

# Improving Departmental Climate in Computer Science and Engineering

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## Executive Summary

Over the past couple of years, CSE has been rocked by revelations and allegations of misconduct by several faculty. Combined with stresses due to enrollment growth beyond capacity, pandemic conditions, and other institutional and societal factors, the climate in our department has been under unprecedented strain. The surveys conducted by the firm of Giffen & Kaminsky (G&K) in Spring 2021 document a range of reactions, including dissatisfaction felt by significant numbers of CSE students, staff, and faculty, based on their experiences and perceptions of the departmental situation.

The purpose of this report is to describe CSE's efforts to improve departmental climate, comprising activities that have been ongoing for some time, recent initiatives, and current work on developing longer-term plans. Communicating a broad survey of these efforts at this point in time serves to further awareness, and may also expose gaps and prompt ideas for extending and improving the portfolio.

These efforts are organized according to G&K's three categories of recommendations: improving diversity, rebuilding trust, and addressing the student academic experience. The catalog of activities is long, and pervades all areas of departmental function. They are being conducted by a large number of faculty and staff as well as some student volunteers. Some are grass-roots initiatives and some are leadership-driven projects; a common pattern is that an individual or small-group or committee idea develops into a CSE-supported program or adopted policy.

The problems being addressed did not develop overnight and there are no immediate fixes to diversity, trust, or capacity challenges. None of the measures we are taking is a silver bullet, yet we believe that many of them—especially taken together—can lead to meaningful positive change over time. It is worth highlighting in this summary two especially important areas of action focused directly on our most acute challenges:

1. Bolstering transparency and security in graduate advisor/advisee relationships. A bundle of initiatives in the CSE graduate program is devoted to improve communication and increase clarity of expectations for faculty and students, and for the department. We are pursuing mechanisms to improve detection of problematic patterns in advising. The graduate staff has been enhanced to provide higher levels of support.
2. Balancing instructional capacity and student population. We are continuing full-throttle efforts to grow capacity (e.g., hiring faculty and staff), but we also need tools to manage the number of students we are committed to serve. A team of faculty and staff is developing a plan that will provide for multiple controlled pathways into the CS majors, designed to produce a diverse and well-served student body.

There is no greater imperative for Michigan CSE than to achieve a climate where all of our members can thrive. The department is directing a great deal of our energy and resources toward this end. We still do not have all the answers, however, and indeed any lasting change will require broader input, discussion, and commitment from all of CSE's constituencies.

The longer-term process of continuing examination and action on climate issues is the central object of CSE's Strategic Action Planning activity, being conducted over the current academic year. This effort has been intentionally structured to focus on climate, in an explicit manner atypical of academic strategic plans. There are dedicated teams devoted to articulating our core mission and values, managing our enrollment imbalance, and defining priorities and goals for culture and community. The strategic action activity is engaging a broad swath of CSE faculty, staff, and students to set a sustained course to build a learning and discovery organization we can all be proud of.

## Background

In February 2021 a group of CSE faculty composed an open letter addressing concerns about CSE's climate. The letter called for, among other things, engagement of an outside consultant to review CSE's climate and practices.<sup>1</sup> Shortly thereafter, Dean Gallimore formed the CSE Climate Assessment Committee (CLASS),<sup>2</sup> led by Professor Tuija Pulkkinen (chair of the department of Climate and Space Sciences and Engineering) and charged with organizing and overseeing a review of various aspects of the learning and working environment in the Division. CLASS in turn selected and engaged an outside firm, Giffen & Kaminski (G&K), to conduct a climate survey and provide recommendations. The survey itself was launched at the end of May.<sup>3</sup> The final report and recommendations were delivered and communicated in September. In the spirit of transparency, the [report](#) was published immediately on the CSE website.

The G&K survey provides a valuable trove of data from a broad array of CSE constituencies. It addresses a comprehensive set of issues around climate as experienced and perceived by students, faculty, staff, and alumni. The data include a spectrum of positive, negative, and neutral expressions, and reflect a diversity of opinion about what CSE is doing and should be doing with regard to climate. The present document does not attempt to fully characterize the findings and implications of all this information. However, it is important to acknowledge the two underlying issues most frequently cited as the source of concern in negative expressions:

- Stress from competitive academic environment
- Dismay over misconduct cases

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<sup>1</sup> This document focuses on CSE actions in response to the outside consultant climate study and recommendations, however the other areas of concrete action called for in the open letter bear attention as well. One concerned the University processes around handling misconduct cases. In the interim the University has reorganized OIE into a successor organization called ECRT, with additional resources and revisions of key policies. It of course remains to be seen how well this will remedy shortcomings of these processes. The second area was bystander intervention training. The College designed a Change-it-Up! workshop focused on anti-black racism and offered it for all CoE departments. Dedicated sessions for CSE faculty and staff were held in April 2021 with high attendance rates. Bystander intervention training provides valuable tools for constructive action in a variety of difficult interpersonal situations, and we all have an obligation to develop and exercise our skills in this area.

<sup>2</sup> Extensive details including membership, timetables, and links to communications and reports are publicly available on the committee's web page: <https://cse-climate.engin.umich.edu/climate-committee/>

<sup>3</sup> The survey was open 27 May through 9 June. This period coincided with intense debate and outcry surrounding a faculty misconduct case in CSE publicly reported shortly before the survey began.

The breakdown of trust among some reflected in the report is perhaps best understood as lack of confidence that we are dealing adequately with the underlying sources.

## Deliberations on Recommendations

The G&K report includes a set of recommendations based on their climate survey.<sup>4</sup> They are grouped into three areas by the report authors:

1. Steps to Improve Diversity, Equity and Inclusion
2. Steps to Heal Past Sexual Misconduct Issues and Rebuild Trust
3. Steps to Address Concerns Regarding the Student Academic Experience

All faculty and staff were encouraged to read the G&K report and reflect on how the findings and recommendations could be incorporated going forward, both in their individual roles and in the broader functions of CSE offices, labs, and committees as well as the department as a whole. The report was discussed in the CSE Executive Committee as well as other formal committees. The report and underlying issues were also discussed extensively at CSE National Advisory Board meetings in August and October.

The department continues to digest and discuss the issues raised in the report in a variety of contexts. The most significant of these is the Strategic Action Plan<sup>5</sup> initiative we launched in early September and are conducting over AY21-22. The strategic planning activity is an essential element of re-establishing an identity and orientation for the department going forward, directing our considerable strengths and assets toward overcoming challenges and reaching our potential as a learning organization. The design of the strategic effort reflects an appreciation of priorities forged in the difficult times we have faced. It is organized into four teams, comprising over 25 faculty and staff as official members and incorporating input from many more.

- **Mission/Vision/Values (MVV).** A grass-roots articulation of our purpose as a department, our aspirations, what we stand for, and how we should conduct ourselves.

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<sup>4</sup> The G&K study did not include a direct review or assessment of CSE's existing programs, policies, and practices. (As part of their survey they did evaluate awareness of some of our climate initiatives, which was generally low.)

<sup>5</sup> <https://cse.engin.umich.edu/culture/cse-action-plan/>

- **Enrollment and Admissions (EAT).** Toward a deliberate and holistic process to support a diverse and thriving student body.
- **Culture & Community (C&C).** Building an organization where we work together, in all realms, toward the CSE mission and individual fulfillment.
- **Computer Science Knowledge (CSK).** Examining the futures of our field, and our roles as learners and explorers, integrating education and research for the benefit of both.

All four of these teams are working on questions that significantly bear on the issues and recommendations of the climate report. For example, EAT's process directly addresses issues of diversity and the student academic experience. C&C most explicitly targets the difficult issues of support and trust, as we work on building a stronger sense of communit(y/ies) in CSE. I refer further to the activities of these teams in the detailed discussion of CSE actions below.

The remaining sections present an extensive though not exhaustive account of what CSE is doing to address issues related to climate. It is organized according to the categories in the G&K report, though does not take these recommendation-by-recommendation. The account includes activities underway for some time as well as more recent initiatives, and also some still in planning stages. This is by no means a final response, as discussions are still ongoing and we anticipate further proposals and plans to come from our strategic planning effort over the current academic year.

## Improving Diversity

Improving diversity in CSE has been an objective of the department for many years, and received renewed attention, backed up by energy and resources, particularly since the launch of the university's DEI initiative in 2016. Progress has been slow, and we are continually learning how to be more effective. CSE is pursuing a multi-pronged approach to building a more diverse, inclusive, and equitable community through purposeful actions and education. We do so with humility, recognizing that the underlying issues can be sensitive, and all of us are prone to blind spots in this area. Even with fundamental agreement on ends there are divergent points of view on means.

The following outlines some of our key programs and activities related to diversity, equity, and inclusion.

**Broadening participation programs.** The computer science field in the United States has long suffered from a lack of gender diversity as well as low rates of participation by African-American, Native American, and Latinx individuals. Diverse representation is especially important in CS, given the social impacts of our technology. Equal access to the economic opportunities of CS careers across socio-economic backgrounds is also a compelling goal. Michigan CSE conducts and supports many programs focused on goals of broadening participation in the field. A sample with capsule descriptions is presented below.

> **Computing Cares**

Program to change how courses are taught through specialized training on inclusive teaching for all instructors in the division.

> **Discover CS**

Introductory course aimed at students with no exposure to the field, providing a basic background in all the skills they need to pursue further education in computing.

> **Intro to Graduate Studies**

Course designed to introduce new graduate students to new research methods, technical communication, and preparation for teaching and internships.

> **RENEW CS**

Expanding efforts to increase the number of women studying computing by improving teaching and mentoring in intro CS courses.

> **CS Kickstart**

Week-long introduction to CS for students of any gender identity with little to no experience that shows them what they can do with a CS degree.

> **Explore CS Research**

Expose undergraduate students to computer science research, including intensive semester-long mentoring, an industry panel, a year-end poster presentation session.

> **Girls Encoded**

Events to develop the pipeline of women in CS, including high school workshops, a Women in CS lecture series, and sponsorships for student initiatives.

> **AI4All Summer Camp**

A rigorous and supportive two-week summer program that serves as an entry point for CS focused on artificial intelligence and machine learning for 9th and 10th-grade students.

**CSE DEI Committee.** CSE formed an official Diversity & Outreach Committee in 2015, and expanded its size and scope in subsequent years. Since Fall 18 the committee has been chaired by Westley Weimer. Renamed the DEI Committee in 2021, this group is composed of faculty, staff, and students, charged with conducting assessments, leading community-building activities, and recommending actions to improve diversity and the CSE climate. The DEI committee has been a font of ideas and initiatives, a sampling of which is listed below. (They must also be credited with facilitating many of the other activities described in this section.)

- **DEI annual reports:** Provides data on the diversity status of the student and faculty populations, recruiting processes, and factors affecting the quality of experience of those in the CSE community.
- **Organizing community events:** Town Halls, special-purpose sessions (e.g., discuss international student concerns, anti-Asian racism), Juneteenth celebrations, Faculty Allies speaker series, etc.
- **Graduate student check-ins:** Conducted 15-minute personal check-ins for each CSE graduate student to hear concerns and communicate care. (One cycle complete, second underway.)

**DEI Program Manager.** CSE hired Jonathan Merrill into a full-time and permanent staff position newly created in 2021, devoted to support delivery and expansion of all CSE DEI activities. Jonathan has already multiplied our capacity for outreach to CSE student groups and is developing new opportunities we previously did not have bandwidth to pursue.

**Faculty recruiting.** CSE's efforts on behalf of diversifying the faculty have been extensive. All faculty on search committees complete STRIDE training through the Advance program, and we carefully follow best practices for avoiding bias in recruiting. As ADAA, the current CSE Chair introduced the requirement for DEI statements on all applications for faculty positions in Engineering, and conducted "Hiring our Values" discussions focused on diversity with all departments. CSE actively participates in pipeline programs such as NextProf and Rising Stars in EECS that particularly engage candidates from under-represented groups. We have also proactively invited prospective future candidates to Michigan events, several of whom eventually became candidates. A few specific recent highlights:

- Presidential Postdoctoral Fellow Program (PPFP). We made a concerted effort to recruit candidates and establish a thorough evaluation and buy-in process for PPFP, a university program designed to bring in candidates expected to contribute to diversity with a path to the tenure track (TT). CSE for the first time put forth a candidate who won a university slot, and we successfully recruited her to Michigan. We are providing a mentoring and support structure to maximize prospects for successful conversion to TT faculty status.
- The Search and Executive Committees evaluated all 2021 candidates with a careful view towards expected contributions to diversity and climate. Professor Tabbye Chavous, director of UM's National Center for Institutional Diversity, presented and discussed best practices for understanding and assessing DEI statements at a CSE faculty meeting in Winter 21. Consideration of these statements had a distinct influence in our selection of candidates to interview.
- CSE's pool of TT applications last year had significantly increased rates of self-identified female and URM candidates. 43% of candidates selected for interview were female, as were 50% of those selected for offers (including two African-American women).
- As part of this year's process CSE worked with the University to approve a standard question about whether a candidate has been sanctioned for misconduct. This approach will also serve as a model for other CoE departments.
- We are adapting our search process to include brief, uniform pre-interview question sessions with "long lists" of candidates, within priority areas.<sup>6</sup>

**Undergraduate student diversity.** Most of the broadening participation programs listed above are directed at improving diversity of our undergraduate populations. Despite the pressures of exploding demand, we have as a department resisted measures that would cap enrollments at the expense of diversity. As elaborated below, the Enrollment and Admissions Team is prioritizing DEI principles as it develops a plan for managing enrollment. Specifically, the team is recommending multiple pathways for admission to the CS major that would recruit and support students from groups that have not historically been well represented in CSE.

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<sup>6</sup> Lucas, B.J., Berry, Z., Giurge, L.M. et al. A longer shortlist increases the consideration of female candidates in male-dominant domains. *Nature Human Behavior* (2021).

**Graduate student diversity.** CSE also has several pipeline initiatives to promote diversity in our graduate program. Some of these, including our “Explore Graduate Studies” workshop, are organized by CSE’s External Recruiting Committee, chaired by Nikola Banovic. One important tool for recruiting diverse PhD students is the Rackham Merit Fellowship (RMF) program, which is not identity-based but employs criteria that promote socio-economic diversity and contributions to an inclusive community. CSE last year introduced a policy that increased incentives for faculty to recruit RMF-eligible students, by backing up first-year funding in case the applicants are not selected by the competitive Rackham process. We intend to pursue further adjustments of our current mechanisms to promote diversity in PhD recruiting. At the master’s level, we have raised corporate contributions and also leverage department and college scholarship resources devoted to enhancing recruiting of domestic MS students based on RMF criteria.

**Staff hiring.** Recent staff hiring processes have included applications from highly qualified individuals from underrepresented groups, which has resulted in gains in staff diversity.

**GSI/IA recruiting and training.** Much of the student support in our large classes is provided by graduate student instructors (GSIs) and undergraduate instructional aides (IAs). Selecting and preparing these teaching assistants effectively is pivotal to the quality of instruction we can deliver. A few years ago, a group of CSE teaching faculty designed a rigorous interview and audition process for IA positions that also had the effect of achieving gender balance despite imbalance in the overall student population and without taking gender identity into account. The faculty published a study on this innovation,<sup>7</sup> which also received notice in a [Michigan Daily article](#). Once selected, GSIs and IAs in introductory courses receive training in such topics as unconscious bias and inclusive teaching through the Computing CARES program, introduced about ten years ago by Valeria Bertacco and Mary Lou Dorf. CSE continues to extend this training to student instructors in additional courses.

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<sup>7</sup> Amir Kamil, James Juett, and Andrew DeOrio. “Gender-balanced TAs from an Unbalanced Student Body”. *ACM Technical Symposium on Computer Science Education (SIGCSE)*, Minneapolis, MN, February 2019.

**DEI continuing education.** CoE recently announced a [plan for educating all faculty, staff, and students in DEI](#), with initial focus on race, ethnicity, and bias. CSE's chair co-led the team that developed the plan for continuing DEI education for faculty, which entails annual reporting of engagement in DEI-related educational activities, and reflection on its effect on faculty practice in research, teaching, and service. The educational plans are carefully designed to avoid any sense of indoctrination, emphasizing instead individually-driven learning and growth.

## Rebuilding Trust and Community

A series of cases alleging sexual misconduct against CSE faculty members since Fall 2019 has shaken the department. All are distressed about the harm of such behaviors, and many have questioned the adequacy of institutional response. The appearance of a cluster has led some outside and inside the department to draw inferences, and has appropriately precipitated deep reflections within our community about the possibility of systematic factors. Sexual or gender-based harassment has never been considered acceptable behavior in CSE. We must continue to strive as a community to eradicate discrimination and exploitation in all forms. To support our commitment to this ideal, we have been and will continue to pursue actions to build trust across the community.

**Transparency and trustworthiness.** Fundamentally, we can rebuild trust only through open communication and by consistent integrity proving ourselves worthy of trust. Through various channels, such as town halls, lab group discussions among students and faculty, messages from the Chair, and other means, CSE has been working to communicate in ways that help community members to be better informed and feel more heard on important matters.

**Handling misconduct allegations.** We are hopeful that reorganization and reconfiguration of resources in the new ECRT are a step in the right direction for processes at the university level. CSE and CoE have learned lessons about response and communication at the unit level. CSE maintains a [webpage dedicated to reporting concerns and misconduct](#), and work is underway to ensure that the various avenues for reporting and the ensuing processes are widely known across students, faculty, and staff.

**Retaliation.** CSE does not retaliate against critics or reporters of concerns, nor does it tolerate retaliation by anyone with authority in the organization. We will continue to be clear on that message and take measures to address any retaliatory action. The University has announced a new Protection from Retaliation policy and is developing training and education programs on this issue. CSE will disseminate the policy across our community and participate in training programs when they become available.

**Guided discussions.** Opportunities to engage in discussion groups facilitated by UM professionals skilled at restorative conversations were provided earlier in 2021. CoE has assisted with conversations between faculty groups and one implicated faculty member. CSE leadership continues to seek opportunities to engage in interactions that may support trust-building.

**Sexual harassment training.** CRLT Players presented a dedicated session of their “Moving the Needle” workshop for CSE faculty in May 2021. This program on building organizations resistant to sexual harassment was well attended and received. CSE will continue to provide such training opportunities, on this and other topics related to ensuring a safe and respectful community.

**Lab community initiatives.** CSE has installed new leaders (changed Directors or newly added Associate Directors) in each of its five labs, with a charge to extend community-building activities. Some labs have already cultivated opportunities for discussion among faculty and students about issues of concern, in addition to extending regular research-oriented as well as social events to broaden and strengthen connections.

**Strategic Action Culture and Community Team.** Led by Chad Jenkins and Ron Dreslinski, C&C is charged with charting a long-term direction for CSE’s effort to thrive as a community. Through broad engagement with various constituents across CSE (with particular efforts focused on those who may not typically speak up) the C&C Team is gathering input to formulate priorities and specific impactful goals with measurable outcomes to improve the CSE climate and culture.

**Strategic Action Mission Vision Values Team.** Promoting a common purpose, a vision for the future, and a shared set of values can serve to foster a communal identity, provide touchstones for decision-making, and communicate clearly what is expected of the community members. Led by Mahdi Cheraghchi and Donna Bender, the MVV team has already proposed initial versions, and will be finalizing the results with further community input in coming weeks.

**Communications Review.** This semester, we stood up a dedicated committee to review our communication channels and processes. The committee will propose a coordinated and forward-looking approach to planning and sharing out key events and messages across CSE constituencies, with campaign themes such as belonging and promulgating the new mission, vision, and values.

## Student Academic Experience

Starting around 2008, CSE has experienced a steep and sustained growth in demand for our undergraduate programs. This has been highly welcome, on one hand, but also presents challenges to a department with high standards for excellence in education. Over the course of this period, with support from the College, CSE has grown its faculty and staff and introduced technology and other innovations to improve efficiency at scale. Despite these efforts, we have not been able to keep up. CSE's teaching load per faculty is 2.9 times that of the next highest department in Engineering. This strain on capacity has led to stresses on students: for example, accentuating perceptions of competitiveness and impersonality in large classes, and limiting choices among advanced elective courses. It has also imposed extreme loads on instructors and student support staff. Meanwhile, growth in student demand continues unabated.

The following describes some of the measures we have taken or are planning to address the factors contributing to stress in the student academic experience.

**Aggressive faculty hiring.** In recent years the College of Engineering has supported CSE's imperative to grow the faculty by providing generous allocations of slots and approval to extend parallel offers. CSE has vigorously searched for TT and teaching faculty, conducting many more interviews than any other department. Over the past four years we successfully recruited 24 new TT faculty, a great achievement given the competition for top-notch talent in CS research. The net increase, however, was only 11 given attrition. We will continue full-throttle faculty search in the coming year, and have already lined up several excellent teaching faculty candidates for interview.

**Managing enrollment.** Serving our educational mission requires aligning our capacities with the student population we are committed to serve. We will grow capacity as best we can, but as long as demand exceeds supply, our system will be under strain. By managing the size of our programs we can better support our students' success with diminished stress through improved access to faculty and to desired upper level courses, among other goals. The Strategic Action Enrollment and Admissions Team is developing an

implementation plan for enrollment management that will achieve balance, while supporting a diverse and thriving student body. The plan features multiple channels for admission to the CS major, including first-year applications, students new to computer science, transfers, and special programs.

**Leinweber Computer Science & Information Building.** Substantial growth of CSE will be enabled by a new addition to the Beyster building, currently in late design stage. The new facility will provide a major expansion of space for CSE, co-located with the School of Information. In addition to research and office space for increased faculty and graduate student populations, the Leinweber building will provide state-of-the-art student service functions, flexible classrooms, meeting and lounge areas, and maker space, among other amenities.

**Resources for instruction and advising.** CSE has greatly expanded the number of GSIs and IAs hired each semester, devoting the additional resources to the courses where student support is most needed. We recently hired a second staff member devoted to administrative support of classes, and will be adding further capacity in that area. We have also hired several new professional staff for undergraduate advising, which will enable more effective deployment of faculty to career and subject-matter advising.

**Graduate program initiatives.** In Fall 20 CSE appointed Emily Mower Provost as Chair of the Graduate Program Committee. Under her leadership, the faculty are instituting numerous reforms designed to improve the graduate student experience.

- Various program simplifications and clarifications of requirements, including a streamlined and more readily updatable web interface.
- New guidelines and an explicit policy statement regarding changing advisors. The upshot is to promote cross-advisor collaborations and reduce the stress entailed by transitions.
- Standard mentoring policy statements published by all faculty who recruit and supervise PhD students.
- Improved tracking of issues and conflicts, for identification of patterns and early intervention.

Just last week, CSE announced an enhancement and reorganization of the Graduate Programs Office, designed to improve support for both PhD and Master's students. These and further adjustments in policies and support structure are informed by the [Graduate Student Check-in Report](#), which provides qualitative and quantitative data gathered through interviews and surveys on the graduate student experience (conducted by the DEI committee; see Diversity section above).

**Planning for the future.** Our strategic action teams are working on establishing a long-term foundation for a thriving learning community. C&C is reviewing data and recommendations from the G&K survey, the Graduate Student Check-in, and other sources toward improving the academic experience for CSE students. CSK is developing a vision for integrated education and research that positions Michigan CSE at the forefront of discovery in computer science.

## Concluding Thoughts and Next Steps

We thank the CLASS committee for their efforts on behalf of CSE and promoting improved climate in the department and college. The data compiled and organized by G&K has been informative and instrumental in moving our reflections forward. We also appreciate the opportunity to provide a comprehensive (yet far from exhaustive) account of our efforts to improve the situation in our department. CSE's experience over the past couple of years has underscored the necessity of focusing on climate, and as the foregoing attests, we are directing a great deal of our energy and resources to these issues. Though we have much yet to accomplish, our faculty and staff are committed to building a community we can all be proud of.

Many of the activities described above are in early or intermediate stages of development, and will require dedicated attention to pursue and adapt in order to achieve their desired effects. We harbor no illusions that we will soon (or ever) be finished focusing on climate; the commitment is and must be for the long term. As such, the most significant steps are those based on ideas that are as yet embryonic or still to be conceived. An incubator for those is our strategic action plan activity, outlined above. This effort has already demonstrated the breadth of support within CSE for focusing attention and resources to departmental climate, and is producing plans and recommendations to keep us on that path.