

M | COMPUTER SCIENCE & ENGINEERING

Climate, Diversity, Equity, and Inclusion
AY 2020-2021 Annual Report

Draft Climate Diversity Equity & Inclusion Annual Report for AY 2020-2021

[Last Year's Report](#)

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.

The 2020-2021 Academic Year was a turbulent time locally and globally. From the aftermath of the [George Floyd and Black Lives Matter protests](#) and attention to [Black participants in computing](#) to the [ethical use of computing](#) to concerns about the [deportation of international students](#) to concerns about [Turing award selection and ethical standards](#) to the continuing presence of COVID-19 to rising enrollment ([despite downward national trends](#)), we have faced many challenges. The CSE community undertook multiple activities, initiatives and policy changes, both reactive and proactive, many of which are detailed below.

Following 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 multi-faceted. 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 or 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 multi-racial students identifying at least one of 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 [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, 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 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 work towards 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](#), 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 of, 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 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 \(Literature, Science and Arts\)](#), and the [Computer Engineering Major](#) (shared with [Electrical and Computer Engineering](#)):

	Winter 2021		Fall 2020		Winter 2020		Fall 2019	
Total	2739	100.0%	2567	100.0%	2586	100.0%	2346	100%
Female	658	24.0%	591	23.0%	590	22.8%	513	21.9%
Male	2081	76.0%	1976	77.0%	1995	77.2%	1834	78.2%
Asian	739	27.0%	681	26.5%	721	27.9%	641	27.3%
Black	49	1.8%	46	1.8%	39	1.5%	37	1.6%
Hispanic	129	4.7%	127	4.9%	122	5.1%	94	4.0%
Two or More	71	2.6%	63	2.5%	76	2.9%	68	2.9%
Two or More URM	40	1.5%	34	1.3%	32	1.2%	27	1.2%
Unknown	170	6.2%	152	5.9%	130	5.0%	120	5.1%
White	978	35.7%	914	35.6%	961	37.2%	903	38.5%
Non Resident Alien	562	20.5%	549	21.4%	505	19.5%	457	19.5%

To provide a context for these numbers on race, the state of Michigan is 79.2% White, 14.1% Black, 5.3% Hispanic, and 3.4% Asian, according to the [US Census](#).

We note that CSE does not admit undergraduates directly when they enter the University of Michigan. Instead, undergraduates complete a number of semesters of prerequisite courses (e.g., in [Engineering](#) or [Literature, Science and Arts](#)) before applying to declare a computing major.

We also note that Engineering and LSA often show different patterns of enrollment with respect to gender and ethnicity. For example, in Winter 2021, Engineering undergraduates in Computer Science were 20.8% female and 8.2% URM (see Issues and Terminology above for the definition of Underrepresented Minority), while LSA undergraduates in Computer Science were 28.9% female and 6.8% URM.

Changes from previous year. Undergraduate enrollment, as whole, continues to rise. CSE created an Enrollment and Admissions Team (EAT), composed of four faculty and three staff members, charged with reviewing a range of possible approaches for managing undergraduate CS student enrollment. Enrollment of Women students has increased (both proportionately and in absolute amounts) every semester. Enrollment of Black students has also increased (but we encourage caution when interpreting changes to smaller numbers). Other subpopulations, such as Asian, Hispanic, or Non-Resident Alien students, have remained steady in proportion.

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 1514 EECS 183, 665 ENGR 101 and 141 ENGR 151 consenting AY 2021 students. Note that some students use transfer credit or a proficiency exam instead of taking introductory courses.

[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 419 consenting Fall 2020 students and 421 Winter 2021 students.

Select sentiment and climate questions:

	Start of EECS 183, ENGR 101, ENGR 151		End of EECS 376	
	AY 2021	AY 2020	AY 2021	AY 2020
After graduation, there are equal opportunities for a career in Computer Science for males and females alike.	3.56	3.50	3.48	3.48
I find Computer Science intimidating.	3.38	3.40	3.26	3.14

I can see myself in a computing-related career in the future.	3.55	3.64	4.27	4.28
I believe that other students in Computer Science will be welcoming of me.	3.82	3.80	3.85	3.92
I feel included in the groups that I want to belong to.	3.73	3.78	3.79	3.90
How would you describe your current mental health?	3.06	3.29	2.70	2.89

Changes from previous year. The biggest change over the previous year is the decreasing self-assessment of mental health. [Mental health and general wellbeing are significant concerns under COVID-19.](#) CSE held a [Town Hall in November of 2020 with a focus on burnout, mental health, and wellbeing.](#)

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, 2284 out of 2320 respondents (98.4%) reported their gender, and 2260 (97.4%) reported their ethnicity. In EECS 376, 710 out of 902 respondents (78.7%) reported their gender, and 699 (77.5%) reported their ethnicity.

	Start of EECS 183, ENGR 101, ENGR 151		End of EECS 376	
	AY 2021	AY 2020	AY 2021	AY 2020
Man	59.76%	61.62%	67.89%	75.50%
Woman	39.45%	37.58%	31.41%	24.06%
Non-binary	0.53%	0.54%	0.42%	0.00%
Trans	0.26%	0.27%	0.28%	0.44%
Asian	36.86%	36.62%	55.08%	52.85%
Black	2.79%	2.70%	1.43%	0.44%
Hawaiian or Pacific Islander	0.00%	0.04%	0.00%	0.00%
Hispanic or Latino	3.05%	3.66%	1.72%	1.97%

Native American or Alaska Native	0.00%	0.08%	0.14%	0.00%
Two or More	3.32%	3.12%	3.29%	2.63%
Two or More URM	3.76%	4.63%	2.43%	2.19%
White, Caucasian, Middle Eastern, North African, Arab	50.22%	49.15%	35.91%	39.91%

Changes from previous year. Echoing overall enrollment trends, these core courses saw a rise in the enrollment of Women students (especially at the end of EECS 376) and a slight increase in the enrollment of Black students (but we encourage caution in the interpretation of changes to smaller numbers). By contrast, CSE saw a slight decrease in Hispanic or Latino student enrollment, with other groups, such as Asian students, largely holding steady.

Undergraduate Degree Conferral

The Office of Student Affairs (Julia Jackson, 6/3/2021) 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), and the Computer Engineering Major (shared with Electrical and Computer Engineering). Data Science (Literature, Science and Arts) data are not available:

	2020-21		2019-20	
Total	1285	100%	1243	100%
CS Eng Total	538	41.87%	517	41.59%
CS LSA Total	404	31.44%	398	32.02%
CS Minor Total	182	14.16%	188	15.12%
CE Total	110	8.56%	97	7.80%
DS Eng Total	51	3.97%	43	3.46%
CS Eng Female	96	17.84%	106	20.50%
CS LSA Female	130	32.18%	111	27.89%
CS Minor Female	48	26.37%	53	28.19%
CE Female	21	19.09%	16	16.49%

DS Eng Female	8	15.69%	10	23.26%
CS Eng URM	36	6.69%	28	5.42%
CS LSA URM	26	6.44%	18	4.52%
CS Minor URM	13	7.14%	10	5.32%
CE URM	8	7.27%	5	5.15%
DS Eng URM	1	1.96%	1	2.32%

The [Michigan Engineering Career Resource Center](#) provides salary data on average salaries by major. For 2018-2019, the latest report available as of this writing, the reported Computer Science salaries for students graduating with bachelor's degrees were median \$101,000, average \$99,248, and range \$52,000 – \$170,000. 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 2020 [Computing Research Association Taulbee Survey](#) of hundreds of PhD-conferring CS departments found that 79% of undergraduates enrolled in CS programs and also 79% of undergraduate degree recipients were males, while 21% of both groups were females. Overall, in the Taulbee survey, 6% of enrolled undergraduates reported as Black or African American, while 13% percent reported as Hispanic. ([The report of Non-Doctoral granting Computing \(NDC\) departments](#) varies, but not significantly.)

CSE's undergraduate enrollment of male and female students (24% female) aligns with the national average. Similarly, CSE's degree conferral of male and female major students (20% female) aligns with national figures and its enrollment rates. However, CSE's undergraduate enrollment of Black and Hispanic students is significantly below the national average and the percentage of the population in the state. Similarly, degree conferral rates for all URM student majors taken together (5.5%) are lower than national averages. Representation of both female and URM students is higher in the minor than in the major. 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.

Changes from previous year. Major degree conferral rates rose slightly for URM students and decreased slightly for female students. Total degree conferral (e.g., for graduating seniors) held steady, while enrollment (including students early in the program) rose, highlighting and class size pressure for students currently in the pipeline.

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 (Ph.D.). **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 Ph.D. 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 **Ph.D.** 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 Ph.D. sequentially.

While graduate degrees share many similarities, because the Master's degree typically places more of an emphasis on coursework and the Ph.D. 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 Ph.D. 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 2021, the visit day activities were remote as a result of COVID-19. 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 2021, CSE sponsored 20 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 gender information is available (via the [UGrab database](#)), 55% were female and 45% were male. Of those for which ethnicity information is available, 25% were Asian, 30% were White, and 15% were Hispanic.

Changes from previous year. CSE sponsored fewer students for fellowships compared to the previous year (20 vs. 59), with a higher proportion of female students (55% vs. 42%) and Hispanic students (15% vs. 4.8%). 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.

Graduate Recruiting

CSE does not currently have a program of faculty or staff visits to other schools for recruiting purposes. In recent years current Ph.D. 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 2020-2021 Academic Year, in conjunction with [CSE Explore Grad Studies](#), we sent targeted recruitment emails to over 140 faculty at 81 institutions:

- Amherst College, Arizona State University, Boston University, Brown, Cal Tech, Carleton College, Case Western, CMU, Columbia University, Cornell, Dartmouth, Dearborn, Duke, Florida State University, Georgia State University, Georgia Tech, Harvard University, Harvey Mudd College, Howard University, Johns Hopkins, Miami University, Michigan State, Michigan Tech, Minnesota, MIT, North Carolina, North Carolina A&T State University, 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, UCSD, UIC, UIUC, UMass Amherst, UNC, University of Chicago, University of Alaska Fairbanks, University of Arizona, University of Colorado, Boulder, University of Hawaii at Manoa, University of Illinois, Chicago, University of Maryland, College Park, University of Michigan, Flint, University of Notre Dame, University of Texas at El Paso, University of Utah, University of Virginia, University of Washington, University of Wisconsin, Madison, UPenn, USC, UT Austin, Virginia Tech, Washington University, St. Louis, Waterloo, Wayne State, Wellesley College, Western, Williams College, Wisconsin, and Yale.

In addition, CSE sends broader recruitment materials to over 20 mailing lists associated with multiple universities and organizations:

- Boston University, Brown, Michigan State University, Michigan, MIT, New York University, Princeton, SIAM Data Mining and Analytics, UC Berkeley, UCLA, UMass Amherst, University of Pennsylvania, UT Austin, and Washington University St. Louis.

including some associated with women:

- Harvard WICS, MIT EECS Women, Northeastern Women in CS, Society of Women Engineers, UIUC Women in Engineering, and Women in Computing.

CSE sent recruiting emails to over 40 National Society of Black Engineers students and over 125 previous participants in the Explore Grad Studies program.

Overall, 117 participants attended the CSE Explore Grad Studies workshop, which helps prepare students for graduate applications. For various reasons (including COVID-19), the [Recruit@Home](#) program did not take place this year.

Changes from previous year. A number of outreach activities were slightly curtailed as a result of COVID. Starting this cycle, CSE also placed an explicit emphasis on climate, diversity, equity and inclusion during the [Virtual Graduate Student Visit](#) activities. These included a one-hour faculty led discussion on climate issues as well as a one-hour closed-to-faculty discussion on climate issues, led by current graduate students.

Graduate Applications: Race/Ethnicity Statistics By Degree

In AY 2021, CSE tracked 1187 applicants to the Ph.D. program (via the Graduate Admissions dashboard system). Of those applicants, 107 were given offers of admission and 42 accepted. Their self-reported races/ethnicities were:

	Applied (Ph.D.)		Admitted (Ph.D.)		Accepted (Ph.D.)	
	2020	2019	2020	2019	2020	2019
Total	1187	867	107	167	42	49
2 or More	9	9	3	3	1	1
Asian	96	136	13	54	4	19
Black	11	9	2	3	0	1
Hispanic	15	8	6	1	2	0
Native American	0	3	0	2	0	1
Did Not Indicate	910	556	64	61	30	16

White	146	146	19	43	5	11
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Changes from previous year. Ph.D. applications increased by 37% over the previous year, with the proportion of applicants reporting as Hispanic increasing slightly (although we encourage caution when interpreting smaller numbers), the proportion of applicants reporting as White decreasing, and the proportion of applicants not reporting increasing significantly. CSE extended fewer offers of admission overall, and we note that admissions are guided by faculty advisor availability and research funding. Among students accepting our offers, far fewer self-reported as Asian or White, and many more did not indicate a race or ethnicity.

In AY 2021, CSE tracked 1871 applicants to the MS program. Of those, 308 were given offers of admission (including admissions to the [SUGS program](#), etc.) and 72 accepted. Their self-reported ethnicities were:

	Applied (MS)		Admitted (MS)		Accepted (MS)	
	2021	2020	2021	2020	2021	2020
Total	1880	1871	280	308	94	72
2 or More	7	16	1	7	1	1
Asian	158	257	49	85	11	27
Black	7	5	4	1	2	0
Hispanic	15	10	9	3	4	1
Did Not Indicate	1615	1458	193	168	67	27
White	78	125	24	44	9	16

Changes from previous year. Master’s program applications held steady, showing similar breakdown trends to Ph.D. applications: a decrease in White and Asian applicants, a slight increase in Hispanic applicants , and a significant increase in the proportion not reporting a race or ethnicity. The Master’s program shows a slight increase 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 2021, CSE received 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 36 undergraduate institutions:

- Bucknell Univ, California St Univ Fullerton, Columbia Univ, Eastern Michigan Univ, Georgia Inst Tech, Jackson State Univ, Massachusetts Inst Tech, Michigan State Univ, New College Florida, Northeastern Univ, Ohio State Univ, Purdue Univ West Lafayette, Rensselaer Polytechnic Inst, Rice Univ, Rochester Inst Tech, Southern Il Univ Carbondale, Spelman College, Univ Amsterdam, Univ Arkansas Fort Smith, Univ California Berkeley, Univ California Davis, Univ California Los Angeles, Univ Central Florida, Univ Chicago, Univ Maryland College Park, Univ Michigan, Univ New Mexico, Univ Pittsburgh, Univ Rochester, Univ South Florida, Univ Texas Austin, Univ Texas El Paso, Univ Utah, Univ Virginia, Univ Washington, Vanderbilt Univ

In Fall 2021, CSE admitted applicants who did not indicate one of the three most frequent ethnicities came from the following 10 institutions:

- Massachusetts Inst Tech, Purdue Univ West Lafayette, Univ Amsterdam, Univ California Davis, Univ California Los Angeles, Univ Maryland Coll Park, Univ Michigan, Univ Michigan, Univ Texas Austin, Univ Virginia

Regarding matriculation, 3 such students accepted our offer, collectively from 3 institutions:

- Univ Amsterdam, Univ California Los Angeles, Univ Virginia

Focusing specifically on Master’s students, CSE internal tracking reports that the accepted, incoming Master’s degree students for Fall 2021 come from 28 different colleges and universities. Their undergraduate institutions range from smaller liberal arts colleges (e.g., with enrollments of 800 undergraduates) to larger universities, including the Univ of Michigan itself (30,000 undergraduates). Ten nationalities are represented in the incoming Master’s class.

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	
	2021	2020	2021	2020	2021	2020
Total	3066	2738	396	475	137	121
Domestic	598	585	139	177	39	54
Domestic Female	115	121	42	50	10	15

Domestic Male	483	464	97	127	29	39
International	2468	2153	247	298	96	67
International Female	571	468	78	62	28	14
International Male	1897	1685	169	236	68	53

Changes from previous year. Graduate applications rose, driven largely by international students. Both the number of female students offered admissions, as well as the number of female students accepting an offer, rose. The proportion of incoming graduate students that are international also rose.

Graduate Enrollment Trends

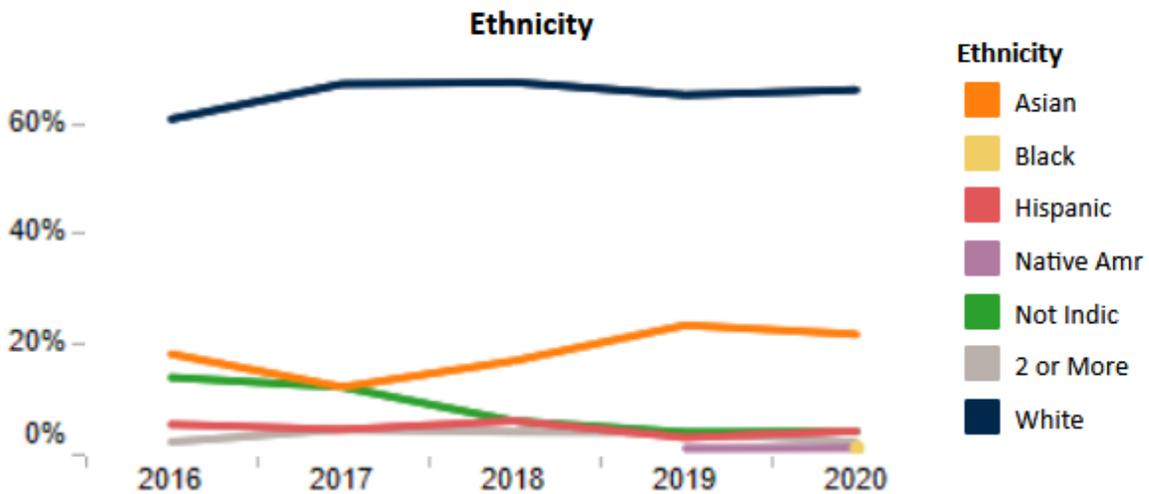
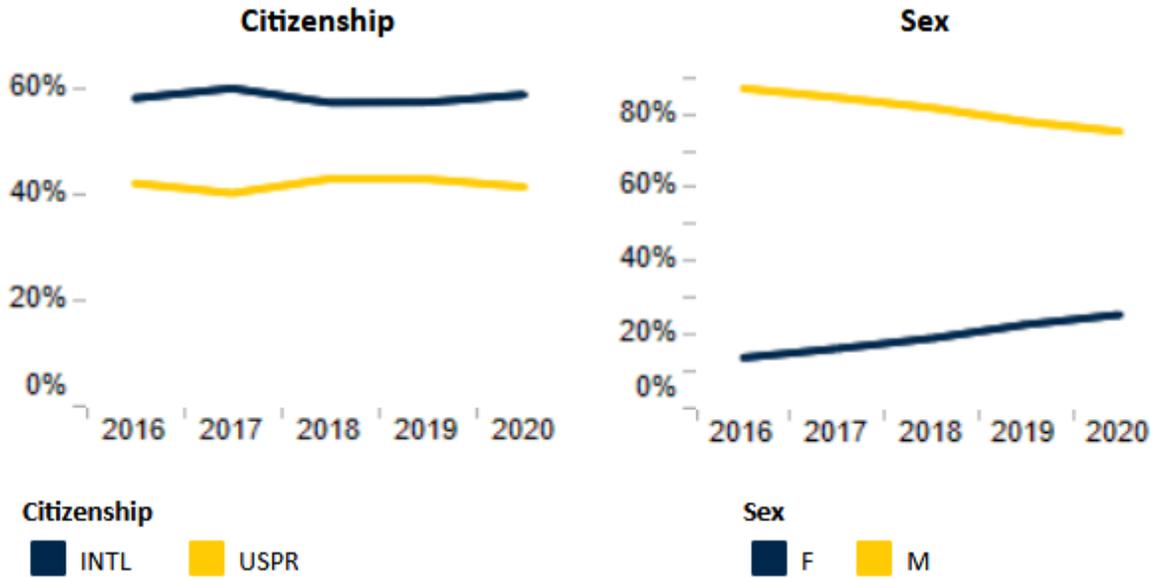
The [Rackham Graduate School's Doctoral Program Statistics for Computer Science and Engineering](#) include information about enrollment trends:

ENROLLMENT



Total Enrollment

235



Demographics

Insights into the citizenship, gender, and ethnicity of students enrolled in Computer Science & Engineering for 2020. 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 conferred 125 graduate degrees in Fall 2020 and Winter 2021, including MS, SUGS and Ph.D. Note that students receiving degrees in AY 2020-2021 entered the program in previous years. Their self-reported ethnicities were:

	Completed (All)		Completed (MS, SUGS)		Completed (PhD)	
	F20/W21	F19/W20	F20/W21	F19/W20	F20/W21	F19/W20
Total	125	100	114	74	11	26
2 or More	2	2	2	1	0	1
Asian	44	30	44	26	0	4
Black	1	0	1	0	0	0
Hispanic	1	3	0	2	1	1
Native American	1	0	1	0	0	0
Did Not Indicate	40	41	34	27	6	14
White	36	24	32	18	4	6

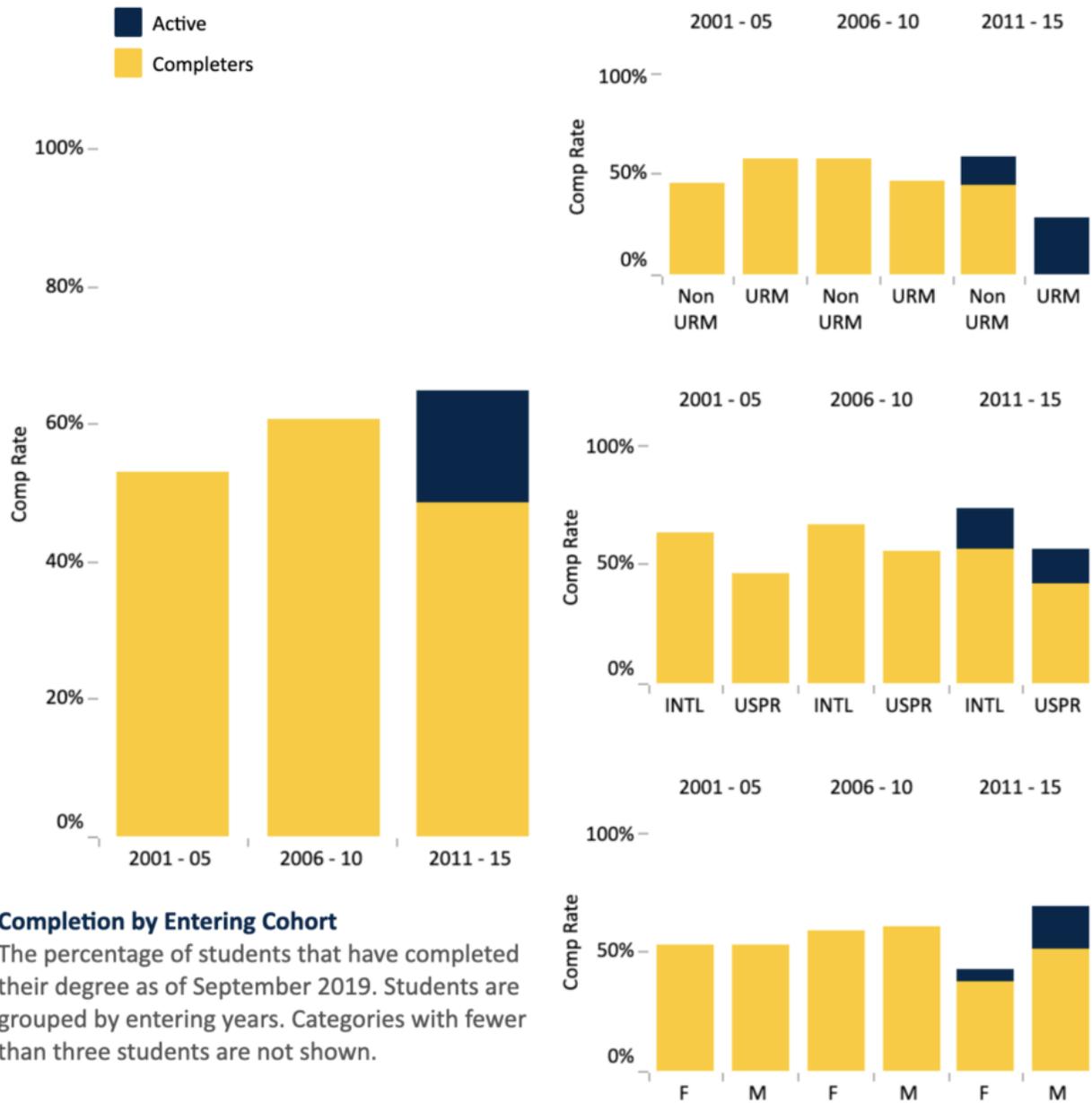
The [Michigan Engineering Career Resource Center](#) provides salary data on average salaries by area. For 2018-2019, the latest available as of this writing, the reported Computer Science and Engineering salaries for students graduating with master's degrees were median \$120,000, average \$119,794, and range \$71,148 – \$175,000.

Changes from previous year. Overall degree completion is up, driven largely by more master's students completing the program, with a slight dip in Ph.D. conferral. At the Ph.D. level, many students experienced delays with conducting research (e.g., in laboratories or with human subjects) due to COVID, and many timeline extensions were granted. If the trend continues in subsequent years, it should be investigated. Master's and SUGS degrees, which primarily focus on coursework (which was continued remotely), were not as affected.

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 ?



Graduate Degree Post-Completion Outcomes

John Gonzalez of [Rackham Institutional Research](#) tracks the “Rackham Career Outcomes Collection” (cf. the [Exit Survey](#) of all Rackham graduating doctoral students). Among CSE students graduating in 2020, 32 provided data. Of those, 5 reported as Asian, 6 reported as White, and 18 did not provide race/ethnicity information. Post-graduation, 5 reported jobs at Universities, 7 reported jobs at companies (e.g., Google, etc.), and 20 did not report information. Since this represents only 32/125 students graduating from CSE in 2020, an additional focus on encouraging participation in graduate outcomes data collection remains merited. Efforts are underway to do so going forward, aligned with the Graduate Committee’s additional focus on exit interviews.

Changes from previous year. The ratio of those reporting academic vs. industrial jobs is similar to the previous year, but we urge caution in the interpretation of results with smaller numbers. In general, with COVID’s impact on the job market, we will be looking to the next year to distinguish outliers from emerging trends.

Graduate Program Context and Discussion

As a broad point of comparison, the 2020 [CRA Taulbee Survey](#) of hundreds of departments found that 23.4% of enrolled CS Ph.D. students were female and 76.6% were male. Hispanic students received 1.6% of CS Ph.D. degrees and Black or African American students received 1.2% of CS Ph.D. degrees. 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 Ph.D. students aligns with the national average. Care must be taken when interpreting ethnicity statistics for CS Ph.D. programs because of low total numbers. For example, while 9% of CSE’s Ph.D. degrees were conferred to Hispanic students, which is nominally higher than the national average, that corresponds to one single student. Similarly, CSE produced zero Black Ph.D. students and one black Master’s student, which represents a significant area for improvement. For context, of the 1661 graduating CS Ph.D. students considered in the Taulbee survey across hundreds of US and Canadian schools, only 19 identified as Black or African American, suggesting a problem that is systemic both at the national and the local level. 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.

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, for example 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. 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 on, 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.

Once interview information 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 very 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, and the faculty as a whole **votes** on hiring decisions. A logistical number of 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 not to reveal that an application is being made (e.g., to avoid friction at the current institution until the 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, Berkeley’s Rising Stars program for women in EECS, MIT’s EECS Academic Career Fair, and Michigan’s NextProf workshops.

Changes from previous year. This cycle CSE participated for the first time 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.

This cycle CSE also introduced new processes to help ensure a focused consideration of climate and diversity as a critical part of each application. The Faculty Search and Executive committees carefully reviewed the candidates’ DEI statements and activities as a first-class consideration (on par with research and teaching). In several cases, this review led to different rankings of candidates, relative to a counterfactual where we did not have or make use of DEI statements.

Faculty Recruiting Statistics

In this Academic Year, CSE received 394 applications for faculty positions (tenure-track and lecturer, but not including PPFP). Only 150 of those 394 applicants (38%) chose to provide self-reported demographic information, up from 18% in the previous year after we changed the language on the request to better communicate why we are gathering this data. Of those, 71% (107/150) reported as male and 28% (42/150) reported as female, up from 15% female in the previous year. (The College of Engineering currently tracks biological sex rather than gender in this context.) We invited 30 of those 394 applicants (7%) to interview. Of the 30 interviewees, 40% (12/30) identified as female. CSE extended job offers to 17 candidates: 59% (10/17) male and 41% (7/17) female.

As of this writing (June 2021), 4 candidates accepted offers (all self-identified as male). In addition, CSE interviewed 4 candidates for the PPFP, which led to 1 accepted fellowship offer (self-identified as female). Not all candidates with offers in hand have made final decisions as of this writing, so these numbers may be updated as decisions come in.

For this Academic Year, of the 150 of 394 applicants reporting demographic information, 61% (92/150) identified as Asian, 34% (51/150) as White, 5% (7/150) as Hispanic, and 2% (3/150) as

Black. Some applicants listed multiple races or ethnicities. No applicants reported other races or ethnicities (e.g., American Indian).

Changes from previous year. The number of applicants self-reporting demographic data increased (from 18% to 38%) after we clarified why we are requesting it. In addition, the number of female applicants rose sharply (from 15% to 28%). Other breakdowns (e.g., the proportion of applicants identifying as Asian, etc.) remained similar. However, the number of candidates accepting our offers overall, and the number of female applicants accepting our offers, did not increase. A number of considerations, from the public perception of CSE's climate and allegations of faculty sexual misconduct, to this being the first hiring cycle under COVID, might explain such changes. We encourage caution when interpreting small numbers, but note that CSE must carefully consider similar information to determine if next year represents a potential negative trend.

Faculty Recruiting Context and Discussion

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.

As a broad point of comparison, the 2020 CRA Taulbee Survey reports that 20% of CS Ph.D. degrees granted in 2020 were received by female students. While not all faculty candidates are new Ph.D.s, 28% of CSE's applicants and 40% of CSE's interviewees for faculty positions identified as female, which is above the national average.

Care must be taken when interpreting minority ethnicity information. If 1.2% of Ph.D.'s produced nationally were awarded to Black or African American students (19 such degrees from hundreds of schools in 2020), hiring cycles in which Black candidates were interviewed (such as the 2019-2020 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) were effective in increasing the diversity of our applicant pool, interviews, and offers for this AY.

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 February 2021, [Dean Alec Gallimore announced](#) the formation of the CSE Climate Assessment Committee. This independent, cross-departmental committee is led by CLaSP Department Chair Tuija Pulkkinen. The committee is charged to organize and oversee a review of the overall culture and climate in the Division of CSE. The climate assessment will be conducted by engaging a third party to lead the assessment, as requested by the [CSE faculty open letter](#). In particular, the committee selected a third-party firm to conduct an assessment survey and will report the results to the Dean's Office and Computer Science and Engineering.

While this committee is independent of CSE, the results and report, expected Fall 2021, will guide CSE reform and policy going forward.

Climate Questions on Course Surveys

Starting in Winter 2020, we arranged to add climate- and inclusion-focused questions to the end-of-semester course evaluations for all CSE classes. We added three quantitative (Likert scale 1-5) questions and one qualitative (free response) question. In the first cycle, we analyzed 10,298 quantitative responses and 1,869 qualitative responses.

Overall, the quantitative responses, on a 1-5 scale, were quite positive:

- 4.69 The instructor treated students with respect.
- 4.43 I felt included and valued when working with other students.
- 4.30 I felt comfortable asking questions in class.

For the qualitative questions, based on a manual categorization, responses were evenly split between positive (35%), neutral (34%) and negative (33%). When answering "How might the class climate be made more inclusive of diverse students?", responses followed this general breakdown:

- 34% Not applicable, no response, don't know, etc.
- 32% Course is already inclusive
- 31% Student provides a suggestion for improvement
- 3% The course is already inclusive, but the student provides a suggestion as well
- 3% The student has no issue with the course

The most common suggestion types included (1) revising basic material, slowing the pace of the class, being more accommodating of non-CS majors and beginning students; (2) providing more chances to speak and having smaller class sizes; (3) fostering community, collaboration, group work, peer review, and random group selection; (4) increasing the representation of women and underrepresented groups among students, assistants, guest lecturers, and professors; and (5) offering more and longer labs, office hours, and assistants.

Changes from previous year. This information is reported for the first time this year.

Graduate Student Check-Ins

Starting this year, CSE reached out to graduate students to conduct one-on-one check-ins. The check-in process included collecting qualitative data from 189 Ph.D. and 49 Master's students from 15-minute Zoom interviews with value-neutral questions, and quantitative data from 223 Ph.D. and 101 Master's students completing a 25-question on-line survey. Goals included learning about current 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). These interviews were conducted from June 29th, 2020 to the end of April 2021.

Overall, most graduate students seem to be doing well on average (or are at least managing) and reported positive experiences with CSE (staff, professors, teaching staff, or fellow students). Most graduate students rate student/faculty relationships and the clarity of program expectations as "good", and most report knowing who to talk to about procedures. Students report that mentorship initiatives, the graduate-run social hours, and even these outreach activities have helped.

The top three expressed concerns shared by all graduate students are:

1. Work-Life Balance
2. No Sense of Community
3. Lack of Access to Faculty

In addition, the most-mentioned concerns for Ph.D. students were:

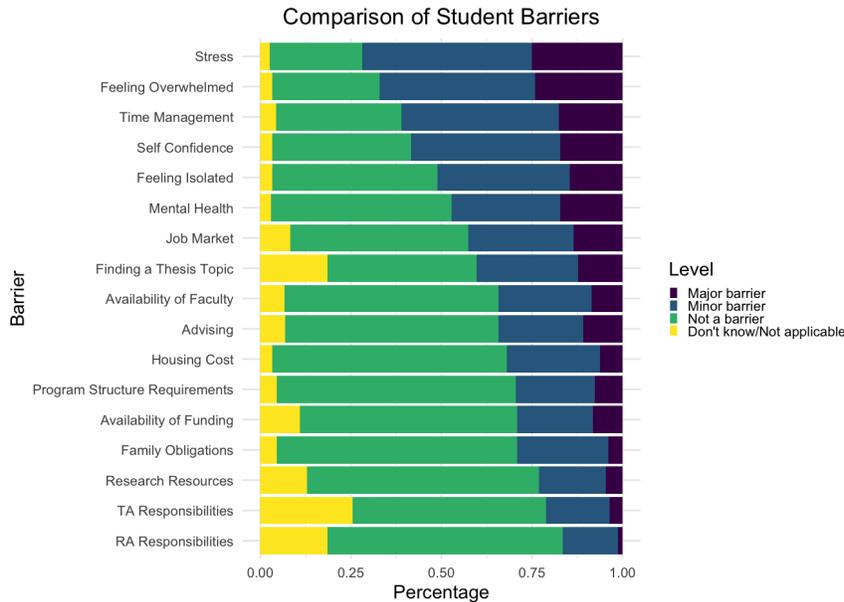
1. Advisor Treatment
2. Lack of Collaboration
3. Switching Advisors
4. Faculty Sexual Misconduct
5. Mental Health Resources

The most-mentioned concerns for Master's students were:

1. Course Requirements
2. Program Structure
3. Job Search
4. Funding Opportunities

5. Student Support

Students reported that stress, feeling overwhelmed, and time management are the greatest perceived barriers to their own success. Self-confidence, feeling isolated, and mental health are also concerning barriers. The bar graph shows perceived barriers in descending sorted order:



A separate, full report on this activity was prepared and is planned to be released publicly to the community. The public-facing report elaborates on the concerns above (both by abstraction and through select anonymized student quotes), highlights issues of department communication and transparency, and gives 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). The information was released late in the academic year, but some CSE faculty have begun changes in response to this data, for example holding open office hours that Ph.D. students of other advisors can use to help create such bridges.

Changes from previous year. This information is reported for the first time this year.

Climate and Diversity Activities

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

Community-Wide Engagement

During this academic year, CSE organized five Climate and Diversity **Town Hall**, **Community Gathering**, and **Information Sessions**. These meetings helped CSE hear concerns, ideas and proposals from students and community members, as well as providing a way to communicate information on related topics. Town Halls typically featured a brief presentation by faculty, followed by questions asked or topics raised either directly or anonymously by participants and addressed by a faculty panel.

- In November, 45 participants attended an [undergraduate-focused town hall](#). Topics included allegations of faculty misconduct, feelings of burnout, available resources, and logistics.
- In February, 100 participants attended a [graduate-focused town hall](#). Professor Wellman read a statement regarding a case of accused misconduct by a faculty member, and results of the university investigation into those allegations. Topics included wellness and wellbeing, research group culture, allegations of misconduct, and trust.
- In March, 60 participants attended an additional [graduate-focused town hall](#). There was no formal presentation, and instead the session was focused entirely on answering students' questions. Topics included LGBTQIA+ concerns, remote work and international issues, graduate student tuition, faculty and lab culture, student feedback and annual evaluations of professors, the process for changing advisors, and a request for a Town Hall focused on URM issues.
- In April, 25 participants attended a [community gathering](#). Topics included requests for language appreciation events, clarity around policies relevant to Asian, Asian American and international students, more check-ins with students, inclusive lecture examples, and how we can identify discrimination.
- In May, CSE hosted an information session focused on international student and remote education issues -- with representatives from the International Center, Undergraduate Advising, Graduate Advising, and CSE Leadership. Topics included access to remote education, reduced course load, Visa applications, COVID vaccine requirements, and masking requirements. The results were emailed to all CSE graduate and undergraduate students.

In response to last year's [Climate Activities Survey](#), CSE created and coordinated a number of [working groups](#) around activities the community identified as medium- or long-term priorities. The four active **working groups** targeted *Effective Office Hours*, *Overwork & Mental Health*, *Lab Culture*, and *Inclusive Environment*. Active working groups began meeting in April 2020 and typically held meetings every-other-week involving about a dozen participants (graduate and undergraduate students, one to two faculty sponsors, and one staff support member).

In addition to CSE-wide town halls, the CSE diversity lead and/or the CSE chair held or participated in **meetings with groups**. These typically lasted an hour and included introductory remarks followed by listening to concerns and question and answer periods. This year, meetings and participation included the Eta Kappa Nau honors society, the CSE staff (in both Fall 2020 and Winter 2021), and the joint Society of Women Engineers + Engineering Student Government + M-Heal Stemclusivity meeting.

The CSE Undergraduate Advising Office partnered with the CSE DEI Committee to host an event this February exploring the **intersection of DEI and Wellness**.

Michigan Engineering C.A.R.E Center partnered with U-M's Sexual Assault Prevention & Awareness Center (SAPAC) to offer facilitated conversations utilizing **restorative circles** to students, staff, and faculty within Computer Science & Engineering. These sessions focused on educational and healing tools to address collective harm that has been caused by sexual misconduct, as well as to collaborate on community needs moving forward.

EECS held a second annual [Juneteenth Celebration](#) to observe the [Juneteenth holiday](#) marking the end of chattel slavery. The event was sponsored by CSE and ECE and organized with the [Graduate Society of Black Student Engineers and Scientists](#) (GSBES) and supported by Michigan Robotics. As of this writing, attendance information is not yet available for the **Juneteenth Celebration**, which included singing of the Black National Anthem, reading the Emancipation Proclamation, and a remembrance of Michigan alumna [Willie Hobbs Moore](#), the first African American woman to receive a Ph.D. degree in physics.

CSE Program Activities

In AY 2020, CSE expanded its [inclusive teaching training](#) for instructional assistants and graduate student instructors. **Inclusive teaching training** efforts were expanded to include all teaching assistants from multiple classes, including EECS 183, 203, 280, 281, 370, 398, 481, 482, 485, 493 and 590. The ninety minute sessions include information on topics such as implicit bias, stereotype threat and imposter syndrome and include hands-on discussions. For the first time, an advanced workshop was held for those who have already taken the standard. The advanced workshop reviewed the content of the standard workshops but then spent most of the time discussing difficult scenarios that might come up in teaching. 117 participated in the standard workshop and 60 participated in the advanced.

Waiting lists for upper-level computer science classes are a critical [undergraduate climate concern](#). 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.

Despite some increased offerings in some upper-level electives, large **waiting lists** are unfortunately likely to persist in very popular courses because the number of CSE majors appears to be increasing. Enrollment in EECS 376, for instance, went up by 22% in one year, which corresponds to approximately 250 additional students who are likely to seek upper-level CSE courses. In very popular courses such as EECS 485, demand has outstrip available instructional capacity, despite increased offerings. In other classes, unavailability of larger classrooms is posing a challenge. Some form of enrollment management is likely to be required in future years to better match enrollment to available instructional capacity, as a step towards reducing waitlists and making student experience less stressful and rewarding.

CSE also teaches a significant number of non-majors in courses such as EECS 183, 280, and 281 and considers it important to serve students who want to get exposure to computing to help broaden participation in computing-related fields. Many of these students may be undecided about computing fields as a mor, may come from diverse backgrounds, and come with different levels of preparation. In EECS 183, CSE is engaged in a pilot effort to explore how best to support such students. Dedicated lab sections were created that are being taught in coordination with the [Comprehensive Studies Program](#) to provide customized support to students.

CSE uses physical and cryptographic **anonymous dropboxes** for community members to leave feedback or discuss climate concerns. Between June 2020 and June 2021, 37 comments were submitted via the dropbox (of which 2 included sender follow-up information and 35 were wholly anonymous). Students and community members are welcome to use these [anonymous mechanisms](#) for any topic.

CSE continued its diversity-focused [Rackham Faculty Allies](#) Speaker Series. The **speaker series** highlights computing for social good. Speakers meet with students and student groups and discuss career paths that are less commonly-discussed. One such presentation given by Dr. Merrie Morris had over 100 student and faculty attendees, with over 85% of responders agreeing that the speakers helped them to better understand how to achieve their career, academic and research goals.

In AY 2020, CSE expanded the number of questions related to climate and DEI activities in **faculty annual reports**. 44 of the 52 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 is expanding on the 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. David Fouhey, among others, organizes the program.

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 hand-on coding instruction, meeting other students and career exploration. Audrey Ladd, Ania Dlugosz, Marina Askar, Rachel Holmes, Divya Ramamoorthy and Sydney Swider, among others, organize the program.

[EECS 198 "Discover Computer Science"](#) is a one-credit class aiming to introduce students to different aspects of CS. The class includes programming instruction, interaction with CS role models, mentorship, and visits to local CS companies. Laura Biester, Laura Burdick, and Rada Mihalcea have introduced and taught the class. The class is open to all students, but encourages the enrollment of women and underrepresented minorities or anyone who is unfamiliar with computer science.

[EECS 598 "Intro to CSE Graduate Studies"](#) is a one credit seminar series designed to introduce new graduate students to the skills needed to be a successful graduate student researcher in computer science and engineering. The course familiarizes students with skills current graduates have found integral for success. Course topics include promoting research, developing a healthy advisor-advisee relationship, publishing in computer science, and developing teaching skills. Lauren Biernacki introduced the course and taught it with Quentin Stout. Megan Shearer, Alanson Sample, and David Fouhey taught the class in Fall 2021.

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. Nikola Banovic and Danai Koutra, among others, organize the program.

The [Explore Computer Science Research](#) program helped involve over 32 students, including women and underrepresented minorities, in the research process. Laura Burdick, Allie Lahnala, Danai Koutra, 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 five workshops served about 25 students and provided application preparation. David Fouhey organizes the program.

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

[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 round-table 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:

- [ColorStack](#) -- a national organization with a mission to increase the entrance, retention and success of Black, Latinx and Native American college students in computing
- [CSEG](#) – Computer Science and Engineering Graduate Students
- [ECSEL+](#) – Ensemble of CS Ladies+
- [EECS DEI Student Action Committee](#) – Undergraduates to Improve Diversity, Equity and Inclusion
- [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
- [oSTEM](#) & [GoSTEM](#) – (Graduates) Out in Science, Technology, Engineering and Mathematics
- [SWE](#) & [GradSWE](#) – Society of Women Engineers

CSE also coordinates with College of Engineering-level DEI activities, including the [COE DEI Committee](#) and Dean Alec Gallimore’s [Eating and Talking Sessions](#) for students.

Finally, while not a focus of this transparency report, CSE also conducts a number of longer-term DEI investigations. One example focus is identifying barriers to the success of transfer students, including lower socioeconomic status students and international students, who pursue computing majors. This includes both the [University of Michigan-Shanghai Jiao Tong University Joint Institute](#) transfer program and [transfer students from other backgrounds](#), such as local community colleges via the [Michigan Transfer Agreement](#). Harsha Madhyastha, among others, organizes this investigation.

Financial Commitments

We also report resources allocated at the CSE level to climate and DEI activities. In general, over the last three years, CSE has fiscally supported:

- Sponsoring these organizations and supporting student travel and registration to their conferences: [Richard Tapia Celebration of Diversity in Computing Conference](#), the [Grace Hopper Celebration](#) highlighting women in computing, the [Society of Hispanic Professional Engineers](#) convention, the [National Society of Black Engineers](#) convention, the [Society of Women Engineers](#) annual conference, the [Computing Research Association Committee on Widening Participation in Computing Research](#). This travel

support is above and beyond the general [Rackham Conference Travel Grants](#) available to all students for academic conferences. Sponsorship of the noted conferences is also provided and CSE sends faculty and staff to the conferences to represent UM and to recruit students into our programs.

- Salary support for Diversity, Equity and Inclusion-focused CSE staff activities and DEI leadership.
- Financial support for student groups such as the [Computer Science & Engineering Graduate Students at UM](#), the [Ensemble of CSE Ladies+](#), the [Graduate Society of Black Engineers and Scientists](#), [Out in Science Technology Engineering and Mathematics](#), the [National Society of Black Engineers](#), and Computing For All.
- Financial support for the [Explore Grad Studies in CSE](#) program and the newly-formed Student Wellness Committee.
- CSE and the College of Engineering provide support for our Faculty Allies Speaker series, town halls (including meals, when held in person), and items such as climate survey gift cards.
- Wellness brochures and [anonymous feedback mechanisms](#).

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 has provided DEI-related **staffing support** as needed over the years. In AY20, specific salary budget lines were established to provide salary support for both faculty and staff time devoted to DEI activities. This corresponds to approximately 1,720 hours per year of paid faculty/staff time for DEI-related activities in the department. In FY21, CSE requested and received funding from the College of Engineering to hire a full-time DEI Project Manager to lead our DEI efforts, adding another 2,080 hours of DEI time for a total of 3,800 hours per year. 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.

Report Summary

This report provides context, statistics, and discussions regarding Computer Science and Engineering in the Academic Year 2020-2021. The report covers undergraduate programs, graduate programs, faculty hiring, sentiment, larger- and smaller-scale activities and organizations, and commitments.

We continue our commitment to release such reports annually. Climate, diversity, equity and inclusion are important to everyone in our community, and a combination of measurement and sustained, collective effort are necessary for improvement.

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