment Report](#) for Computer Science and Engineering Undergraduates provides enrollment information. We consider the [CS Major \(Engineering\)](#), the [CS Major \(Literature, Science and Arts\)](#), the [Data Science Major \(Engineering\)](#), the [Data Science Major \(Literature, Science and Arts\)](#) (shared with [Statistics](#)), and the [Computer Engineering Major](#) (shared with [Electrical and Computer Engineering](#)):

| | Winter 2023 | | Fall 2022 | | Winter 2022 | | Fall 2021 | | Winter 2021 | | Fall 2020 | |
|---------------------------|-------------|-------|-----------|-------|-------------|-------|-----------|-------|-------------|-------|-----------|-------|
| Total | 3250 | 100% | 2863 | 100% | 2966 | 100% | 2752 | 100% | 2739 | 100% | 2567 | 100% |
| Female | 824 | 25.4% | 709 | 24.8% | 717 | 24.2% | 651 | 23.7% | 658 | 24.0% | 591 | 23.0% |
| Male | 2426 | 74.6% | 2154 | 75.2% | 2249 | 75.8% | 2101 | 76.3% | 2081 | 76.0% | 1976 | 77.0% |
| Asian | 1017 | 31.3% | 883 | 30.8% | 859 | 29% | 778 | 28.3% | 739 | 27.0% | 681 | 26.5% |
| Black | 40 | 1.2% | 38 | 1.3% | 49 | 1.7% | 44 | 1.6% | 49 | 1.8% | 46 | 1.8% |
| Hispanic | 144 | 4.4% | 115 | 4.0% | 142 | 4.8% | 137 | 5% | 129 | 4.7% | 127 | 4.9% |
| Two or More | 90 | 2.8% | 81 | 2.8% | 87 | 2.9% | 79 | 2.9% | 71 | 2.6% | 63 | 2.5% |
| Two or More URM | 38 | 1.2% | 36 | 1.3% | 44 | 1.5% | 39 | 1.4% | 40 | 1.5% | 34 | 1.3% |
| Unknown | 233 | 7.2% | 202 | 7.1% | 202 | 6.8% | 185 | 6.7% | 170 | 6.2% | 152 | 5.9% |
| White | 1014 | 31.2% | 889 | 31.1% | 976 | 32.9% | 931 | 33.8% | 978 | 35.7% | 914 | 35.6% |
| Non Resident Alien | 670 | 20.6% | 616 | 21.5% | 605 | 20.4% | 557 | 20.2% | 562 | 20.5% | 549 | 21.4% |

To provide a context for these numbers on race, the state of Michigan is 74.2% White, 14.1% Black, 5.6% Hispanic, and 3.4% Asian, according to the [US Census](#).

In the past, CSE did not directly admit first-year undergraduates when they entered the University of Michigan. Instead, undergraduates completed a number of semesters of prerequisite courses as undeclared students (e.g., in [Engineering](#) or [Literature, Science and Arts](#)) before applying to declare a computing major.

Engineering and LSA showed similar patterns of enrollment with respect to ethnicity. In Winter 2023, Engineering undergraduates in Computer Science were 6.9% URM (see [Issues and Terminology](#) above for the definition of underrepresented minority), and LSA undergraduates in Computer Science were 6.1% URM. On the other hand, we noted different patterns of enrollment between Engineering and LSA undergraduates with respect to gender. For example, in Winter 2023, 23.3% of Engineering undergraduates in Computer Science were female, while 28.3% of LSA undergraduates in Computer Science were female. In previous years, Engineering and LSA had similar enrollment patterns with respect to gender, while Engineering undergraduates in Computer Science tended to have higher rates

of URM students. These enrollment patterns shifted in the last year.

Changes from previous years: As with previous years, total undergraduate enrollment has continued to increase. Similarly, enrollment of female students has increased (both proportionately and in absolute amounts) every year. Although the population of Black students has approximately stayed the same, proportionally it has decreased with the overall increase of enrollment. The population of Hispanic students decreased (both proportionally and in absolute amounts) in the past year. Other subpopulations, such as Asian and Non-Resident Alien students, have continued to increase in small increments. The CSE Enrollment and Admissions Team (EAT) has identified new admissions pathways, including considerations for increasing the diversity of our undergraduate population. Pathway one, focusing on preferred admissions for incoming high school students, will be implemented for students who enroll in Fall 2023. Refer to the [Strategic Plan](#) section for more information.

Undergraduate Core Courses

[Computing CARES](#) conducts extensive surveys and interventions in courses associated with the first through third semester of the CSE program. In this presentation, Likert scale responses are presented as 1-5 numerical values (e.g., terms such as “strongly disagree,” “poor,” or “not at all” map to 1; “neutral” maps to 3; “strongly agree” or “excellent” map to 5, etc.).

[EECS 183](#), [ENGR 101](#), and [ENGR 151](#) are introductory computing courses. We present *start-of-course* survey data for 1721 EECS 183, 756 ENGR 101, and 117 ENGR 151 consenting AY 2023 students. Note that some students use transfer credit or a proficiency exam instead of taking introductory courses at U-M.

[EECS 376](#) is an undergraduate theory of computation course. It is required for the major and is often one of the last non-elective courses taken. We present *end-of-course* survey data for 558 consenting Fall 2022 students and 543 Winter 2023 students.

Select sentiment and climate questions:

| | Start of EECS 183, ENGR 101, ENGR 151 | | | | End of EECS 376 | | | |
|---|--|------------|------------|------------|-----------------|------------|------------|------------|
| | AY 2023 | AY 2022 | AY 2021 | AY 2020 | AY 2023 | AY 2022 | AY 2021 | AY 2020 |
| After graduation, there are equal opportunities for a career in Computer Science for males and females alike. | 3.51 | 3.55 | 3.56 | 3.50 | 3.58 | 3.60 | 3.48 | 3.48 |
| I find Computer Science intimidating. | 3.48 | 3.44 | 3.38 | 3.40 | 3.28 | 3.23 | 3.26 | 3.14 |
| I can see myself in a computing-related career in the future. | 3.62 | 3.63 | 3.55 | 3.64 | 4.17 | 4.25 | 4.27 | 4.28 |
| I believe that other students in Computer Science will be welcoming of me. | 3.73 | 3.79 | 3.82 | 3.80 | 3.83 | 3.85 | 3.85 | 3.92 |
| I feel included in the groups that I want to belong to. | 3.67 | 3.70 | 3.73 | 3.78 | 3.82 | 3.80 | 3.79 | 3.90 |
| How would you describe your current mental health? | 3.05 | 3.09 | 3.06 | 3.29 | 2.90 | 2.88 | 2.70 | 2.89 |

Changes from previous year. There continues to be an increase in the feeling of equal opportunity for careers in CS for males and females by the end of EECS 376. Over the past two years, we also note a slight increase in students seeing themselves in computing-related careers as they begin the curriculum. However, over the past four years, which includes some parts of COVID-19, there has been a downward trend regarding students reporting feeling included in the groups they belong to and that other students in CS will be welcoming to them.

We also present canonicalized gender and ethnicity self-reporting, as a percentage of students who reported their gender and ethnicity at each stage. Differences between the presence of various groups at these two stages provides one lens for examining retention or pipeline issues. In EECS 183, ENGR 101, and ENGR 151, 2543 out of 2594 respondents (98.0%) reported their gender, and 2527 (97.4%) reported their ethnicity. In EECS 376, 860 out of 1101 respondents (78.1%) reported their gender, and 849 (77.1%) reported their ethnicity.

| | Start of EECS 183, ENGR 101, ENGR 151 | | | | End of EECS 376 | | | |
|--|---------------------------------------|---------|---------|---------|-----------------|---------|---------|---------|
| | AY 2023 | AY 2022 | AY 2021 | AY 2020 | AY 2023 | AY 2022 | AY 2021 | AY 2020 |
| Man | 53.76% | 57.49% | 59.76% | 61.62% | 68.02% | 71.19% | 67.89% | 75.50% |
| Woman | 44.08% | 40.6% | 39.45% | 37.58% | 29.07% | 27.15% | 31.41% | 24.06% |
| Nonbinary | 1.73% | 1.6% | 0.53% | 0.54% | 2.56% | 1.66% | 0.42% | 0.00% |
| Trans | 0.43% | 0.32% | 0.26% | 0.27% | 0.35% | 0% | 0.28% | 0.44% |
| Asian | 37.59% | 37.65% | 36.86% | 36.62% | 57.6% | 57.62% | 55.08% | 52.85% |
| Black | 2.77% | 2.63% | 2.79% | 2.70% | 1.18% | 0.84% | 1.43% | 0.44% |
| Hawaiian or Pacific Islander | 0.00% | 0.08% | 0.00% | 0.04% | 0% | 0% | 0.00% | 0.00% |
| Hispanic or Latino | 4.91% | 3.25% | 3.05% | 3.66% | 2.47% | 1.96% | 1.72% | 1.97% |
| Native American or Alaska Native | 0.04% | 0.16% | 0.00% | 0.08% | 0.12% | 0.42% | 0.14% | 0.00% |
| Two or More | 3.64% | 3.88% | 3.32% | 3.12% | 3.06% | 3.92% | 3.29% | 2.63% |
| Two or More URM | 7.28% | 5.65% | 3.76% | 4.63% | 2.83% | 3.36% | 2.43% | 2.19% |
| White, Caucasian, Middle Eastern, North African, Arab | 43.77% | 46.71% | 50.22% | 49.15% | 32.74% | 31.89% | 35.91% | 39.91% |

Changes from previous year. We continue to see an increased enrollment of women at the beginning of the curriculum. We also see an increase from last year in the percentage of women, nonbinary, and trans students persisting through EECS 376. However, if one assumes, for simplicity, that first-years from AY21 are now completing EECS 376 in AY23, there is a 27.75% decrease in women for this group (i.e., 1 in 3 women left by EECS 376). While we see an increase in Black students at the beginning of the program and in EECS 376, there remains a large decrease in Black student enrollment in EECS 376 compared to the beginning of the program. Similarly, we see continued enrollment increases of Hispanic or Latino students, but the percentage of Hispanic or Latino students persisting through EECS 376 continues to be much lower than at the start of the program (with both populations, we encourage caution in the interpretation of changes to smaller numbers).

Undergraduate Degree Conferral

The Office of Student Affairs (Lisa Villarreal, 6/2/2023) provides the following information about selected undergraduate degree conferral rates. We consider the CS Major (Engineering), the CS Major (Literature, Science and Arts), the CS Minor, the Data Science Major (Engineering), the Data Science Major (Literature, Science and Arts) (shared with Statistics), and the Computer Engineering Major (shared with Electrical and Computer Engineering).

| | 2022-23 | | 2021-22 | | 2020-21 | | 2019-20 | |
|------------------------|---------|--------|---------|--------|---------|--------|---------|--------|
| Total | 1629 | 100% | 1548 | 100% | 1285 | 100% | 1243 | 100% |
| CS Eng Total | 603 | 35.64% | 598 | 38.63% | 538 | 41.87% | 517 | 41.59% |
| CS LSA Total | 596 | 35.22% | 460 | 29.72% | 404 | 31.44% | 398 | 32.02% |
| CS Minor Total | 248 | 14.66% | 211 | 13.63% | 182 | 14.16% | 188 | 15.12% |
| CE Total | 104 | 6.15% | 116 | 7.49% | 110 | 8.56% | 97 | 7.80% |
| DS Eng Total | 39 | 2.30% | 54 | 3.49% | 51 | 3.97% | 43 | 3.46% |
| DS LSA Total | 102 | 6.03% | 109 | 7.04% | 92 | 6.65% | N/A | N/A |
| CS Eng Female | 134 | 22.22% | 109 | 18.23% | 96 | 17.84% | 106 | 20.50% |
| CS LSA Female | 182 | 30.54% | 129 | 28.04% | 130 | 32.18% | 111 | 27.89% |
| CS Minor Female | 69 | 27.82% | 70 | 33.18% | 48 | 26.37% | 53 | 28.19% |
| CE Female | 19 | 18.27% | 23 | 19.83% | 21 | 19.09% | 16 | 16.49% |
| DS Eng Female | 11 | 28.21% | 13 | 24.07% | 8 | 15.69% | 10 | 23.26% |
| DS LSA Female | 35 | 34.31% | 44 | 40.37% | 26 | 28.26% | N/A | N/A |
| CS Eng URM | 40 | 6.63% | 47 | 7.86% | 36 | 6.69% | 28 | 5.42% |
| CS LSA URM | 34 | 5.70% | 36 | 7.83% | 26 | 6.44% | 18 | 4.52% |
| CS Minor URM | 17 | 6.85% | 24 | 11.37% | 13 | 7.14% | 10 | 5.32% |
| CE URM | 10 | 9.62% | 12 | 10.34% | 8 | 7.27% | 5 | 5.15% |
| DS Eng URM | 2 | 5.13% | 5 | 9.26% | 1 | 1.96% | 1 | 2.32% |
| DS LSA URM | 4 | 3.92% | 4 | 3.67% | 2 | 2.17% | N/A | N/A |

Changes from previous year. Major degree conferral rates for CS LSA and CS minor increased for female students. However, there is a decrease in URM degree conferral across all majors and the minor. Total degree conferral (e.g., for graduating seniors) rose from last year alongside total enrollment (including students early in the program).

The [Michigan Engineering Career Resource Center](#) provides salary data on average salaries by major. For 2022, the latest report available as of this writing, the reported CS salaries for students graduating with bachelor's degrees were median \$121,000, average \$116,747, and range \$60,000 – \$215,000. The Engineering Career Resource Center does not tie their data to ethnicity breakdowns.

Undergraduate Program Context and Discussion

As a broad point of comparison, the 2022 [Computing Research Association Taulbee Survey](#) of 182 PhD- conferring CS departments documents the continued increase of CS enrollment and degree conferral at all levels. Gender diversity among undergraduate degree conferrals stayed relatively the same from the 2021 report to the 2022 report; among CS graduates for whom the information was known in 2022-2023, 22.2% were female in comparison to 22.3% in 2021-2022. Similarly, enrollment of females in CS stayed about the same at 22.5% in 2022-2023 in comparison to 21.9% in 2021-2022.

In comparison to last year, the 2022 Taulbee Survey found a decrease in Black or African-American students enrolled in CS. 1.9% of undergraduates reported identifying as Black or African American (as opposed to 4.2%). The survey notes a slight increase for Hispanic students enrolled in CS: 11.1% of undergraduates reported identifying as Hispanic (as opposed to 8.3%).

CSE's undergraduate enrollment of female students (25.4% female) continues to exceed the national average represented by the Taulbee Survey. The survey also found that 22.2% of CS bachelor's degrees and 18% of CE Bachelor's degrees were awarded to female students. CSE's CS bachelor's degree conferral rates (combining CS Eng and CS LSA) for females now exceed the national average and CE bachelor's Degree conferral rate continues to exceed the national average.

However, CSE's undergraduate enrollment of Black students continues to be significantly below the national average and percentage of the population in the state. CSE Hispanic undergraduate enrollment increased over the past year (although rates stayed about equal) and continues to fall below both the percentage of the population in the state and the national average. Taken together, the degree conferral rate for all URM student majors this year is 6.32%, which is a decrease from last year (8%) and is below the national average.

Representation of female and URM students continues to be higher in the minor than in the major, although representation of URM students in the major is approaching the representation rate of the minor. When enrollment or admission rates for a group are lower than degree conferral rates for that group, it highlights a pipeline or retention issue. Self-perceptions of mental health deteriorate throughout the major.

Graduate Program

Information about the CSE graduate program is available at various points throughout the program. Note that because the graduate program is associated with the [Rackham Graduate School](#), some data reporting follows a different format.

Note that race/ethnicity information (e.g., such as being Black, Hispanic, or Native American) is typically only associated with domestic students and is usually not tracked for international students.

Graduate Admissions Process

Broadly, students [apply to CSE's graduate program](#) seeking a master's degree or a Doctor of Philosophy (PhD). **Master's** students are typically self-funded and pursue a two-year degree based on coursework. (Some master's students are more research-focused and may transition to the PhD program after completing the master's degree.) Our Sequential Undergraduate/Graduate Study (**SUGS**) program allows Michigan students to complete an undergraduate degree and master's degree, often in a total of five years. While **PhD** completion times vary, it is common for a student to spend four years on doctoral research after completing a master's degree. Some students apply for the Ph.D. program after completing a master's degree elsewhere; others may apply after a bachelor's degree and then obtain a master's degree and PhD sequentially.

While graduate degrees share many similarities, because the master's degree typically places more of an emphasis on coursework and the PhD degree typically places more of an emphasis on research, graduate admissions often treats applicants separately. While strong graduate applicants are distinguished by initiative and a mastery of undergraduate material generally, strong PhD applicants typically additionally demonstrate experience with independent research.

All CSE faculty members can review all CSE graduate applicants. The **graduate admissions committee** reviews all applicants, regardless of focus area, and brings strong applicants to the attention of appropriate faculty. This involves a holistic consideration of individual application materials, including direct applicant mentions of particular faculty members as well as perceived research interest or overlap based on application essays and previous experience.

Faculty often follow up with admitted students to encourage them to **accept** the offer. This is often done through a combination of email, phone calls, and awarding scholarships or fellowships, such as the [Rackham Merit Fellowship](#). In addition, CSE hosts a formal Visit Day. In AY 2022, the Visit Day activities were in person after a two-year break due to COVID. In general, it can be more difficult for some students to attend a Visit Day (e.g., based on international or socioeconomic status). CSE provides full support for domestic students and \$500 for international students for Visit Day travel.

In 2022, CSE sponsored 16 students for graduate **fellowships**: each student had at least one CSE faculty recommender. The fellowships included the Michigan Rackham Merit Fellowship as well as the Ada Lovelace, Beyster, CRA, Google, Facebook, IBM, JP Morgan, Lipschutz, Microsoft, ProQuest,

Rackham Outstanding Graduate Student Instructor, Towner, and Two Sigma fellowships, among others. Of those students for which information is available (via the [UGrab database](#)), 25% were female and 75% were male. Of those for which ethnicity information is available, 18.8% were Asian, 12.5% were White, and 6.3% were Hispanic.

Changes from previous year. CSE sponsored fewer students for fellowships compared to the previous year (16 vs. 20), with a lower proportion of female students (25% vs. 55%) and Hispanic students (6.3% vs. 15%). Factors such as COVID and the availability of faculty funding and advising capacity influence admissions and fellowship considerations. We encourage caution in the interpretation of measurements for small numbers. At the University level, Rackham announced that it will **no longer use the GRE** general test in its PhD admissions beginning with the 2022-2023 admissions cycle. While not directly a CSE initiative, this was something many CSE faculty and students advocated for.

Graduate Recruiting

CSE does not currently have a program of faculty or staff visits to other schools for recruiting purposes. In recent years, current PhD students have returned to their alma maters to deliver recruitment talks. In addition, CSE makes heavy use of advertising through social media and mailing lists, including lists targeted at specific audiences, such as URM students.

In the 2022-2023 Academic Year, in conjunction with [CSE Explore Grad Studies](#), we sent targeted recruitment emails to over 180 faculty at 87 institutions:

- Amherst College, Arizona State University, Boston University, Brown, Cal Tech, Carleton College, Case Western, Carnegie Mellon University, Colorado, Columbia University, Cornell, Dartmouth, Duke, Florida State University, Georgia State University, Georgia Tech, Harvard University, Harvey Mudd College, Howard University, Johns Hopkins, Maryland, Miami University, Michigan State, Michigan Tech, Minnesota, MIT, North Carolina, Northeastern, Northwestern, NYU, Ohio State, Penn State, Princeton, Purdue, Rice, Rutgers, Southeastern, Oklahoma State University, Southern Methodist University, Stanford, Stevens Institute of Technology, Stonybrook, Swarthmore College, Syracuse University, Texas A&M, Toronto, Tufts University, UC Berkeley, UC Irvine, UC Santa Cruz, UCLA, UC San Diego, UIC, UIUC, UMass Amherst, UNC, University of Chicago, University of Alaska Fairbanks, University of Arizona, University of California- Berkeley, University of Colorado-Boulder, University of Hawaii at Manoa, University of Illinois-Chicago, University of Maryland-College Park, University of Michigan-Flint/Ann Arbor/Dearborn, University of Notre Dame, University of Texas at El Paso, University of Toronto, University of Utah, University of Virginia, University of Washington, University of Wisconsin-Madison, UPenn, USC, UT Austin, UT Dallas, Virginia Tech, Washington University-St. Louis, Waterloo, Wayne State, Wellesley College, Western, Williams College, Wisconsin, Yale

In addition, CSE sends broader recruitment materials to over 170 mailing lists associated with multiple universities and organizations, including student organizations focused on underrepresented groups.

Similar to prior years, CSE sent recruiting emails to UM student organizations, including Color Coded, ECSEL, HKN, SHPE, GoSTEM, SWE, GradSWE, ETC, GEECS, KTP, and over 170 National Society of Black Engineers students and over 110 previous participants in the Explore Grad Studies program.

Over 75 participants attended the virtual CSE Explore Grad Studies 2022 Workshop, which helps prepare students for graduate applications. In 2022, the program had remarkably diverse representation with 22% first-generation students, 11% identifying as Hispanic or Black, and 35% women and nonbinary attendees.

Changes from previous year. This cycle saw slightly increased recruitment materials sent to both faculty and institutions, but a slightly decreased number of participants in Explore Grad Studies.

Graduate Applications: Race/Ethnicity Statistics By Degree

In AY 2023, CSE tracked 1301 applicants to the PhD program (via the Graduate Admissions dashboard system). Of those applicants, 128 were given offers of admission and 53 accepted. Their self-reported races/ethnicities were:

| | Applied (Ph.D.) | | Admitted (Ph.D.) | | Accepted (Ph.D.) | |
|-------------------------|-----------------|------|------------------|------|------------------|------|
| | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 |
| Total | 1300 | 1073 | 128 | 114 | 52 | 47 |
| 2 or More | 21 | 13 | 8 | 3 | 3 | 0 |
| Asian | 162 | 102 | 27 | 13 | 9 | 5 |
| Black | 7 | 10 | 1 | 0 | 0 | 0 |
| Hispanic | 1 | 16 | 0 | 1 | 1 | 1 |
| Native American | 0 | 0 | 0 | 0 | 0 | 0 |
| Did Not Indicate | 985 | 806 | 70 | 76 | 30 | 32 |
| White | 124 | 126 | 22 | 21 | 9 | 9 |

Changes from previous year. Overall, PhD applications increased by about 20% over the previous year. There was an increase in multiracial and Asian applicants, and a continued decrease in applicants who identified as White. While the past year saw increases in applications from students identifying as strictly Black or Hispanic, this year’s numbers were lower in those single-demographic categories and higher in the “2 or more” multi-demographic category. However, this increase in multi-demographic applications (which does include applicants indicating Black and Hispanic identities)

does not entirely account for the overall drop in Black and Hispanic applicants. CSE extended a similar amount of offers of admissions, and we note that admissions are guided by faculty advisor availability and research funding. Among students accepting our offers, we note an increase of individuals who self-reported as Asian and multiracial. Similarly to previous years, many more applicants did not indicate a race or ethnicity.

In AY 2023, CSE tracked 2463 applicants to the master’s program. Of those, 180 were given offers of admission and 50 accepted. Their self-reported ethnicities were:

| | Applied (MS) | | Admitted (MS) | | Accepted (MS) | |
|-------------------------|--------------|------|---------------|------|---------------|------|
| | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 |
| Total | 2463 | 2276 | 175 | 321 | 50 | 92 |
| 2 or More | 9 | 10 | 6 | 4 | 0 | 2 |
| Asian | 285 | 160 | 67 | 49 | 28 | 11 |
| Black | 8 | 7 | 0 | 3 | 0 | 1 |
| Hispanic | 9 | 12 | 5 | 8 | 0 | 2 |
| Native American | 1 | 0 | 0 | 0 | 0 | 0 |
| Did Not Indicate | 2056 | 2000 | 75 | 226 | 12 | 60 |
| White | 95 | 87 | 22 | 31 | 10 | 16 |

Changes from previous year. Master’s applications increased by almost 10% over the previous year. Most demographics stayed consistent with the previous year, with the largest change being an increase of applicants who did not report ethnicity. The master’s program shows a slight decrease in the number of Black and Hispanic students applying, admitted, and accepting our offers (but we encourage caution when interpreting smaller numbers).

Graduate Applications: Undergraduate Institution Statistics

In AY 2023, CSE received PhD applicants from a number of undergraduate institutions. The undergraduate institutions of applicants are one lens to evaluate the breadth of the applicant pool and our recruitment outreach efforts. Applicants who did not indicate one of the three most frequent ethnicities (i.e., “Did Not Indicate,” “White,” or “Asian”) came from 25 undergraduate institutions:

- Boise State University, Carnegie Mellon University, Cornell University, Francis Marion University, Georgetown University, Harvey Mudd College, Michigan State University, New

York University, Penn State University Park, Pomona College, Rensselaer Polytechnic Institute, Rutgers-New Brunswick, University of Arkansas Fayetteville, UC Davis, UCLA, University of Iowa, University of Maryland College Park, University of Michigan, University of Minnesota Twin Cities, UT Dallas, UT San Antonio, University of Wisconsin- Madison, Virginia Commonwealth University, Wichita State University, and Worcester Polytechnic Institute

For Fall 2023, CSE admitted applicants who did not indicate one of the three most frequent ethnicities came from the below 9 institutions. Regarding matriculation, 4 students accepted our offer from Boise State, NYU, University of Maryland College Park, and U-M.

- Boise State University, Carnegie Mellon University, Georgetown University, New York University, UC Davis, University of Iowa, University of Maryland College Park, University of Michigan, and UT Dallas

Focusing specifically on master's students, CSE internal tracking reports that the accepted, incoming master's degree students for Fall 2023 come from 29 different colleges including:

- California Institute of Technology, Case Western Reserve University, Georgia Institute of Technology, Indian Institute of Technology Bombay, Keio University, King's College London, Michigan State University, National Taiwan University, Ohio State University, Peking University, Princeton University, Rensselaer Polytechnic Institute, Spring Arbor University, University of California Berkeley, University of California San Diego, University of Colorado Boulder, University of Connecticut, University of Florida, University of Illinois Urbana-Champaign, University of Massachusetts Amherst, University of Michigan, University Minnesota Twin Cities, University Southern California, University of Texas Dallas, University of Washington, University of Arizona, University of Waterloo, University of Windsor, and Vanderbilt University

Their undergraduate institutions range from smaller liberal arts colleges (e.g., with enrollments of 800 undergraduates) to larger universities, including the University of Michigan itself (30,000 undergraduates).

Graduate Applications: Other Demographic Statistics

We also distinguish between domestic and international (non-resident) applicants and between male and female applicants. (In current tracking, both are reported as binary categories.)

| | Applied | | Admitted | | Accepted | |
|-----------------------------|---------|------|----------|------|----------|------|
| | 2023 | 2022 | 2023 | 2022 | 2023 | 2022 |
| Total | 3884 | 3426 | 418 | 496 | 172 | 188 |
| Domestic | 614 | 617 | 179 | 175 | 82 | 80 |
| Domestic Female | 115 | 110 | 46 | 43 | 15 | 13 |
| Domestic Male | 499 | 507 | 133 | 132 | 67 | 67 |
| International | 3270 | 2809 | 239 | 321 | 90 | 108 |
| International Female | 707 | 700 | 71 | 97 | 22 | 26 |
| International Male | 2563 | 2109 | 168 | 224 | 68 | 82 |

Changes from previous year. Graduate applications as a whole continue to increase. However, we note a 16% increase in international applications. Despite this increase, the amount of domestic women and men admitted were comparable to previous years, and the amount of admitted international men and women decreased slightly.

Graduate Enrollment Trends

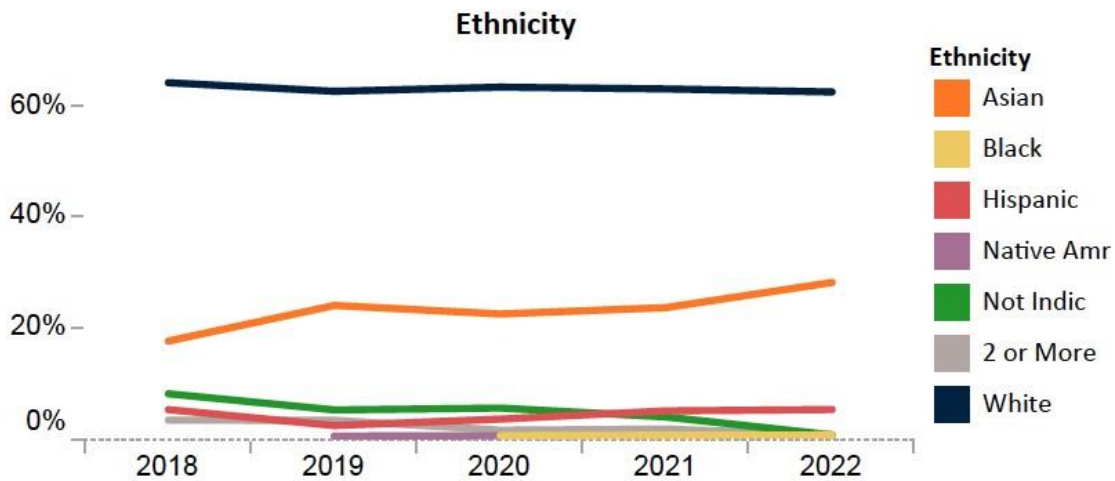
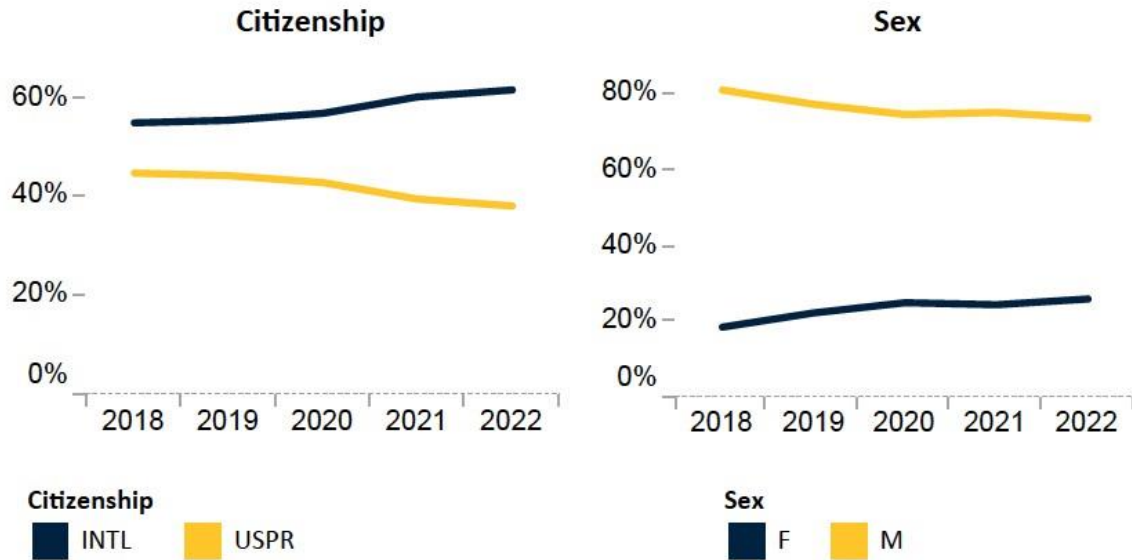
The [Rackham Graduate School's Doctoral Program Statistics for Computer Science and Engineering](#) include information about enrollment trends:

ENROLLMENT



Total Enrollment

230



Demographics

Insights into the citizenship, gender, and ethnicity of students enrolled in Computer Science & Engineering for 2022. Ethnicity is reported only for domestic students (US Citizens or Permanent Residents). Hispanic students are excluded from the Two or More category. Categories with fewer than 5 students are not shown.

Insights into the citizenship, gender, and ethnicity of students enrolled in CSE or 2021. Ethnicity is reported only for domestic students (US Citizens or Permanent Residents). Hispanic students are excluded from the Two or More category. Categories with fewer than 5 students are not shown.

Note that ethnicity information is only available for domestic students (US Citizens or Permanent Residents). Note that slight differences in how CSE and Rackham present the data result in slightly different totals. This can be relevant for groups with low total numbers, such as underrepresented minorities.

Graduate Degree Completion

CSE’s Graduate Program Office provided data around graduate degree completion rates. CSE conferred 142 graduate degrees in Fall 2022 and Winter 2023, including MS, SUGS, and PhD degrees. Note that students receiving degrees in AY 2022-2023 entered the program in previous years. Their self-reported ethnicities were:

| | Completed (All) | | Completed (MS, SUGS) | | Completed (Ph.D.) | |
|-------------------------|-----------------|---------|----------------------|---------|-------------------|---------|
| | F22/W23 | F21/W22 | F22/W23 | F21/W22 | F22/W23 | F21/W22 |
| Total | 142 | 126 | 124 | 111 | 18 | 15 |
| 2 or More | 2 | 2 | 2 | 2 | 0 | 0 |
| Asian | 64 | 49 | 56 | 47 | 8 | 2 |
| Black | 1 | 1 | 1 | 1 | 0 | 0 |
| Hispanic | 4 | 2 | 4 | 2 | 0 | 0 |
| Native American | 0 | 0 | 0 | 0 | 0 | 0 |
| Did Not Indicate | 51 | 44 | 42 | 35 | 9 | 9 |
| White | 20 | 28 | 19 | 24 | 1 | 4 |

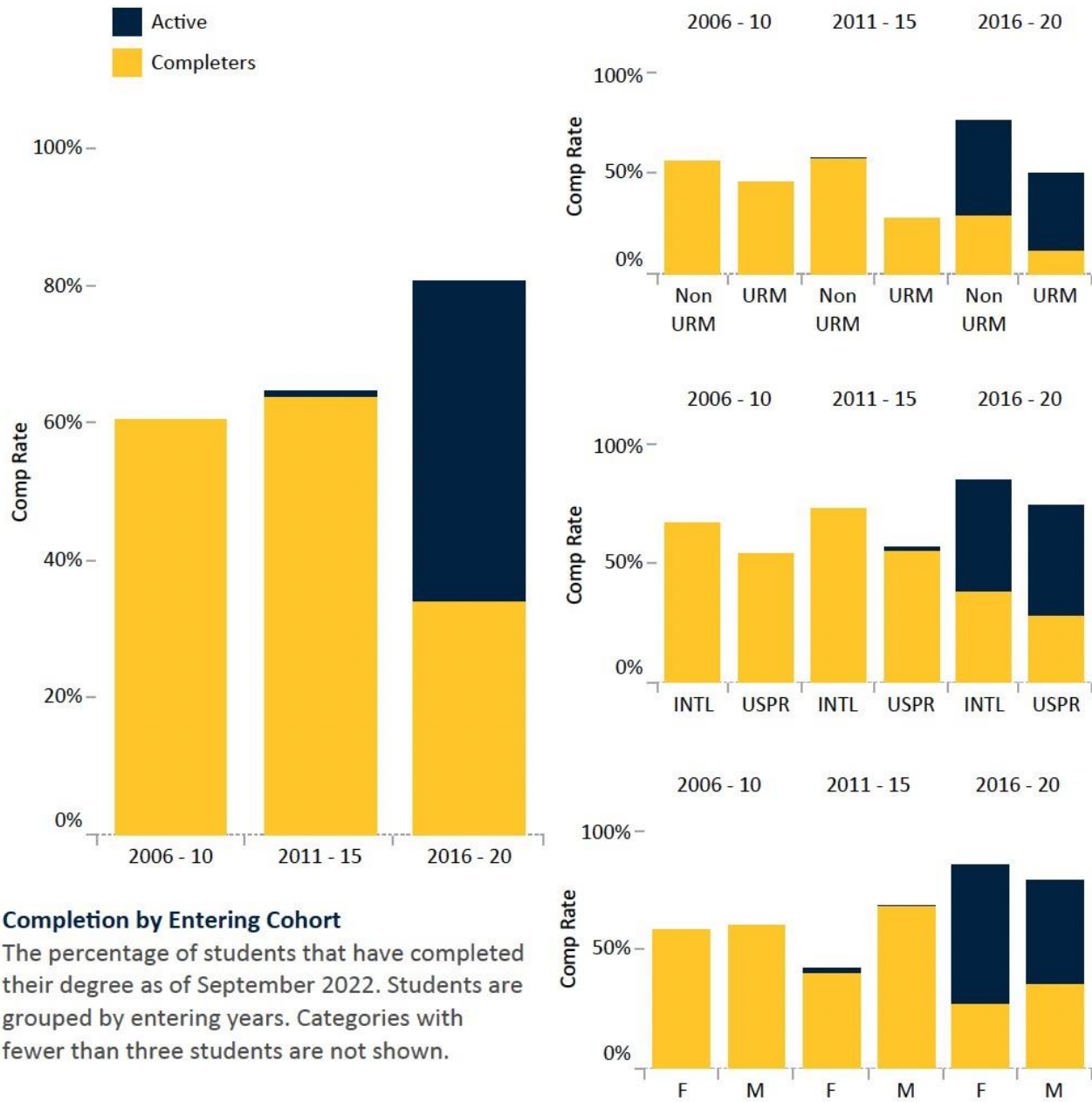
The [Michigan Engineering Career Resource Center](#) provides salary data on average salaries by area. For 2022, the latest available as of this writing, the reported Computer Science and Engineering salaries for students graduating with master’s degrees were median \$135,000, average \$139,280, and range \$103,000–\$200,000.

Changes from previous year. We continue to note an increase in degree completion, driven largely by more master’s students completing the program. Overall PhD conferral has increased.

Graduate Degree Completion Trends

The [Rackham Graduate School’s Doctoral Program Statistics for Computer Science and Engineering](#) include information about degree completion trends:

COMPLETION RATE BY ENTERING COHORT



CSE is particularly interested in trends in completion rates across groups. For example, in AY 2022-2023 the DEI Committee and graduate students discussed apparent differences in completion rates between male and female students. We coordinated with John Gonzalez, Director of Rackham Institutional Research, to look more closely into the data, including to look for potential differences in particular years (e.g., under COVID-19, or during periods associated with allegations of faculty sexual

misconduct). For male vs. female students, while there is a trend, the difference is not statistically significant, although the recurring trend merits careful monitoring. For other groups, such as international students completing the program at a higher rate than US permanent residents, the difference is statistically significant.

Graduate Degree Post-Completion Outcomes

John Gonzalez of [Rackham Institutional Research](#) tracks the “Rackham Career Outcomes Collection.” Among CSE students graduating in 2022, 32 provided data. Among domestic students (12), 7 self-identified as white, 2 as Asian, and 3 did not indicate. The remaining 20 students are considered international and thus no ethnicity information is available for them. Post-graduation data is available for 6 graduates. Among these graduates, 1 reported working in a research-intensive university, 1 reported working at an international university, and 4 reported jobs at companies (e.g., Google, etc.), and the remaining did not report information. Since this represents only 6/32 students graduating from CSE in 2022, an additional focus on encouraging participation in graduate outcomes data collection remains merited. Efforts are underway to do so going forward.

Changes from previous year. The amount of post-graduation data continues to be less than previous years, and there does not appear to be a significant change between the ratio of those reporting academic vs. industrial jobs. We urge caution in the interpretation of results with smaller numbers.

Graduate Program Context and Discussion

As a broad point of comparison, the 2022 [Computing Research Association Taulbee Survey](#) of 182 PhD- conferring CS departments found that 24.9% of enrolled CS PhD students were female, 74.9% were male, and 0.2% were nonbinary. This is a very slight increase for female students (0.5%). 2.2% of enrolled CS PhD students identify as Hispanic, while Black or African-American students account for 1.6%. These percentages have not changed significantly from the 2021 survey.

CSE’s graduate recruiting efforts currently show a strong focus on [Research 1 Universities](#) and highly ranked programs and a smaller, but growing, emphasis on community colleges, [Historically Black Colleges and Universities](#), or other [Minority-Serving Institutions](#).

CSE’s enrollment rate for female PhD students continues to align with the national average. Demographic data regarding degree conferral should be interpreted with care due to small numbers. However, in the past two years CSE has not conferred any PhDs to Hispanic or Black students. CSE produced four Hispanic master’s students and one Black master’s student, which is a slight increase from Fall 21/Winter 22. This continues to be a significant area for improvement for CSE. The Taulbee Survey again suggests that this is an issue systemic to the field (only 19 out of 1,609 graduating CS PhD students identified as Black or African American in their survey). CSE master’s degree enrollment and production trends paint a similar picture when compared to national averages. CSE’s graduate application institution data suggests that many of our minority applicants come from the same small set of undergraduate institutions.

Faculty Recruiting

This section provides additional transparency on the processes associated with faculty recruiting. This information may clarify the context under which CSE strives to elicit a broad pool of applicants and make decisions to interview, recruit, and retain high-quality candidates.

CSE faculty recruiting activities are conducted and tracked internally, within the CSE division. While some candidates are interdisciplinary, ECE and CSE faculty recruiting and hiring within EECS are effectively separate and parallel.

CSE faculty hiring is overseen by **Faculty Search Committees**. While education and research are priorities for all faculty members, there is typically one committee each year for hiring research-focused faculty members and a separate committee for hiring teaching-focused faculty members (lecturers). This distinction is made because those faculty tracks involve slightly different activities (e.g., lecturers are typically tasked with teaching core undergraduate classes) and thus candidates demonstrate the qualifications in slightly different ways. The tenure-track search committee now includes a graduate student representative (from the CSE graduate student organization) as a full member.

While details vary from year to year and school to school, hiring a new faculty member requires support from higher levels of the University administration. Resources must be provided (e.g., space, salary), and as a result a faculty search is often given a finite number of **positions** to fill. Sometimes these are given over a longer period; a department might be given permission to fill three faculty positions over the next two years, for example. When a faculty member leaves or retires, permission is typically given to hire a new faculty member, often called a “replacement hire.” Alternatively, when there is a strategic desire to grow a department (e.g., perhaps because many undergraduates are enrolling in its classes, or because its research is particularly successful), a department might be given permission to fill new positions. In some cases, a department might focus hiring on a particular subject matter **area** (e.g., to hire someone in machine learning). In other cases, a department might look to hire the best candidates on the market that year. In addition to the departmental positions that may be tied to priority subject areas, the College of Engineering always entertains additional hires, including “Target of Opportunity” candidates that fall outside priority areas of allocated positions. These can be considered special opportunities for various reasons, including (and most commonly) contributions to diversity. Per state law this cannot be based on identity but can be based on other factors, such as a demonstrated commitment to broadening the field.

The search committee drafts an official job description and notice which is posted publicly. Candidates typically apply in a November to December timeframe. The search committee reviews their application materials, which include essays, evidence of teaching, research and service success, and letters of recommendation. All faculty applications must include a DEI statement, in which candidates explain their record of activity and achievement in support of diversity, equity, and inclusion. The Faculty Search and Executive committees carefully review the candidates’ DEI

statements and activities as a first-class consideration (on par with research and teaching).

Starting last year, CSE introduced a **pre-screen** step in our evaluation process for all candidates. Since pre-screen is lower cost relative to a full interview, this was intended to help us consider more candidates who might otherwise have been overlooked, especially candidates from underrepresented groups and institutions.

After pre-screening, a small number of candidates are invited to **interview**. Interview invitation decisions are based on a combination of considerations, including targeted subject matter areas and candidate qualifications. The CSE faculty as a whole are involved in the process. For example, while the Search Committee is responsible for reading through all applications and bringing promising candidates to the forefront, all applications are visible to all faculty members. In addition, the various CSE [Labs and Centers](#) are explicitly consulted and meet to discuss and review applications from candidates in their subject matter areas. A key constraint regarding interview selection is time. It is typically not possible to host more than two, or in extreme cases three, interviews per week. Each interview is about a day and a half long, and includes a seminar presentation, meetings with individual faculty, meetings with student groups, and meetings with department chairs and deans. In addition, not all candidates are available at all times (e.g., they are often also interviewing at other schools), and thus interview time slots must be coordinated.

Feedback from anyone who has interacted with the candidate or the candidate's application materials is solicited after the interview. In particular, student feedback from student-only meetings, which often involve discussion of advising and DEI issues, are solicited via a student-facing portal and taken seriously in hiring discussions. Student feedback is often significant. In several cases over the past few cycles, DEI review as well as student feedback has led to significantly different rankings of candidates, relative to a counterfactual where we did not have or make use of DEI statements or student feedback. In some cases, faculty reached out and engaged in deeper discussions with students in order to reach a consensus.

Once interview feedback is available, the search committees, labs, and the faculty as a whole meet to consider whether or not to extend offers. Key considerations include target hiring subject matter areas (if any), candidate qualifications, the number of positions available, and whether or not the candidate meets department collegiality, climate, and professionalism standards. Interviews often have a significant impact compared to a candidate's record "on paper." While CSE-level hiring authority ultimately resides with the CSE Executive Committee, the chair contacts candidates and handles any negotiations, any faculty member can evaluate any candidate, and faculty **discuss and vote** on candidates in lab (i.e., subject matter area) meetings.

A number of logistical nuances and uncertainties complicate the situation. For example, because the interview season spans multiple months, it may be necessary to decide whether or not to extend an offer to one candidate before another candidate has interviewed. Similarly, not all offers are accepted,

so a department hoping to hire one faculty member might negotiate with the administration to have two outstanding offers simultaneously with the expectation that only one will be accepted. While this incurs the slight risk that more candidates might accept offers than expected, it mitigates the risk that a search cycle might produce no new hires. Conversely, a department will sometimes decide that no available candidate in a particular hiring cycle was above threshold.

Finally, sometimes faculty candidates intentionally choose not to report particular specific information or even the general fact that they are applying. Some candidates may not report ethnicity information, for example. In addition, while most faculty candidates just completed graduate degrees or postdoctoral research positions, a small number are more senior faculty or researchers at other schools or labs. A senior candidate, such as one who already has tenure at another institution, may choose not to reveal that an application is being made (e.g., to avoid friction at the current institution until and unless the application results in an offer) and may ask that the visit be publicly recorded as a general seminar, rather than a job interview.

These issues complicate **reporting**. Questions that might appear direct, such as “how many positions were available this cycle and how many minority candidates were invited to interview?”, may be difficult to make precise. For example, if the administration offered a department three positions over two years, there may not be a definite answer for how many positions were available the first year alone, and if a senior candidate applied, the number of interviews may contain private information.

Faculty Recruiting and Diversity

Faculty hiring and employment are governed by applicable laws relating to civil rights and workplace discrimination, such as Michigan’s [Elliot-Larsen Civil Rights Act](#) (at the state level) and Title VII of the [Civil Rights Act of 1964](#) and [Executive Order 11246](#) (both at the federal level). Like the Michigan constitutional provision discussed above, these state and federal laws prohibit discriminatory hiring processes (e.g., based on race or gender). Instead, there is a focus on producing a broad applicant pool that has as many excellent candidates as possible from all backgrounds.

To that end, search committee members are required to complete special training, namely the [STRIDE Workshops](#) offered by the ADVANCE Program, which “provides information and advice about practices that will maximize the likelihood that diverse, well-qualified candidates for faculty positions will be identified, and, if selected for offers, recruited, retained, and promoted at the University of Michigan.”

The committee actively recruits candidates who increase the diversity of our application pool and/or have made strong contributions to DEI, e.g., through programs such as the AI Symposium (which highlights rising stars in AI from underrepresented backgrounds), Berkeley’s Rising Stars program for women in EECS (where CSE faculty Reetu Das was an invited speaker in AY 2021-2022), MIT’s EECS Academic Career Fair, and Michigan’s NextProf workshops. In addition, there was a recruitment campaign via Twitter.

CSE has also previously participated in the [President’s Postdoctoral Fellowship Program](#) (PPFP), a

postdoctoral fellowship intended to lead to a tenure-track offer after two years, assuming that candidates continue on a promising trajectory and conditional on a tenure-track interview. The program is particularly interested in scholars with the potential to bring to their research and undergraduate teaching the critical perspective that comes from their non-traditional educational background or understanding of the experiences of groups historically underrepresented in higher education. The department continues to monitor the program, but there is a perception that the PFP is less attractive than an up-front tenure-track offer. With the competitive hiring environment for computer science faculty, the focus this cycle was on direct recruitment to a tenure-track position. However, our previous PFP fellow successfully converted to a tenure-track position in CSE this cycle.

Changes from previous year. This cycle, the Faculty Search Committee solicited nominations for pre-screens directly from the DEI committee, all of whom were invited to pre-screen.

In addition, the tenure-track search committee mandated that at least one teaching faculty be part of every tenure-track candidate interview. This was intended to ensure that each candidate's teaching skills were expertly assessed, and to help us identify climate issues that might arise due to candidate attitudes toward teaching-focused faculty.

The search committee also substantially improved its engagement with graduate students. In particular, the department offered a graduate seminar course (EECS 599) to provide students with credit for attending faculty interview seminars. In addition to increasing student engagement in the search process, this was intended to help students gain a breadth of knowledge and experience that might better prepare and motivate them for academic careers. The search committee also developed a set of documents to help students understand the search process and how to actively engage with our process. In addition, we revised the questions asked in student evaluations of faculty candidates to help us assess candidates along several student-relevant dimensions (e.g., mentorship and climate).

This cycle, there were robust discussions around the balance between maintaining an inclusive climate and protecting individual expression, as well as around our process for evaluating DEI statements and contributions. Several ideas were generated for consideration in next cycle's processes, including asking candidates a question related to diversity, equity, and inclusion in the pre-screening and rubrics for more systematically evaluating DEI statements and contributions. The DEI Committee anticipates connecting with the Faculty Search Committee before their process starts next cycle to help concretize these discussions.

Faculty Recruiting Statistics

In this Academic Year, CSE received 442 applications for faculty positions (all data in this section aggregates across both tenure-track and lecturer searches).

Only 163 of those 442 applicants (37%) chose to provide self-reported demographic information, the same proportion as previous years.

Of those, 61% (100/163) reported as male and 24% (39/163) reported as female, with the remainder not indicating either sex (the College of Engineering currently tracks sex rather than gender in this context.)

Of those who self-reported demographic information, 54% (88/163) identified as Asian, 27% (44/163) as White, 1% (2/173) as Hispanic, and 0.6% (1/163) as Black. Some applicants listed multiple races or ethnicities. No applicants reported other races or ethnicities (e.g., American Indian).

We invited 44 of those 442 applicants (10%) to interview. Of the 44 interviewees, 39% (17/44) identified as female. CSE extended job offers to 27 candidates: 66% (18/27) male and 33% (9/27) female.

As of this writing (early June), 8 candidates accepted offers (2 self-identified as female, 1 self-identified as Hispanic). This includes one PFP fellow from two cycles ago who accepted a tenure-track offer. Not all candidates with offers in hand have made final decisions as of this writing.

Changes from previous year. The total number of applicants decreased slightly this academic year, due in part to broader trends in hiring this cycle (e.g., COVID restrictions on hiring being lifted last cycle). Overall, self-reporting of demographic data remained similar after an increase two cycles ago (from 18% to 38%) after we clarified why we are requesting it on the application. However, there was a substantial decrease, from 75% to 61%, in the number of male-identifying applicants, but with no corresponding increase in the proportion of female-identifying applicants, which decreased slightly this year after a sharp increase two cycles ago (from 15% to 28%, and now 24%). Similarly, fewer applicants self-reported as Asian this year (from 64% to 54%) without a corresponding increase in other categories. We continue to receive very small numbers of applicants identifying as Hispanic, Black, or American Indian.

Faculty Recruiting Context and Discussion

As a broad point of comparison, the 2021 CRA Taulbee Survey reports that 23.3% of CS PhD degrees granted were received by female students. While not all faculty candidates are new PhDs, 24% of CSE's applicants, 39% of CSE's interviewees, and 33% of CSE's offers for faculty positions identified as female, which is above the national average.

Some have suggested that CSE might implement something akin to the "[Rooney Rule](#)" for faculty hiring, in which at least one minority candidate must be selected to be interviewed during each faculty search cycle. This approach [may not be legally permissible](#), but the situation is also complicated by

low total numbers and low ethnicity reporting rates. Given the low total numbers of interview candidates with reported ethnicities, providing evidence that at least one individual from each of various underrepresented groups was interviewed could be misinterpreted as tokenism. Instead, search committees can take steps to broaden their outreach efforts to promote greater diversity in their applicant pools. In addition, job postings can require a commitment to DEI, as reflected in scholarship, teaching, or service, and for search committees to use the strength of a candidate's rating on that criterion as a factor.

Care must be taken when interpreting minority ethnicity information. If 1.3% of PhDs produced nationally were awarded to Black or African-American students (19 such degrees from hundreds of schools in 2021), hiring cycles in which Black candidates were interviewed (such as the 2020-2021 Academic Year) would appear significantly above that average, while cycles in which no Black candidates were interviewed would appear below that average. Pipeline concerns and small-number reporting difficulty do not eliminate responsibility; it remains incumbent on CSE to ensure that the applicant and interview pools are as broad as possible.

Efforts to actively cultivate several candidates from underrepresented groups (prior to the application/interview/hiring periods) did not increase the racial diversity of our applicant pool, interviews, and offers for this AY, so more work remains to be done.

A number of considerations, from the public perception of CSE's climate and allegations of faculty sexual misconduct, might continue to be having a negative impact on our ability to recruit strong candidates across demographic groups, but we are not able to determine the relative impact of this factor over other factors, e.g., an overall competitive hiring environment. We encourage caution when interpreting small numbers but note that CSE must carefully consider similar information to determine if potential negative trends are emerging.

In addition, there appears to be a change in self-reporting patterns this year which resulted in substantially fewer applicants identifying as male and Asian, without a corresponding increase in other categories. While we do not have data to point to particular reasons for this change, there may be a perception that applicants are disadvantaged by revealing that they are members of majority groups (among applicants to CSE).

CSE Sentiment

In addition to town halls and other community gatherings and engagement described later, CSE was also the subject of an external climate assessment and organized two different approaches to determining sentiment: an analysis of course surveys and a check-in process with graduate students.

Climate Assessment Committee

In 2021, the Climate Assessment Committee (CLASS), was charged with overseeing an independent review of the overall culture and climate in CSE and hosted two virtual community events in September

to share results and recommendations from the external firm. The “Towards the Future” survey findings were also published [in a public report](#).

[Issues including](#) oversubscribed courses, the need for more support and participation for underrepresented students, and allegations of sexual misconduct involving CSE faculty were cited as factors for examining CSE’s climate more closely. Recommendations from the assessment, presented at the community meetings, fell into three categories: steps to improve diversity, equity, and inclusion; steps to heal past sexual misconduct issues and rebuild trust; and steps to address concerns regarding the student academic experience.

Some of the specific recommendations, such as “Further develop mentoring programs,” “Have the University offices responsible for compliance with policies and conducting investigations appear on campus to answer questions,” or “Training on ‘imposter syndrome’ and other ways to encourage people to speak up” have associated efforts already underway (see later in this report). Others, such as “Improve recruiting of Underrepresented individuals for all Faculty and Staff Positions,” “Make training on misuse of power imbalances a requirement for Faculty and Staff,” and “Foster group work among Students and in so doing, review the Code of Honor and determine if any changes are required to help foster proper and appropriate group work among Students” remain longer-term processes. Finally, some recommendations, such as “Leadership should identify and concisely set forth the goals as to Student-to-Faculty ratio at the various Student levels and evaluate what is needed to achieve the ideal ratio” are explicitly addressed as part of the Strategic Action Plan efforts undertaken by CSE and summarized later in this report. In that regard, the results of the assessment are helping to shape CSE policy going forward.

Climate Questions on Course Surveys

In Winter 2020, the DEI Committee added climate- and inclusion-focused questions to the end-of-semester course evaluations for all CSE classes. This included three quantitative (Likert scale 1-5) questions and one qualitative (free response) question. For AY22-23, the responses were fairly positive:

Fall 2022

- 4.76 The instructor treated students with respect.
- 4.5 I felt included and valued when working with other students.
- 4.4 I felt comfortable asking questions in class.

Winter 2023

- 4.74 The instructor treated students with respect.
- 4.48 I felt included and valued when working with other students.
- 4.4 I felt comfortable asking questions in class.

Each semester, about 900 responses are collected in response to the qualitative question “How might

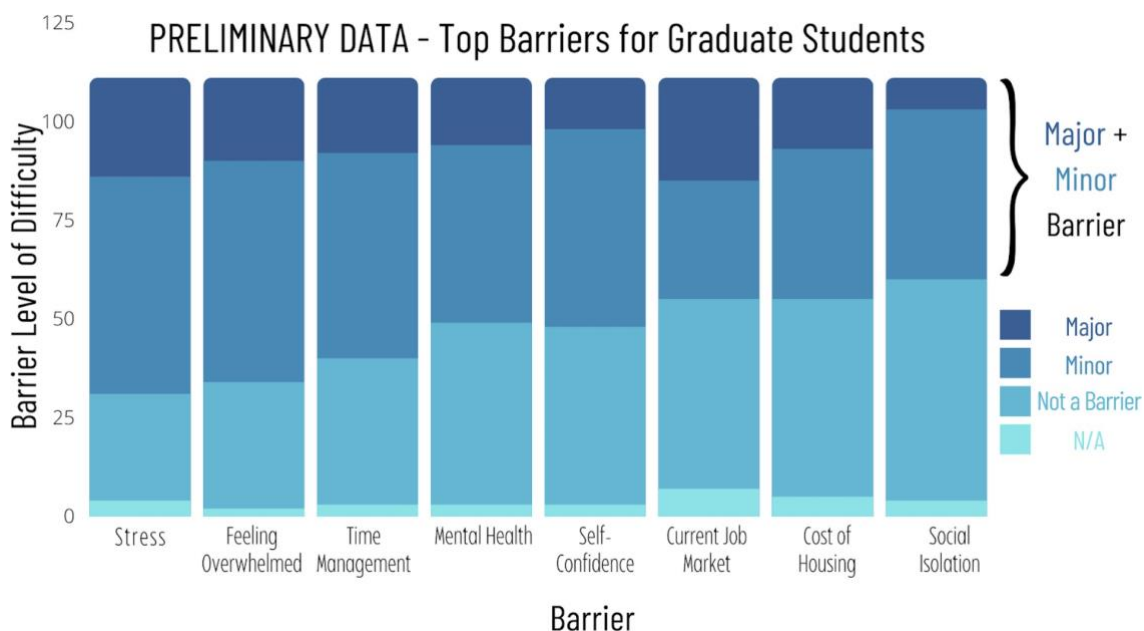
the class climate be made more inclusive of diverse students?” A separate, full report on these responses is currently being developed and is planned to be released publicly to the community. The public-facing report will elaborate on the kinds of suggestions that students submit, as well as high-level trends across courses.

Changes from previous year. The averages for the Likert scale questions remain similar to prior years. Once we have analyzed the qualitative data, we plan to hold a more in-depth discussion with faculty and teaching staff to review and implement students’ suggested strategies where possible.

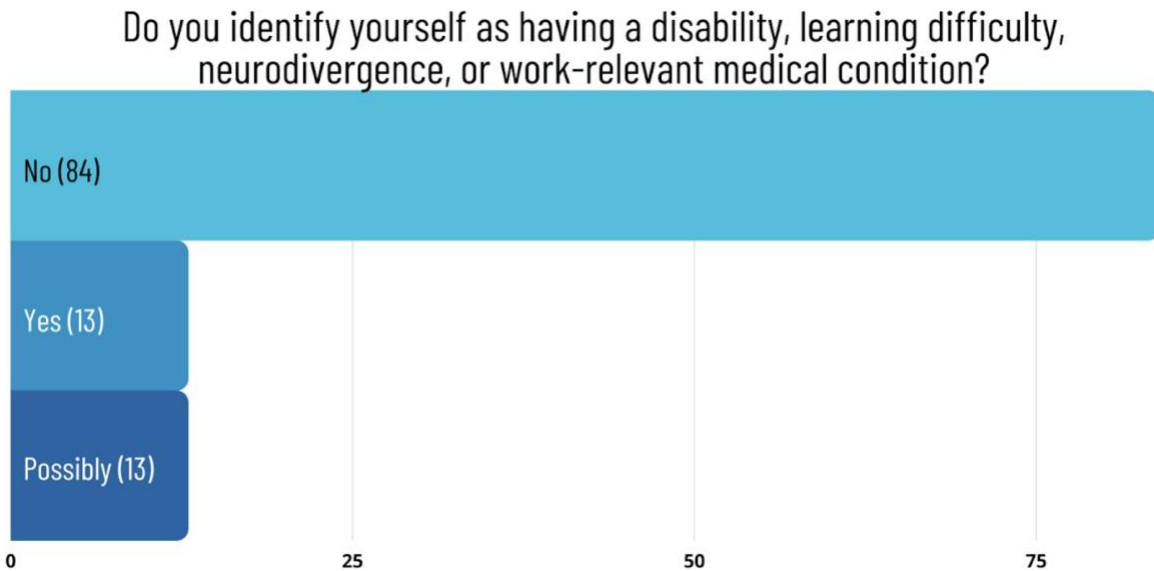
Graduate Student Check-Ins

Starting in 2020, CSE reached out to graduate students to conduct one-on-one check-ins. The check-in process includes collecting qualitative data via 15-minute Zoom interviews with value-neutral questions, and quantitative data through a 30-question online survey sent to all master’s, SUGS, and PhD Students. Per student request, this year the Zoom interviews are offered only to new students and students who have indicated a concern in prior years. Also newly added this year are questions about neurodiversity and IRO reporting methods. Goals of this initiative include continuing to learn about graduate-level concerns, identifying students who might benefit from additional support, and hearing from all students (including those, such as first-generation students or non-native English speakers, who might not reach out to us). Data collection for this effort is ongoing at the time of writing this report.

We summarize the 112 received responses. From the preliminary data, most graduate students continue to report that they are doing well on average and are having generally positive experiences with CSE staff, professors, teaching staff, and fellow students. Most graduate students rate student/faculty relationships and the clarity of program expectations as “excellent,” “very good,” or “good,” and most report knowing who to talk to about procedures. Compared to last year, more students are reporting a greater sense of community, though about a quarter of responses still describe their sense of community as only “poor” or “fair.”

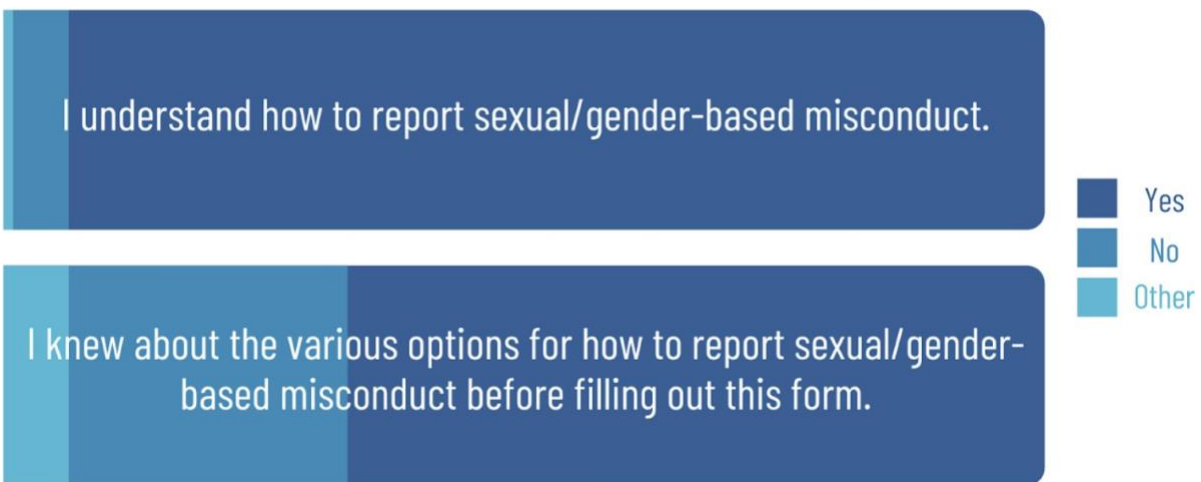


Over 70% of students reported that stress was either a major or minor barrier to their own success. Feeling overwhelmed, time management, mental health, self-confidence, the current job market, the cost of housing, and social isolation were also top barriers to their own success.



The newly added question regarding disability status reveals that almost a quarter of students either identify or possibly identify as having a disability, learning difficulty, neurodivergence, or work-relevant medical condition.

PRELIMINARY DATA - Knowledge of IRO reporting options



Thirty-seven students reported that they did not know about the various reporting options for sexual or gender-based misconduct prior to filling out the survey. The survey listed the three options for

reporting ([sharing the experience with an IRO](#), filing a formal report through the [Equity, Civil Rights, and Title IX Office](#), or reporting via the anonymous dropbox in Tishman Hall or through the [online form](#)) and based on the preliminary findings, it seems that more advertising of these options, as well as confidential resources (such as the [Sexual Assault Prevention & Awareness Center](#)), is needed.

A separate, full report on this activity is currently being developed and is planned to be released publicly to the community. The public-facing report will elaborate on the concerns above (both by abstraction and through select anonymized student quotes), highlight any issues of department communication and transparency, and give constructive feedback to advisors about activities that correlate with positive student satisfaction (advisor communication, collaboration, and work-life balance) as well as activities that correlate negatively with student satisfaction (micromanagement, apathetic communication, and lack of a second supporting faculty member). Once published, a discussion will be planned with CSE faculty and other relevant parties.

Changes from previous year. Following student requests, the face-to-face portion of the check-ins will only be held with new students and those who have expressed a prior concern. Overall, the reported issues and their relative priorities are very similar to last year. Informally, now that we have a three-year picture of graduate student views, our focus is on addressing the issues raised. We will continue to focus on tackling the barriers and difficulties that students have reported.

Climate and Diversity Activities

CSE students, faculty, staff and community members organize a number of DEI, climate, and outreach activities. These include both grassroots activities that grew organically as well as CSE-wide or -sponsored actions.

Community-Wide Engagement

During this academic year, CSE's DEI Committee published a report detailing their activities during the Fall semester as well as priorities for the Winter semester. The full report can be found [here](#) and three new activities of note are summarized below:

- **Undergraduate Instructional Aide (IA)/Grader Experience.** This project focuses on reports from undergraduate IAs that much of the harmful behavior they experience is from the students they are supposed to be supporting. The committee has held a focus group and collected survey data from students to get a better sense of their experience and ways we can support them. Planning for community-building initiatives has started for Fall 2023.
- **Undergraduate Mentoring Program.** This program began as a pilot in Fall 2022 and continued through the Winter semester. The goal of this program is to provide more support for students (particularly from underrepresented groups) as they transition into the major and take 183, 203, 280, and/or 281. Four mentors served the program for both semesters and 17 mentees participated in F22 and 24 mentees participated in W23.

- **Neurodiversity.** Following requests from students, CSE DEI organized an in-person discussion with two faculty members about support for neurodiverse graduate students. Plans to continue the conversation around support and include undergraduate students are under way for Fall 2023.

A dynamic we noted during town halls in previous years was that concerns regarding the experiences of students of color and women were often not addressed. Therefore, a continued priority for the DEI Committee is direct outreach to student organizations in order to have focused conversations regarding climate with their constituents. Two members of the DEI Committee and one faculty member attended a GEECS meeting to host a conversation around support systems for women in STEM in the College of Engineering. There were around 20-30 participants at each of these sessions. Themes that arose from these conversations were captured and beginning action steps to address them were identified in this [document](#).

The DEI Committee continued outreach efforts to **meet with student organizations**. These typically lasted an hour and included introductory remarks followed by listening to concerns and brainstorming ways CSE can offer support. This year, meetings and outreach included G/oSTEM, GEECS, and GradSWE. Some of these meetings led to further collaboration with CSE; for example, CSE DEI helped sponsor a Black History Month Celebration Lunch hosted by GradSWE.

In addition to conversations with student organizations, CSE DEI organized an in-person discussion with two faculty members about support for neurodiverse graduate students in April 2023. DEI has followed up with [SSD](#) and [ASAP](#) to continue the conversation around support.

In contrast to previous years, CSE's DEI Committee has focused on such smaller conversations (which can be specialized to student contexts) rather than large town halls.

EECS held a fourth annual [Juneteenth Celebration](#) to observe the [Juneteenth holiday](#) marking the end of chattel slavery. The event was sponsored and organized by CSE and ECE. This year's celebration, *EECS Juneteenth Celebration: Tech Empowering Our Communities*, included a welcome address from EECS alumnus and Michigan Lt. Governor Garlin Gilchrist, a performance of the Black National Anthem, a reading of the Emancipation Proclamation and history of Juneteenth, and a panel discussion on the importance of empowering and uplifting our Michigan communities through STEM.

CSE Program Activities

In AY 2022-23, CSE continued its [inclusive teaching training](#) for instructional assistants and graduate student instructors. **Inclusive teaching training** efforts were held in both the Fall and Winter semesters, and to target all teaching assistants from multiple classes. The 90-minute sessions include information on topics such as implicit bias, stereotype threat, and imposter syndrome and include hands-on discussions. The advanced workshop reviews the content of the introductory workshops but also focuses on difficult scenarios that might come up in teaching. In Fall 2022, 69 students attended the standard training, and in Winter 2023, 51 students attended the standard training and 107

attended the advanced training (compared to 71, 123, and 74, respectively, in Fall 2021 and Winter 2022). The inclusive teaching training offerings were well-received by instructional aides. For Winter 2023, 79% of the standard attendees gave the training workshop an “A” grade, and 87% of the advanced attendees gave it an “A” grade.

Waiting lists for upper-level computer science classes are a critical [undergraduate climate concern](#). Recently, CSE expanded its upper-level CS technical elective and capstone course Spring and Summer offerings based on the anticipated demand. This included **course offerings** of EECS 441, 481, 482, 484, 485, and 495. CSE added sections in several high-demand courses including EECS 481, 485, and 493 based on availability of instructors and prioritizing courses with high demand.

Waiting list and capacity concerns remain significant but nuanced. For example, in AY 2023-2023, CSE expanded EECS 445 to 6 sections, raising enrollment capacity from 480 to 720 students. Despite this, there was still a waiting list for EECS 445. Addressing Enrollment and Admissions concerns through multiple approaches (including raising capacity and implementing major selection policies) has become a key focus of CSE’s Strategic Action Plan.

CSE eliminated the GPA requirement for declaring the CS-LSA major. Previously, students were required to achieve a 2.5 GPA over the prerequisite courses (Math 115, Math 116, EECS 203, EECS 280) taken at U-M to be eligible to declare CS-LSA. While students who meet the GPA requirement do tend to be better prepared for upper-level CS courses, the policy required students who do not meet the threshold to retake courses, which negatively affected those on financial aid or who do not have time in their schedule to retake a course. The CSE faculty determined that the negative consequences outweigh the benefits of this policy, so they voted to eliminate the GPA requirement as of Fall 2022.

CSE uses physical and cryptographic **anonymous dropboxes** for community members to leave feedback or discuss climate concerns. Between June 1, 2021, and June 1, 2022, 38 comments were submitted via the dropbox (of which 4 included sender follow-up information and 34 were wholly anonymous). Between June 1, 2022 and June 1, 2023, 9 comments were submitted (of which 8 were anonymous). This represents a decreasing trend in reported concerns. We speculate that many commonly-reported topics in past years (e.g., COVID issues, discussions related to allegations of faculty sexual misconduct) have been partially addressed, and others (e.g., instructional aide concerns, graduate student lab concerns, etc.) have been increasingly handled via check-ins and surveys of those groups. Students and community members are welcome to use these [anonymous mechanisms](#) for any topic.

In AY 2020, CSE expanded the number of questions related to climate and DEI activities in **faculty annual reports**. For the 2022 report, 48 of the faculty with reports available elected to respond with detailed summaries of their DEI activities. Faculty annual report data is used by CSE when considering certain raises and awards. In addition, CSE continues to consider ways in which faculty can voluntarily include certain structured DEI activities (such as attendance at [STRIDE workshops](#) and [CRLT Engineering workshops](#)) in **promotion and tenure casebook materials**. CSE continues to offer new

faculty members monetary research award incentives to attend extended training. One medium-term goal is to see if faculty are applying what they are learning in such workshops in the classroom and to consider alternative ways to evaluate teaching.

CSE Associated Groups, Programs, and Activities

Many programs, groups, and activities have a large number of student and faculty organizers; for brevity, we list a few contacts for each program and include links for more information.

The [AI4All program](#) features a two-week summer camp for high school students and open learning with a focus on Detroit. The program was jointly organized by David Fouhey and OCCE. About 25 students participated this year.

The [African Undergraduate Research Adventure](#) (AURA) program is a research exchange for undergraduate students at the Addis Ababa Institute of Technology who [come to Ann Arbor for 12 weeks during the summer](#). Todd Austin and Valeria Bertacco, among others, organize the program.

The [Computing CARES](#) program aims to broaden participation in computing, particularly for women, through fundamental changes to how classes are taught. It organizes inclusive teaching training, community-building, and survey activities. Valeria Bertacco and Amir Kamil, among others, organize the program.

The [CS KickStart](#) program is a [week-long introduction to computer science](#) for Michigan students with little to no experience. It includes hands-on coding instruction, meeting other students, and career exploration.

Debby Chung, Julia Jun, Abby Hart, Jessica Zhang, and Maurice Tobiano, among others, organize the program.

[Discover Computer Science \(EECS 198 now EECS 110\)](#) is a two-credit course designed for any student who is interested in exploring computer science but doesn't have formal programming experience, and is particularly designed to support women and underrepresented minorities. Students in the course learn to write code; learn core computing concepts; explore interdisciplinary computer science applications; attend upper-level student, graduate student, and CS industry professional panels; and interview CS graduate students. Elizabeth Lipin, Laura Biester, Laura Burdick, and Rada Mihalcea, among others, have organized and taught this course.

[EECS 601 Intro to CSE Graduate Research](#) is a one-credit seminar series designed to introduce new graduate students to the skills needed to be a successful graduate student researcher in CSE. Rotating speakers give perspective on the research process, time management, publishing in CS, managing the highs and lows of grad school, working with your advisor, career paths, etc. The goal is to give students the background knowledge and perspective needed to be successful in grad school, as well as to help develop non-technical skills such as presenting and self-promotion. Additionally, this course offers an opportunity for incoming students to meet their cohort and connect with the wider CSE

research community. Lauren Biernacki introduced the course and taught it with Quentin Stout. Since then, Alanson Sample and David Fouhey have been teaching the class. This year, it is a required course for all new PhD students.

The [Explore Computer Science Graduate Studies](#) program helps undergraduate students understand and prepare for graduate school through an annual day-long workshop that includes application writing clinics and faculty panels. Roya Ensafi and Nikola Banovic, among others, organize the program.

The [Explore Computer Science Research](#) program involved 30 students this year, including women and underrepresented minorities, in the research process. Students give project presentations at the end of each year and attend CS research panels where they connect with CS research professionals and learn about interdisciplinary opportunities to apply CS research. Andrew Lee, Aylin Gunal, Rachel Germaine, and Rada Mihalcea, among others, organize the program.

The [Girls Encoded program](#), which was designed to address gender underrepresentation in computer science and engineering, provides outreach and research mentorship for all interested students. Laura Burdick, Rada Mihalcea, and others organize the program.

This year, CSE ran a series of [Graduate Fellowship Workshops](#). The workshops provided application preparation to help students seek fellowship funding. Nikola Banovic organized the program this year. Two students, Jaylin Jerskovitz and Amani Alkayyali, volunteered to provide feedback to attendees. This year, six CSE students were awarded the fellowship, including four incoming graduate students and two current PhD students.

CSE faculty are involved in the [M-STEM Academies](#), a co-curricular summer program that supports students as they transition from high school to the first two years of college.

The Undergraduate Mentoring Program is a new program that was first offered for students in Fall 22. This program seeks to provide social support to students (especially from underrepresented groups) as they transition into the major and are taking 183, 203, 280, and/or 281.

[Women in Computing](#) is a CSE seminar series that brings in distinguished women researchers to discuss their work and meet with faculty and students. The series was initiated and is frequently organized by Rada Mihalcea. It traditionally includes a roundtable with interested students.

In addition, CSE sponsors, mentors, or otherwise supports and recognizes a number of student groups or programs that participate in climate- and DEI-related activities. These include, in brief summary:

- [Color Coded](#) – Student org focused on community, experience, and learning opportunities for students from underrepresented populations in CS, CE, and Information
- [CSEG](#) – Computer Science and Engineering Graduate Students [ECSEL+](#) – Ensemble of CS Ladies+
- [ETC](#) – Engineering Teaching Consultant Program

- [GEECS](#) – Girls in Electrical Engineering and Computer Science
- [HKN](#) – Eta Kappa Nau, International Honor Society of the Institute of Electrical and Electronics Engineers
- [KTP](#) – Kappa Theta Pi, Co-Educational Technology Fraternity founded at U-M
- [NSBE](#) – National Society of Black Engineers
- [oSTEM](#) & [GoSTEM](#) – (Graduates) Out in Science, Technology, Engineering and Mathematics
- [SHPE](#) – Society of Hispanic Professional Engineers
- [SWE](#) & [GradSWE](#) – Society of Women Engineers

CSE also coordinates with College of Engineering-level DEI activities, including the [CCE Staff Network](#), [OCCE Faculty Committee](#), and the CoE Dept. DEI Program Coordinators. At the national level, CSE also participates in the [LEAP Alliance](#).

Finally, while not a focus of this transparency report, CSE also conducts a number of longer-term DEI investigations. One example is [identifying bias in teaching evaluations](#) based on the professor's gender. As previously mentioned, we are also investigating student staff experiences with their peers. Finally, we are also focusing on identifying barriers to the success of transfer students, including lower socioeconomic status students and international students, who pursue computing majors.

During AY22, effort was dedicated toward increasing outreach to transfer students. Two CSE faculty members and one DEI staff met with Washtenaw Community College STEM Scholars to share information about CSE's undergraduate programs. CSE's DEI Project Manager also attended both of the College's WCC application information sessions to answer questions and serve as an early point of contact for any students interested in CSE. The DEI Committee is also planning on facilitating a session on "Careers in Engineering" for WCC and Mott Community College students in July 2022. We anticipate broadening these efforts to reach more Community College students during the next academic year.

Financial Commitments

We also report resources allocated at the CSE level to climate and DEI activities. The following list includes initiatives CSE has fiscally supported during the 2022-2023 academic year.

- Conference sponsorship of the [Richard Tapia Celebration of Diversity in Computing Conference](#) and the [Grace Hopper Celebration](#) highlighting women in computing. Registration passes are often included in sponsorship packages; for example, CSE supported the registration for 10 students (3 students from GEECS) for Grace Hopper and 3 students for Richard Tapia.
- As part of the sponsorship package, CSE sends faculty and staff to the conferences to represent

U-M and to recruit students into our programs. The College of Engineering specifically sponsored the [Society of Hispanic Professional Engineers](#) and the [National Society of Black Engineers](#) convention. Mahdi Cheraghchi attended NSBE this year, and CSE staff participated in recruiting prospective students at these conferences as well.

- Direct financial support was given to U-M student organizations (NSBE and SHPE) to participate in national conferences. New this year, 5 students from NSBE were supported to attend the [AfroTech](#) conference.
- Additional financial support for student groups. This year we provided additional funding to the [GradSWE](#). This additional funding often took the form of CSE sponsoring student organization programs (Black History Month Celebration).
- CSE hosted our third annual [Service Awards for Excellence in Diversity, Equity, and Inclusion](#). The award was one way that CSE aims to support graduate students who put uncompensated time into improving the climate and culture in CSE. Five graduate students were selected to receive the award.
- In Winter 2023, CSE hosted its first Graduate Recognition Reception to celebrate the contributions graduate students have made to CSE over the past year. During the program, this year's DEI Service Awards and the inaugural [CSE HACKS Spirit Award](#) were presented to honor those graduate students who made contributions to improving the climate and culture at CSE and embodied the spirit of the HACKS values.
- CSE funded the pilot of the Undergraduate Mentoring Program for Fall 2022, and it continued during Winter 2023. Four mentors were compensated for their work over the semesters, and many community- building events were organized and funded.

Raw numbers can be difficult to interpret because they vary with the size of the department. For context, we use CSE Faculty Search as a point of comparison. Faculty Search includes travel and hosting reimbursements, staff time, seminar organization and similar activities, and is viewed as a core CSE activity typically involving 30-40 interviews each year. Each year CSE spends approximately **twice as much** on the climate and diversity activities listed above as it does on Faculty Search (compared to Faculty Search the year before COVID, to avoid conflating its reduction in travel). Spending money on processes does not guarantee desired outcomes, but this does indicate the relative fiscal importance of DEI activities to CSE.

CSE's *DEI Project Manager* started in June 2021, providing around 2,080 dedicated hours toward DEI efforts in CSE. The Project Manager's role is focused on coordinating and leading efforts at the student, staff, and faculty level. In addition, CSE has a full-time dedicated *Outreach and DEI Administrative Coordinator*. The Outreach and Administrative Coordinator's role is focused on working with student groups (e.g., our OUTdoors social activity) and reaching out to students (e.g., the 15-minute check-ins and surveys of graduate students). As of 2023, Taj Williams is the DEI Project Manager and Sarah Snay is the Outreach and DEI Administrative Coordinator. Part of the impetus of maintaining two DEI staff positions is to ensure that there is capacity for both to take ownership of critical strategies and goals to improve the culture in CSE. It should be noted that these hours do not include the unpaid effort that is

put forward by many in the CSE community on a regular basis.

Strategic Action Plan

Strategic planning is a process of defining our values and goals and then making decisions (including resource allocation) to attain them. Aspects related to climate and DEI, such as culture and community, are integral to CSE's strategic planning. Sustained focus on the goals and priorities established in the CSE Strategic Action Plan will help to ensure that we continue to improve in meeting the needs of our members and strive toward even greater levels of excellence.

To shape CSE as a thriving division for students, faculty, and staff, we commenced a Strategic Action Plan process on September 3, 2021, with leadership from 23 faculty and staff members. Four teams composed of faculty and staff – Mission, Vision, Values; Culture and Community; Enrollment and Admissions; and Computer Science Knowledge – worked to create the substance of the Action Plan through gathering relevant research and input from a variety of stakeholders. The teams deliberated through the 2021-22 academic year, with the process culminating in the articulation of a mission, vision, and set of core values, along with key priorities and goals to guide CSE in taking action over the ensuing five years to help the division become an even better place to learn and work. CSE's website includes an [Executive Summary of the Strategic Action Plan process and outcome](#).

Strategic Action Plan Implementation: Year 1

CSE is a sizable organization and a wide variety of implementation activities occur across committees, faculty research lab groups, and staff teams. A May 19, 2023, faculty-staff retreat considered work accomplished over the AY22-23 toward achieving our goals. The following is a snapshot of our Year 1 goal efforts, including a summary of examples of actions supporting progress.

This snapshot focuses on Culture and Community, the Strategic Action Plan priority most directly associated with diversity, equity, and inclusion.

Priorities and Goals – Culture and Community

Culture and Community, Priority 1: **Develop and evolve systems and programs to promote student, faculty, and staff success and well-being.**

- *Goal 1.A: Enhanced community members' engagement in CSE and sense of connection with one another.* A number of faculty, staff, and students were very intentional in organizing opportunities for members of the CSE community to gather and share experiences. Examples include:
 - CSEG/Grad Programs Office collaboration; [Open House](#); 2nd/3rd year student events Games Day
 - Labs/lab social activities Halloween door decorating Junior faculty monthly lunch Staff bowling party Community News Feed Junior faculty retreat
 - Monthly AI Tea, with participation from students and faculty AI book reading club

- Annual AI lab picnic in the fall, with students and faculty
- *Goal 1.B: Improved student learning experiences through support and attention to health and well-being.* A heightened awareness emerged as we transitioned from the conditions of the pandemic of the need to attend to student well-being in various ways. Student-facing units such as undergraduate course support staff, the Undergraduate Advising Office, and the Graduate Office play an important role in providing and promoting the evolution of resources to improve the learning experience. Additionally, faculty of several courses have pursued initiatives such as engaging the U-M [Foundational Course Initiative](#) to assess curricula and teaching impact. Activities included:
 - Increased intro course support staff
 - Assist with [Services for Students with Disabilities \(SSD\) request processing](#) Developing cross-course standards
 - Petition system for students to advocate for themselves
 - EECS 203 partnered with [Wolverine Wellness](#) to administer wellness survey Undergraduate Advising Office (UAO) partnered with Engineering Center for Academic Success: expanded tutors by 7, offering support in EECS 183, 203, 280, 281, 370, and 376 (+695 tutoring hours)
 - Undergraduate Advising Office expanded [drop-in advising hours](#)
 - Foundational Course Initiative processes in some intro course sections
 - Development of [Comprehensive Studies Program](#) sections that prioritize support for LSA students in key intro courses
 - Undergraduate mentoring programs for students from underrepresented groups Coaching for graduate students
 - The Graduate Office and Graduate Programs Committee are reworking the annual review process for PhD students to ensure feedback is more meaningful and useful for students and faculty.
- *Goal 1.C: Harassment-free workplace and environments for learning.* Ensuring a safe and harassment-free place to learn and work is an ongoing charge for both CSE and the University overall. CSE has begun to tap into the the results of recent efforts by U-M to create effective policies and processes, and expand resources by establishing a new [Equity, Civil Rights and Title IX Office](#). Examples of CSE-applied actions include:
 - Providing Individuals with Reporting Obligations (IRO) policy clarification and training
 - [PEAR \(Prevention Education, Assistance & Resources\)](#) Listening Circle
 - Anonymous feedback box Feedback on faculty surveys
 - Proactive notification of faculty candidates of historical concerns
 - Discussions in mandatory PhD courses, such as EECS 601
 - Community-building among labs open to everyone
 - Outreach to students who may not volunteer information through faculty and advising Informal mentorship
- *Goal 1.D: Impactful promulgation of CSE values.* It is important to articulate expectations for how one should strive to participate in a community. The process of development of values for

CSE culminated in this set of guiding principles:

- **Honesty:** Conduct ourselves with integrity and communicate with transparency and authenticity.
- **Achievement:** Strive for academic excellence and celebrate personal and collective efforts and accomplishments.
- **Cooperation:** Collaborate in work and learning, promote inclusion and mutual respect, encourage diverse perspectives, and look after each other.
- **Knowledge:** Protect academic freedom, advance learning and scientific progress, and cultivate wisdom.
- **Service:** Contribute to the well-being of our community and global society.
- Meaningfully weaving these values into the culture of CSE will require multidimensional initiatives sustained over time. Over this past academic year first steps have been taken to [launch the promulgation of our values](#), not least of which was the creation of a graphic.
- Other activities to engage faculty, staff, and students in learning the values include:
 - Chair’s “Odd Tuesday” messages spotlighting each of the values in action
 - Visible messaging of values, including communications materials that include HACKS: CSE website, brochure, stickers
 - Creation of [Social Consequences of Computing](#) course
 - Faculty HACKS discussion with IAs in EECS 280 & 445 IAs HACKS games in 280
 - New graduate student award for embodying HACKS values



Culture and Community, Priority 2: **Increase diversity across the Division (students, staff, IAs/GSIs, faculty)**. Please refer to other sections of this report for an extensive list of programs and initiatives that work in pursuit of this priority.

- *Goal 2.A: Growth in the number of members of underrepresented groups amongst undergraduate and graduate students, faculty, and staff.* Attracting students, faculty, and staff from groups typically underrepresented in CS is an ongoing challenge for the Division, but a significant priority nonetheless. Examples of activities over the past year include:
 - CSE grad student recruitment video series with diversity component
 - Enrollment pathways development: community college connections and bridge programs [EECS 110: Discover CS](#), with 70% women students
 - Explore CS Research [RENEW CS](#)
 - [Explore Graduate Studies](#) (virtual workshop)

- *Goal 2.B: Initiatives for support and retention of members of underrepresented groups.* Recruiting members of faculty, staff, and students is only one aspect of building a diverse community. It is important to provide ongoing support and resources to promote success and retention as well. The following are a few examples of CSE efforts.
 - Undergraduate mentoring programs for students from underrepresented groups
 - Comprehensive Studies Program (CSP) course sections/initiatives
 - DEI Committee annual meetings with student organizations
 - Improvements to CSE website to increase focus more on community, inclusivity, and welcoming

Culture and Community, Priority 3: **Improve CSE communications to enhance the quality of interactions and better meet the needs of students, staff, and faculty.**

- *Goal 3.A: Communications in a diverse world skills for faculty, staff, IAs/GSIs and students.* People of the world have never before been as interconnected by various communications vehicles as they are in the current era. However, building relationships, engaging in collaborations, and effectively transmitting complicated information within a complex matrix of diverse perspectives requires learning, modeling, and mentoring of necessary skills. CSE/ECE has begun to incorporate this training into course curriculum and teaching practices, and through other types of engagement:
 - [EECS 601, Intro to Grad Research](#): includes technical communications skills, and approaches for cultivating higher quality interactions with advisors and colleagues
 - IA/GSI training: Evolving training approaches considering how to be more effective in teaching and supporting diverse students
 - EECS 300 Electrical Engineering Systems Design II
 - EECS 497 Human-Centered Software and Design and Development e-HAIL experiences teach research and grant writing
 - [Grad student coaching](#) assists with communications and connection-building Slack for Assistant Profs
 - Roundtable with AI alumni
- *Goal 3.B: Increased communication and feedback pertaining to the creation, refinement, clarity, and distribution of information about formal policies and procedures.* CSE is a large department within a large institution and it is challenging to ensure that members of our community are aware of various policies and key resources. Transparency has been a notable theme over the past several years, as has improving awareness of information important for navigating work and learning environments. Some steps that have been taken to improve communications:
 - Individuals with Reporting Obligations (IRO) policy clarification and training
 - CSE Teaching Faculty Incentives Policy

- Undergraduate Advising Office improvement of information for students about program policies Information provided about [new enrollment policies](#)
- Grad program enhancement of posted information about program policies
- More generally, the Communications team has been focusing more on this kind of communication
- New faculty orientation/onboarding program
- Chair's "Odd Tuesday" messages
- CSE Faculty Slack
- Many automated processes ("deptapps") are reducing the need for understanding of procedural details

Culture and Community, Priority 4: **Lead in improving the culture and community of computing as a field.** We want to not only promote well-being, diversity, equity, and belonging in our CSE community, but also strive to shape the wider computing culture as well. This includes improving the practices used by industry and other organizations to recruit and develop our students in their careers.

- *Goal 4.A: Creation of best practices for industry-academia engagement for healthy and collaborative exploration of post-graduate opportunities and outcomes for continued participation in computing.*
 - [AI Lab industry partner program](#)
 - [e-HAIL](#) industry partners conversations
 - Partnership with College of Engineering Career Resource Center and [LSA Opportunity Hub](#) Conversations with alumni for mentorship and recruiting opportunities
 - CSE National Advisory Board reboot:
 - More meaningful interaction with CSE student/faculty activities and experiences at Oct. meeting
 - New NAB chair, new members, new targeted subcommittees
- *Goal 4.B: Recognition and reward of contributions for shaping the culture and community of the computing profession.*
 - Faculty recognition in national professional organizations focused on CS public engagement

Priorities and Goals – Enrollment and Admissions

Enrollment and Admissions, Priority 5: **Create a new multi-pathway admissions model that caps the number of CS majors but allows for control over class composition and promotion of more diversity.** Significant progress has been made over the past year in implementing the first phase of the new CSE admissions model to achieve a more optimal faculty/student ratio: Pathway 1-Advance Selection. Assessments will be conducted to determine how well the approach performed in meeting our objectives and work will continue to build out other pathways to majoring in CS.

- *Goal 5.A: Preferred major admissions process for first-year U-M applicants.*
 - Created and implemented, with U-M Office of Undergraduate Admissions, an Advance

Selection process using holistic criteria developed in collaboration with CSE faculty and staff

- *Goal 5.B: Admissions process for current U-M students who discover interest in CS.*
 - Commenced drafting the application process and policies for implementation WI 2024 aimed at students who newly discover CS after matriculation at U-M
 - Will collaborate with U-M Undergraduate Admissions Office to fashion best practices and create a team for processing applications
- *Goal 5.C: Effective pathway for external transfer students from community colleges and partner institutions.*
 - CSE DEI and enrollment specialist staff have continued outreach work with community colleges to build a transfer pathway facilitating entry to the CS undergraduate majors
- *Goal 5.D: Targeted access pathway admissions for students from bridge programs*
 - Partnering with the [Math, Computer Science and Statistics \(MACSS\) Scholars](#)
 - Exploring other opportunities with existing bridge programs

Enrollment and Admissions, Priority 6: **Engage in enrollment management practices to balance student demand for courses with available space and teaching capacity.**

- *Goal 6.A: Systematic approach to course access management according to major status and other parameters.*
 - Associate Chair and Undergraduate Advising Office have been working to pursue course registration procedures to address diverse student enrollment needs

Priorities and Goals – Computer Science Knowledge

Computer Science Knowledge, Priority 7: **Review, and revise if needed, the CSE curriculum and program structure (undergraduate and Master’s) to ensure effective provision of the skills, knowledge, and teaching strategies appropriate for different user groups and ongoing course and program integrity.**

- *Goal 7.A: Exploration of the role of CSE in the broader area of computer education at U-M.* This is an ongoing issue as CSE is challenged to meet the ongoing demand for teaching thousands of students taking its introductory course sequence, as well as addressing the continued growth of students desiring to major in CS. One alternative to promoting computing education that is not solely dependent on CSE teaching is empowering other faculties to provide discipline-relevant training themselves. CSE Prof. Mark Guzdial has been working with LSA in launching the [Program in Computing for Arts and Sciences](#).
- *Goal 7.B: Curriculum structure for CS/CE that offers appropriate undergraduate paths and pedagogy for:*
 - a) majors; b) those who may want certain CS skills but not the major; and c) those who would like to enter the major as enrolled discoverers, external transforms, or participants in specialized bridge programs, such as M-STEM and M-Sci.

- Conducting a comprehensive and in-depth curriculum review is a major undertaking requiring a significant amount of person-time. While a broad review was not possible this past AY22-23, a number of specific improvements were implemented by the Undergraduate Program Committee, course faculty, and others:
 - CSP programming and sections in EECS 203, 280, and 183 Foundational Course Initiatives
 - CS major requirement adjustments: ACE and GPA for CS major declaration
 - Data Science curriculum changes to differentiate the major more distinctly from CS Python being adopted in intro courses
 - Expansion of the [CS minor elective list](#) Greater emphasis on collaboration in courses
- *Goal 7.C: Assessment of the structure and functioning of the Master's programs.*
 - Resources were not available during AY22-23 to comprehensively pursue an assessment. The Associate Chair for Graduate Affairs anticipates work in the area in the upcoming AY23-24.
- *Goal 7.D: Engagement of the whole faculty in understanding and developing programs, curricula, courses, and teaching approaches.* Efforts have begun to assist in providing various avenues for dissemination of information about various course content and didactic strategies:
 - Faculty meeting course spotlights
 - Teaching Lab faculty consultations
 - Buildout of course information webpage
 - Syllabus project in advising
- *Goal 7.E: Implementation of a continuous quality improvement process surpassing previous ABET (Accreditation Board for Engineering and Technology) accreditation effectiveness.*
 - CSE has been given the opportunity to participate in a CoE/CRLT pilot project in the upcoming AY23- 24 focused on developing processes for curriculum review and assessment.

Computer Science Knowledge, Priority 8: **Cultivate leadership, professionalism, and mentoring skills and mindsets through the life cycle of students, staff, and faculty.** Having the resources, skills, and knowledge to succeed requires in no small part dedication of sufficient support and mentorship of all members of the community. Ways we have been improving in this regard:

- *Goal 8.A: Improved orientation and mentorship programs sustained across time.*
 - January 20, 2023 Junior faculty mini-retreat: practical orientation, tenure process, mentorship beyond launch committees
 - New master's advising process: students are assigned a dedicated faculty advisor at the

beginning of their degree who they can reach out to for any questions related to industry, research, and course content.

- Undergraduate mentoring program for students from underrepresented groups
- RENEW CS mentoring targeting women and nonbinary students: near-peer program for sections of EECS 183, 203, and 280
- Onboarding buddies for incoming graduate students
- Public faculty mentorship plans
- EECS 601 coaching and cohort development Undergraduate orientation improvements
- CS and Data Science sessions on community building
- Planning an in-person welcome event
- A staff retreat session focused on building a community of connection and wellbeing as a basis for ongoing support and mentorship

Computer Science Knowledge, Priority 9: **Develop an open and vibrant culture of cross-disciplinary research in CSE.**

- *Goal 9.A: High-impact, interdisciplinary research as a means of keeping U-M CSE at the forefront of computing innovation.*
 - Faculty serving on cross-department teams/committees such as MIDAS and cognitive science executive committee
 - Hired two research faculty that work on the boundaries of health and CS Putting more work into weaving ethics into curriculum
 - Working with the [E-Health and Artificial Intelligence \(e-HAIL\)](#) and [Summer Undergraduate Research in Engineering \(SURE\)](#) programs
 - Integration with EECS 399/499 special topics courses
- *Goal 9.B: Increased integration in the doctoral program of research and learning opportunities focused on innovation and boldness.*
 - As one example, CSE graduate and undergraduate students have [published research investigating the relationship between psychoactive substance use](#) (e.g., Adderall or cannabis, which are controversial in some communities) and computing company hiring and drug policies.
- *Goal 9.C: A CSE-wide undergraduate research program that engages well-motivated students early in their studies.* Below are examples of current initiatives that provide undergraduate research engagement. The appointment of a new CSE Associate Chair for Undergraduate Affairs will provide an opportunity for the creation of a more centralized and intentional approach to UG research in the Division.
 - Explore CS

- Summer Undergraduate Research in Engineering (SURE)
- [Undergraduate Research Opportunity Program \(UROP\)](#)
- Faculty sponsorship of independent study projects
- Partnerships with industry on machine learning projects
- Professor Sindhu Kutty offered a summer undergraduate research course
- Updates to the CSE web page on undergraduate research
- Professor Mark Brehob maintains a list of ad hoc summer research opportunities
- [LSA CS Honors Thesis](#) work

Report Summary

This report provides context, statistics, and discussions regarding Computer Science and Engineering in the Academic Year 2022-2023. The report covers undergraduate programs, graduate programs, faculty hiring, sentiment, larger- and smaller-scale activities and organizations, commitments, and strategic planning.

We continue our commitment to release this report annually. This academic year marks the fourth year in which CSE has published climate, diversity, equity, and inclusion data. Information from these reports are used to inform future initiatives and divisional planning (as shown directly in the Strategic Action Plan).

Additionally, CSE faculty have presented this report at seminars to encourage other Universities to follow a similar process of transparent reporting. Climate, diversity, equity, and inclusion are important to everyone in our community, and a combination of measurement and sustained, collective effort is necessary for improvement.

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