



# Women and Marginalized Communities in STEM at the University of Michigan Focus Group Report

May 2020

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## Executive Summary

At the University of Michigan, women are largely underrepresented within the Science, Technology, Engineering, and Mathematics (STEM) undergraduate and graduate departments. As a result, women and marginalized communities in STEM fields often face barriers to personal and career development. Institutional experiences in terms of classroom climate, feedback on learning, peer group interaction, and faculty interaction are all factors that influence the persistence or departure of underrepresented identities in the STEM fields.

The Center for the Education of Women+ (CEW+) supports women and underserved students professionally, academically and financially through events, workshops, funding, counseling and advocacy initiatives. This CEW+ focus group study was conducted to address the needs of the University of Michigan undergraduate and graduate students (male, female, and non-binary) entering the professional world. The major goal of this study is to increase awareness of the importance of gender equity and equal opportunity in the STEM academic setting and ultimately, the workplace.

Higher education which includes undergraduate departments and graduate level programs is the appropriate place to make these advances to better include women and marginalized communities. In an educational safe space, faculty are in a position of privilege to work closely with young developing STEM professionals and to take this opportunity to learn together.

The objective of this CEW+ focus group research study is to identify challenges women and marginalized communities face in STEM courses, majors, and departments at the University of Michigan. Marginalized communities in this context refers to groups that are underrepresented and underserved in STEM. According to the NSF’s definition, underrepresented minorities include Hispanic or Latinx, Blacks or African Americans, American Indians or Alaska Natives. The results of this report are to be disseminated to the University of Michigan staff and faculty to provide feasible recommendations to better support nontraditional students and to be implemented in the classroom and department-wide settings.

This report examines and incorporates the opinions and perspectives of a diverse group of undergraduate and graduate students with lived experiences in STEM courses, majors and departments at the University of Michigan to accomplish the following:

1. Assess the gaps that exist between undergraduate and graduate students and faculty and staff.
2. Identify identity-specific challenges faced by nontraditional undergraduate and graduate students in STEM disciplines.
3. Provide actionable steps to improve and prioritize efforts of Diversity, Equity & Inclusion (DEI) in STEM departments.
4. Create an easily accessible downloadable resource sheet for faculty and staff to better support marginalized undergraduate and graduate student identities in STEM departments.

5. Develop an online training module for faculty & staff to engage with strategies to navigate nontraditional student identities in STEM majors and programs.

As a Research Assistant at CEW+, I conducted 8 STEM-department wide focus groups, 4 within the undergraduate community and 4 within the graduate community at the University of Michigan (UM). Participants in all focus groups described examples of challenges or positive experiences with respect to their core social identities in the STEM classroom or STEM department setting. This focus group study involves both the undergraduate population and the graduate population to better understand the way in which the challenges and identity-specific microaggressions faced by women and marginalized communities operate at multiple levels or magnitudes at different career points within STEM. Additionally, findings support that challenges faced by women and marginalized communities in STEM at the undergraduate level persist into the graduate level at higher magnitudes or manifest in different forms. Across the undergraduate and graduate community at the University of Michigan, participants recounted feeling as though DEI is not made a priority in their STEM courses, majors and departments in comparison to their humanities or social science-oriented courses, majors and departments. Undergraduates report needing additional support from Staff & Faculty in navigating the STEM courses and majors. It is evident that undergraduates strongly desire for Staff & Faculty to acknowledge the challenges faced by women and marginalized communities in STEM courses and majors. Taken together, to improve the STEM department climate, DEI practices and policies need to be further emphasized by UM Faculty and Staff.

Key findings from **undergraduate** student focus groups,

1. The practice of Office Hours needs to be adjusted to better match the needs of students with nontraditional student identities.
2. Underrepresentation in STEM negatively impacts nontraditional students' learning and may contribute to attrition out of STEM courses and majors.
3. Undergraduate students find that discussions related to social identities are valuable to their learning in STEM courses and help to create an academic safe space.
4. DEI-related practices, programs and policies are not given the visibility required and therefore students are not aware of UM resources and services that exist to support their learning experience.

Key findings from **graduate** student focus groups,

1. The STEM departments' practices and policies need to be improved to accommodate the departments whose students represent a diverse set of identities
2. Departments need to reframe their approach to advising and funding to provide equitable support for Domestic and International graduate students.
3. STEM graduate students note that their departments' Staff and Faculty play a pivotal role in fostering a positive department culture and promoting professional career development.
4. Graduate students recommend a call-for-action to make DEI a higher priority in departments, through training, departmental discussions, and periodic climate polls.

It is clear when listening to the stories of undergraduate and graduate students that their experiences in STEM departments with regards to issues related to diversity, equity and inclusion are inadequately addressed, and in many cases act as an impediment to their overall learning experience.

## Introduction

At CEW+, we navigate circumstantial barriers by providing academic, financial, and professional support to help UM students, staff, and faculty and UM-affiliated community members reach their personal potential. Established to support women through higher education, CEW+ lifts up women and all underserved communities at the University of Michigan and beyond. Likewise, this focus group study focuses on the barriers nontraditional students face in an underrepresented environment like STEM at the undergraduate and graduate levels. Historically underrepresented groups in STEM include women, persons with disabilities, African Americans, Hispanics or Latinos, and American Indian or Alaskan Natives.

The progress of female representation in senior-level and management roles at Fortune 500 companies is constantly being examined.<sup>1</sup> What's missing amongst the literature surrounding gender parity, is a similar analysis specific to STEM departments and majors at academic institutions. Women and Marginalized Groups involved in STEM disciplines often experience barriers to involvement in STEM spaces. These barriers don't only take place at the faculty and staff level, rather research indicates that gender discrimination in STEM operates at all levels which include but are not limited to undergraduate level and graduate-level students.<sup>2</sup> Current literature supports that women and marginalized communities often face unwelcoming STEM spaces and various challenges in academic environments which contributes to attrition out of STEM fields.<sup>3</sup>

The Women and Marginalized Communities in STEM Focus Group study conducted by CEW+ Research Assistant, Varna Kodoth, in Fall 2019 to Winter 2020, identified challenges faced by women and marginalized groups involved in STEM departments at the University of Michigan campus. The goal of this research study is to provide the opportunity through the focus group setting to discuss support for Women and Marginalized Communities in STEM in a safe space. Educational safe spaces are positive environments meant to foster a sense of belonging on Campus. Safe spaces allow students of all identities to feel respected and heard. This space is inclusive of all races, sexes, genders, abilities, immigration status, and lived experiences.<sup>4</sup> The implementation of this safe space led to the development of effective recommendations to better respond to the needs of a diverse student population. Additionally, the feedback collected from focus group participants informed the content in the printable and downloadable Resource "Cheat Sheet" aimed to better equip faculty and staff with UM Resources that exist to support nontraditional student identities academically, financially and professionally. The final product of the focus group results will lead to the implementation of an online Canvas training program on "Nontraditional Students in STEM" accessible via the Canvas COUNTS Toolkit. The module content features major themes from both the undergraduate and graduate-level focus

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<sup>1</sup> See *Women in the Workplace*, 2019, by Lean In, McKinsey & Company

<sup>2</sup> From Settles, Isis H., et al. "Climate Perceptions and Identity Interference Among Undergraduate Women in STEM: The Protective Role of Gender Identity." *Psychology of Women Quarterly*, vol. 40, no. 4, Dec. 2016, pp. 488–503.

<sup>3</sup> Beeler, Whitney & Smith-Doody, Kristin & Ha, Richard & Aiyar, Raeka & Schwarzbach, Elizabeth & Solomon, Susan & Jagsi, Reshma. (2019). *Institutional Report Cards for Gender Equality: Lessons Learned from Benchmarking Efforts for Women in STEM*. *Cell Stem Cell*. 25. 306-310.

<sup>4</sup> Casad, B.J., Petzel, Z.W. & Ingalls, E.A. *A Model of Threatening Academic Environments Predicts Women STEM Majors' Self-Esteem and Engagement in STEM*. *Sex Roles* 80, 469–488 (2019).

groups, recommendations in response to challenges, and strategies to approach scenarios involving issues related to gender equity in STEM.

Overall, the results of this study demonstrate that the University of Michigan staff and faculty are the key to creating a positive learning experience for nontraditional undergraduate and graduate students. This may be through expressing awareness or taking actions that reflect your awareness and inclusion of nontraditional student identities. **This focus group study assesses the needs of nontraditional students in STEM and transforms these needs into actionable deliverables for STEM departments to adapt as daily practices.**

## Methodology

Data collection was conducted in two sets of four in-person focus groups. In the first set of four focus groups, eligible participants were undergraduate students at the University of Michigan involved in the pre-health sciences or traditional STEM majors. In the second set of four focus groups, eligible participants were graduate students across multiple STEM departments at the University of Michigan Rackham Graduate School. The findings of the undergraduate focus groups did not influence the development of the questions asked in the graduate focus groups. All participants were required to complete a 2-minute online pre-survey upon signing up to volunteer as a focus group participant. The purpose of this pre-survey was to ask participants to reflect upon the 3 identities that have the strongest effect on them on a daily basis. These 3 identities are referred to as their core identities throughout the focus group and guide their responses during the focus group. Additionally, all participants were provided with adequate background information on the topic of this research study prior to participating in the focus group. All focus groups required a minimum of 3 participants and a maximum of 8 participants to be facilitated. Please see Appendix A for more information on focus group participant recruitment.

## Focus Groups

### Undergraduate Student Recruitment Plan

The following table details the recruitment plan implemented to obtain undergraduate focus group participants.

	Focus Group #1	Focus Group #2	Focus Group #3	Focus Group #4
Date	November 8, 2019 1 PM	November 8, 2019 2:30 PM	November 15, 2019 1 PM	December 4, 2019 10:30 AM
Target Population	Pre-Med, Engineering, Math, General Hard Sciences (Biology,			

	(Biology, Chemistry, Physics) Undergraduate Student	(Biology, Chemistry, Physics) Undergraduate Student	(Biology, Chemistry, Physics) Undergraduate Student	Chemistry, Physics) Undergraduate Student
No. of Participants	6	4	3	5
Location	CEW+ Conference Rm 330 E Liberty St 2nd floor, Ann Arbor, MI 48104	CEW+ Conference Rm 330 E Liberty St 2nd floor, Ann Arbor, MI 48104	CEW+ Conference Rm 330 E Liberty St 2nd floor, Ann Arbor, MI 48104	CEW+ Conference Rm 330 E Liberty St 2nd floor, Ann Arbor, MI 48104
Environment	Circle Seating 1 Facilitator Responses electronically recorded.			
Accommodations	Complimentary food & beverages provided.			
Duration	1 hr	1 hr	1 hr	1 hr

### Graduate Student Focus Group Recruitment Plan

This recruitment plan was devised and executed with the assistance of the DEI committee at the Molecular, Cellular, & Developmental Biology (MCDB) graduate department at the University of Michigan.

	Focus Group #1	Focus Group #2	Focus Group #3	Focus Group #4
Date	January 27, 2020 4-5 PM	January 27, 2020 5:30-6:30 PM	February 3, 2020 4-5 PM	February 3, 2019 5:30-6:30 PM

Target Population	Graduate Students in Engineering, Mathematics or General Sciences (MCDB, Neuro, Chem or Physics)	Graduate Students in Engineering, Mathematics or General Sciences (MCDB, Neuro, Chem or Physics)	Graduate Students in Engineering, Mathematics or General Sciences (MCDB, Neuro, Chem or Physics)	Graduate Students in Engineering, Mathematics or General Sciences (MCDB, Neuro, Chem or Physics)
No. of Participants	4	3	3	4
Location	Biological Sciences Building Conference Rm 4222, 1105 N University Ave, Ann Arbor, MI 48109	Biological Sciences Building Conference Rm 4222, 1105 N University Ave, Ann Arbor, MI 48109	Biological Sciences Building Conference Rm 4222, 1105 N University Ave, Ann Arbor, MI 48109	Biological Sciences Building Conference Rm 4222, 1105 N University Ave, Ann Arbor, MI 48109
Environment	Circle Seating 1 Facilitator Responses electronically recorded.			
Accommodations	Complimentary food & beverages provided.			
Duration	1 hour	1 hour	1 hour	1 hour

### Online Participant Sign-Up Survey

Participants volunteering to be a part of the CEW+ Women and Marginalized Community in STEM focus group study were presented with the social identities circle at the start of the participant sign-up survey. Note that the social identities circle is not an exhaustive list of all social identities. The social identities circle contains 11 identities. For the purposes of this focus group, ethnicity and race were defined as two separate



identities. Ethnicity is specifically related to one's chosen culture, languages spoken and cultural practices based on their place of origin. Race is socially constructed on the basis of inherited phenotypes across generations. The information collected from the survey allowed us to identify the frequency at which each theme emerged from each focus group as well as across all four focus groups and this is reflected in the clusters and themes. Please see Appendix B to view the Social Identities Wheel.

Each participant was required to select from the Social Identities Wheel with respect to the following two questions: In courses specific to your major, what identities do you think about most often in the classroom setting? Say, on a daily basis? Select 3 core identities. Conversely, in courses specific to your major, what identities do you think about least often in the classroom setting? Select 3 core identities. During the focus group, each participant was randomly assigned a unique numerical I.D. to maintain anonymity throughout the focus group. Participants were instructed to introduce themselves and refer to other participants by numerical I.D. In doing so, the facilitator was blind to the participant's personal information during analysis and each participant's response is solely attached to their selected 3 core identities.

## Focus Group Design

The process of developing focus group questions involved designing focus group discussions to be widely applicable to all social identities and directly related to the participants' experiences in STEM courses and majors at the University of Michigan. Focus group questions were geared towards examining the roles of the three pre-selected core identities that are most important on a daily basis in the context of a STEM environment or situation. Participants were first asked to identify a situation or multiple situations that related to one or more of their core identities within their STEM courses and majors. The subsequent questions required participants to reflect and elaborate on this identity-specific experience at UM.

Participants were also asked at various times to make recommendations for areas of improvement within their STEM major or department to better address their needs as it relates to their selected core identities. Responses also included specific examples of existing resources at the University that positively supported their identities.

The following are the "Focus Group Guidelines" described to participants about the format of a focus group and what a focus group discussion entails.

1. We want YOU to do the talking
  - We would like everyone to participate
  - I may call on you if I haven't heard from you but you can "pass" and not reply to specific questions
2. There are no right or wrong answers
  - Every person's experiences and opinions are important
  - Please share your perspective, regardless of whether others agree or disagree
  - We want to hear a wide range of opinions
3. We will be recording the responses
  - We want to capture everything so we can accurately represent your opinions
  - We won't identify anyone by name in our report

○ All participants are encouraged to refer to and respond to other participants in their focus group by their provided numerical I.D.

The following **key definitions** were provided to participants so they would have a common understanding before entering the focus group discussion. A hard copy of the focus group definitions was provided so that participants may refer back to these definitions as needed over the course of the focus group.

Marginalized Communities are groups that are underrepresented and underserved in STEM.

DEI stands for Diversity, Equity and Inclusion.

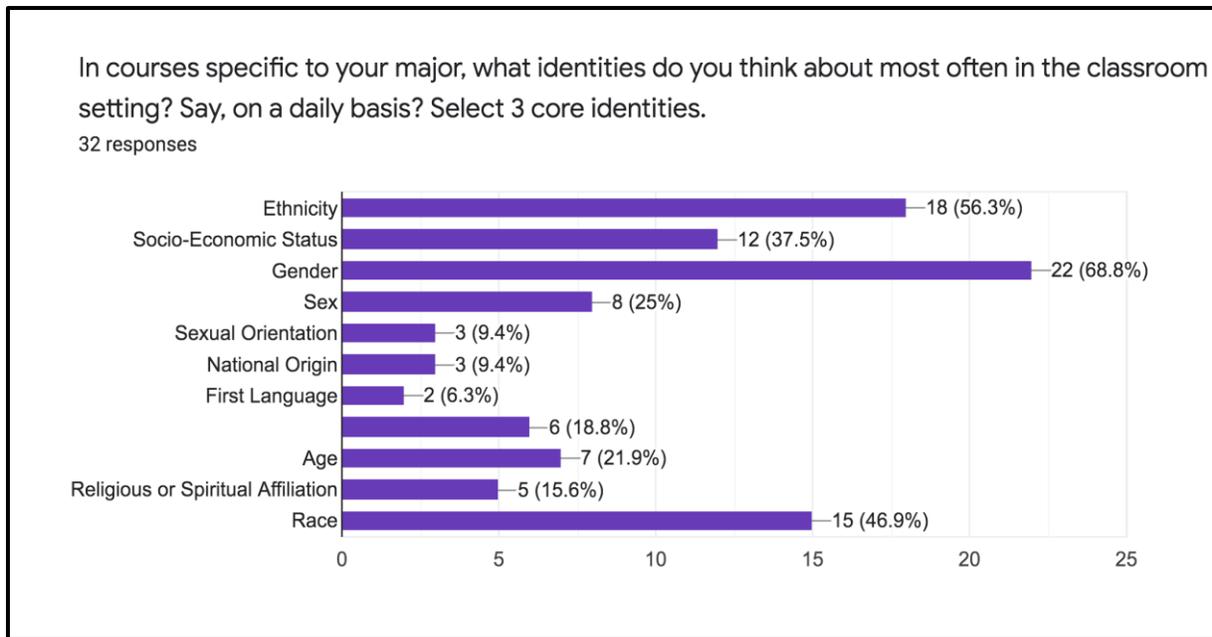
Ally is a term used to refer to any individual with identities different from you who may serve as support.

Race as is defined by the U.S. Census Bureau, is a person’s self-identification with one or more social groups.

Ethnicity as is defined by Stanford University, denotes groups that share a common identity-based ancestry, language, or culture.

All focus group sessions were analyzed to identify key categorical themes, frequency of sub-themes, and recommendations for staff and faculty. The discussion guides were revised and adjusted between groups to better probe for emergent themes. All focus group discussion guides are available in Appendix G.

### Participant Demographics for Undergraduate Student Focus Groups



**Figure 1. The demographics presented reflect the self-reported information by the 32 participants in the 4 focus groups.**

The departmental majors represented in this study include Biopsychology, Cognition, and Neuroscience (BCN); Biomolecular Sciences; Biochemistry; Biology, Health & Society (BHS); Computer Science; Neuroscience; Ecology & Evolutionary Biology (EEB); Public Health; Gender & Health; Biology; Biomedical Engineering; Industrial Operations Engineering (IOE). The top 3 core identities that participants across all 4 focus groups selected to think about most often in the classroom setting include Gender, Race, and Ethnicity.

Participant Demographics for Graduate Student Focus Groups

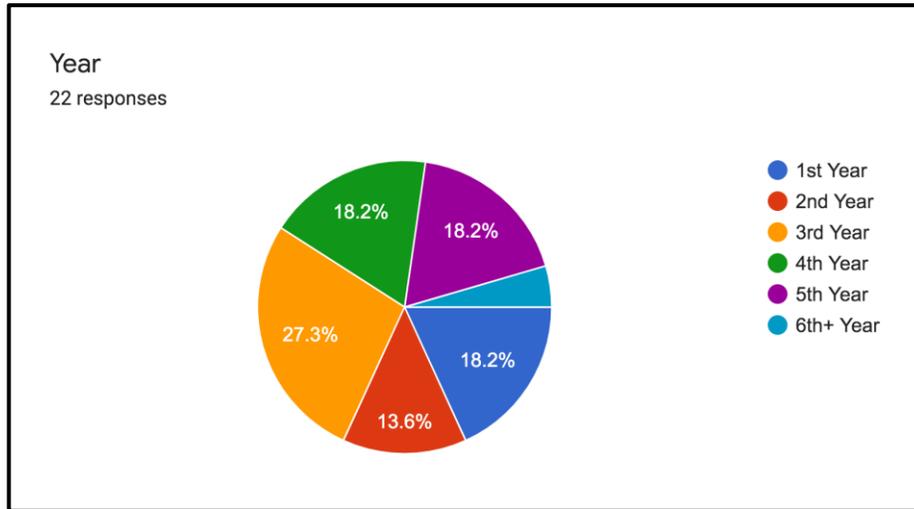


Figure 1. The demographics presented reflect the self-reported year of graduate study by the 22 participants in the 4 focus groups.

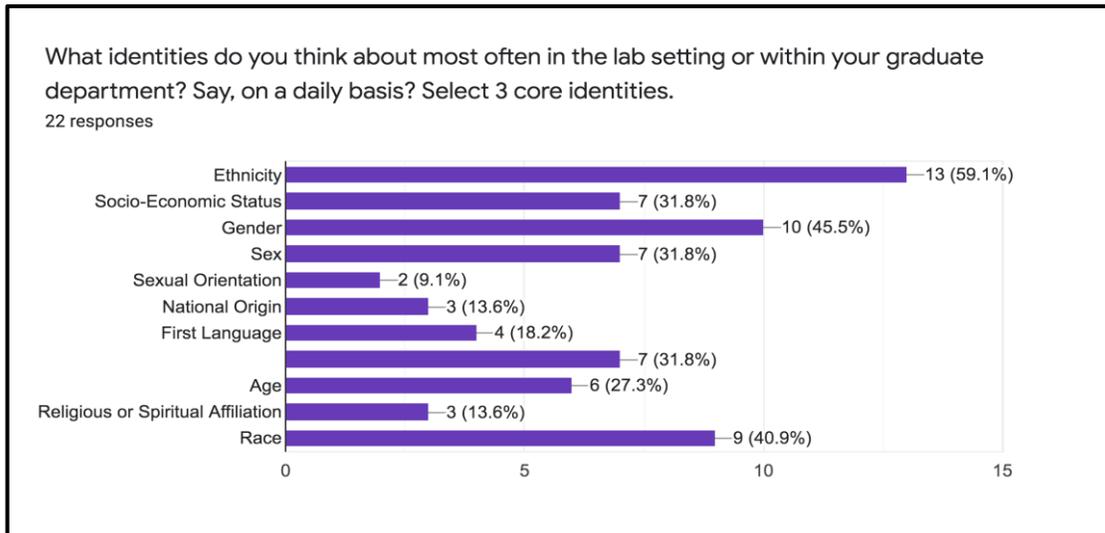


Figure 2. The top 3 core identities participants across all 4 focus groups selected to think about most often in the classroom setting include Ethnicity, Gender and Race.

In a joint recruitment effort with the DEI Committee of the Department of Molecular, Cellular, and Developmental Biology (MCDB), focus group participants represent the following graduate STEM departments: Aerospace Engineering, Ecology and Evolutionary Biology, Earth & Environmental Sciences, MCDB, and Neuroscience.

## Focus Group Discussion Guide

With the input of experienced focus group facilitators at CEW+, the facilitator constructed the interview questions. **The Guiding Question** posed to the **undergraduate** focus groups at the start of the focus group and later revisited at the end of the focus group is: **How can UM staff and faculty better support and include women and marginalized communities in STEM courses and majors?**

The first set of questions generated for the Undergraduate Focus Groups focus upon students' experiences in the classroom, within STEM major courses. The second set of questions focus upon students' perceptions of DEI-related practices, programs and policies. The complete focus group discussion questions are available in Appendix G.

**The Guiding Question** posed to the **graduate** focus groups at the start of the focus group and later revisited at the end of the focus group is: **How can UM staff and faculty better support and include women and marginalized communities in your STEM graduate Department?**

The first set of questions generated for the graduate Focus Groups focus upon students' experiences within the lab environment. The second set of questions focus upon students' perceptions of Rackham DEI-related practices, programs and policies. The complete focus group discussion questions are available in Appendix G.

### The Role of the Facilitator

The role of the facilitator consisted of guiding the focus group discussion through the aforementioned 2 sets of questions and creating a welcoming environment for all participants to share their open and honest perspectives. With the assistance of CEW+ funds, the facilitator conducted 8 total focus groups (4 undergraduate and 4 graduate) and provided complimentary food and beverages to all participants. The guidelines for the focus group provided participants with sufficient instructions to participate in this research study. Through the goals of the focus group and the guidelines, the safe space was established. Introducing participants to a focus group space involves listening attentively to responses and responding with follow-up questions that further clarify or reveal additional information. The facilitator navigated the discussion to maintain an organized, focused and cohesive group dialogue and also provided clarification when requested by participants. Lastly, the facilitator's role involved gathering field notes and participant feedback on UM support services.

## Analysis

### The Coding Process

The focus groups are recorded and then analyzed based on transcripts. The transcripts are a word-for-word account or written record of the discussed topics and responses directly from the audio file. Transcripts are produced through Temi.com, an audio file to a written transcript converting service. Temi processes the uploaded audio file and transcribes it into a Microsoft Word Document. The transcription maintains anonymity and identifies speakers by a number. Following each focus group, the transcript produced by Temi was checked against the original audio file for accuracy. Additionally, each transcript is supplemented with summative field notes taken during the time of the focus group.

### Developing the Codes

Theme extraction took place using the following procedure to develop codes. This methodology is repeated to create the Graduate Focus Group codes. Based on the broad factors that often contribute to the underrepresentation of women and marginalized communities in STEM and from preliminary debrief sessions of each focus group, we developed a pre-set list of codes and screened for these codes first across all four focus groups. There was one primary coder. These codes corresponded to common themes heavily present in all 4 focus groups. Codes were defined based on a phrase that corresponds to a theme. Analysis of the transcripts took place at a sentence-level structure, meaning that the codes and the corresponding sentences of the transcript were selected for and the remaining transcript eliminated from further analysis. Once the relevant text or data had been extracted, the data were then categorized by the question and then processed for emergent themes present in the responses. Each theme was distinctly labeled with color to enable connections to be drawn between themes, participant core identities, and participant experiences. While undergoing further analysis, subtler and nuanced themes arose and this set of codes was labeled emergent codes. The pre-set codes and emergent codes are then applied to each focus group and checked for the frequency of each code in each focus group.

To conduct a reliability check of the method of coding utilized, I compared a random selection of 9 pages of transcript against the coding completed by Dr. Angela Ebreo, Ph.D., the Associate Director of the Diversity Research & Policy Program and Associate Research Scientist in the School of Education at the University of Michigan. The percentage of agreement (PA) was calculated using the following formula:  $PA = [NA / (NA + ND)] \times 100\%$ .<sup>5</sup> This is a reliability measure in which NA is the number of agreements and ND is the number of disagreements. The percent agreement yield was 91.9% with 34 total agreements and 3 total disagreements.

The data presented in the following section reflects the prevalence of the code within each focus group and across all 4 focus groups as well as any relationships found between a participant's core identities and a certain theme. The themes are reconfigured as actionable steps and recommendations (please see the "Future Directions" section) to UM Staff and Faculty. The recommendations are to ultimately be incorporated

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<sup>5</sup> (Syed, Moin & Nelson, Sarah (2015)) *Guidelines for Establishing Reliability When Coding Narrative Data. Emerging Adulthood.*)

into a Canvas training module on Nontraditional Students in STEM for all UM staff and faculty to take voluntarily starting in August 2020.

## I. Major Themes from Undergraduate Student Focus Groups

- Cluster 1. Revisiting Office Hours
- Cluster 2. Representation in STEM Majors
- Cluster 3. Integrating Social Identities in STEM
- Cluster 4. Accessibility of Resources

### Cluster 1: Revisiting Office Hours

1. **Undergraduate students seek improvements to Office Hours. The improvements contribute to making Office Hours an inclusive safe space for course and non-course related content.**

#### To whom does this apply to most?

Some students reported that Office Hours do not maintain an atmosphere that allows for questions that are professional, career-oriented, and research or academic-related but not related strictly to the course material. Office hours are viewed by most participants as a time to discuss only material related to the course.

#### Representative Quote

The following testimonial is from undergraduate Focus Group no. 3. This participant selected the following three core identities: Socio-Economic Status, Ethnicity, and Sex.

*“They're kind of just like, ‘On an academic level, what did you come here to talk about?’ And sometimes ‘I'm like, no, I actually have some personal stuff going on and I need an extension.’ And some professors are way more approachable than others just based on assumptions they make prior to entering the conversation.”*

#### Now, what can I do?

As a Faculty member, take the time to revisit your office hour policies so that it is presented as an invitation to undergraduate students to ask questions related to the course and professional questions unrelated to the course.

2. **Undergraduate students provided with opportunities to engage in informal one-on-one conversations with staff or faculty members, report feeling positively supported in their core identities more than undergraduate students without this opportunity.**

#### To whom does this apply to most?

All students reported that personalized interactions with staff or faculty members positively impacted their undergraduate learning experience. These “personalized interactions” ranged from discussions of course content, grades, and study methods to approach upcoming material to professional questions related to job search, summer opportunities, or lab assistant positions.

## Representative Quote

The following testimonial is from undergraduate Focus Group no. 1. This participant selected the following three core identities: socio-economic status, gender, and religious or spiritual affiliation

*“The professor was a young woman, a new professor, who I just identified with a lot and she was very, very encouraging. Um, encouraged people to come to office hours, encouraged people, asked questions, explicitly invited me to join her lab because she wanted more women in her lab. the Michigan chemistry department has an excellent representation of women”*

## Now, what can I do?

Despite large lecture hall size, let’s rephrase office hours as an opportunity to encourage students within the context of the course or the field of work. For example, encouragement may present itself in the form of motivating students to prioritize improving understanding of material over achieving a certain grade on a test or recognizing the student for their work and suggesting extracurricular work or readings to pursue in addition to coursework. When introducing office hours to the class, please define what this time may be used for. This will break the stigma that office hours are only for exam-related questions.

- 3. When undergraduate students are made hyper-aware of their core gender identity, conventional Gender Roles often negatively impact their ability to ask questions.**

## Who does this apply to?

Many undergraduate students who selected gender as a core identity reported feelings of imposter syndrome and stereotype threat in STEM courses. The imposter syndrome and stereotype threat typically manifested when asking questions during the lecture or office hours. All female-identifying undergraduate students reported feeling that asking questions reflect poorly on their academic abilities. Most attributed this to a constant need to challenge socially constructed traditional gender roles. For example, when asking questions female-identifying undergraduate students became conscious of appearing inadequately prepared or less intelligent in comparison to their male peers.

## Representative Quote

The following testimonial is from undergraduate Focus Group no. 3. This participant selected the following three core identities: ethnicity, gender, and religious or spiritual affiliation

*“I know women who ask more questions come off as dumb and I feel like I’m really aware of that, unfortunately. Also, I think I’ve been in situations where I’ve asked professors question and they treated me like I was so stupid and I just felt so bad about myself. I feel like women instructors nod more at me to let me know like I am listening to you. Whereas like a lot of female instructors or professors or whatever they are, we’ll kind of validate you more so you feel like you almost have some sort of connection to them.”*

## Now, what can I do?

Knowing that nontraditional undergraduate students are experiencing imposter syndrome and stereotype threat in the classroom, Staff, and Faculty are in the position to normalize asking questions. Additionally, please see recommendations for comprehensive instructions on creating safe spaces in the classroom.

## Cluster 2: Representation in STEM Majors

1. **Undergraduate students identified a lack of faculty and staff diversity in STEM departments. This experience negatively impacted students' learning experiences and their transition into the classroom.**

### To whom does this apply to most?

Most participants who selected gender or ethnicity as one out of three of the core identities that are most salient to them in the classroom setting on a daily basis shared that the difficulty in finding a faculty member who shared an identity with them impacted their experience at the University of Michigan. For instance, female-identifying students in STEM courses and majors felt particularly inspired in courses led by female instructors or female graduate student instructors. Similarly, some of the previously identified female-identifying students reported feeling more comfortable asking questions at the end of class or during office hours with their female professors and specified that upon reflection, this is likely because the participant and the faculty member shared a gender identity.

### Representative Quote

A participant from the undergraduate Focus Group no. 4, identified that the sharing of an identity is not required for a successful conversation between Faculty and student. The key to a positive experience is expressing awareness or taking actions that reflect your awareness of nontraditional student identities. This participant selected the following three core identities: ethnicity, race, and religious or spiritual affiliation.

*"I think it's not even like that they don't have the same identity as me, but like it's just very like as if they're unaware of that aspect. Being a woman in a computer science field is extremely challenging. And I think like the professors are predominantly male and like there's a lot of assumptions that like males and that space typically like to know a lot more. And I think professors who kind of reinforce that belief are the ones that like that make it hard to like you want to like go to them or like connect with them."*

### Now, what can I do?

Most participants spoke passionately about acknowledging representation and diversity or the lack thereof within a field of study. While representation matters, faculty may set the tone for the course by taking key actions on the first day to express their awareness of the identity specific challenges in the classroom and field.

2. **Undergraduate students with nontraditional student identities in STEM benefited from sharing an identity with a faculty or staff member in STEM.**

### To whom does this apply to most?

All participants who shared one or more core identities with a faculty or staff member reported feeling a sense of belonging than participants who did not share a core identity with a staff or faculty member.

## Representative Quote

The following testimonial is from undergraduate Focus Group no. 1. This participant selected the following three core identities: Socio-Economic Status, Gender, and Race.

*"I would say that the CSP professor that I had, or instructor for my calc two class was the most, she was the most inclusive towards me. Um, she was an African American woman and she like made me feel like I was um, I don't know, important in the classroom and she specifically asked me to join study groups or like she even emailed me after the class and asked me to be a group facilitator and stuff. like she was focused on my improvement."*

## Now, what can I do?

Professors and advisors in departments play an important role in creating a welcoming environment for undergraduate students. Creating an inclusive safe space in STEM involves understanding Nontraditional backgrounds and listening to identity-specific learning experiences or challenges.

- 3. Identity impacts the student's learning experience in STEM courses and majors. When underrepresented communities express being made hyper-aware of a core identity, it is often in environments in which there exists a strong racial or gender disparity.**

## To whom does this apply to most?

Most undergraduate students who selected gender, socio-economic status and/or race as one or more core identities, expressed that being made hyper-aware of this core identity impacted their behavior in STEM courses and majors and their interactions with the Staff and Faculty.

All participants representing the field of computer science observed and reported that they are made hyper-aware of their gender identity due to the lack of classroom representation. All participants from the School of Engineering reported that socio-economic status is an identity that is not visible and therefore isn't acknowledged amidst peers, faculty, and staff members.

All students in the Biopsychology, Cognition, and Neuroscience Major Department identified a stark difference in the gender composition of the classroom between their neuroscience-based courses and psychology-based courses.

## Representative Quote

The following testimonial is from undergraduate Focus Group no. 2. This participant selected the following three core identities: ethnicity, socio-economic status, and gender.

*"There is a barrier to entry with marginalized identities to STEM classes. I overheard three African American students talking about being pre-med. They were older, probably juniors or seniors and they were talking amongst themselves and they were asking like, 'Oh, do you know any freshmen who are currently premed? Because I know a lot of us drop it because we don't feel like a support system.' A lot of African-American students starting freshman year really want to be doctors but they don't have the foundation and resources that they feel like they need to get through the four years and go beyond."*

## Now, What Can I do?



Within STEM courses and majors, it is evident to undergraduate students that there is a disproportionately higher ratio of male professors to female professors. Additionally, most STEM fields are dominated by white, heterosexual males. Taken together, this sends an unwelcoming message to undergraduate students particularly those of marginalized identities. Therefore, Faculty and Staff may serve as a support system or as informal mentors especially to nontraditional students who lack a community within STEM.

### Cluster 3: Integrating Social Identities in STEM

1. **Nontraditional undergraduate students in STEM frequently experienced stereotype threat or experienced a microaggression based on one of their core identities in their STEM major/course during peer to peer interactions. Participants less frequently experienced stereotype threat or experienced a microaggression based on one of their core identities in their STEM major/course during interactions with their STEM department staff or faculty.**

#### To whom does this apply to most?

Many nontraditional undergraduate students experienced a STEM stereotype in the form of a microaggression which includes but is not limited to: stereotypes commonly associated between a specific race and pursuing a STEM-related career, insensitive comments about one's cultural identity and gender-based prejudices.

#### Representative Quote

The following testimonial is from undergraduate Focus Group no. 3. This participant selected the following three core identities: ethnicity, socio-economic status and sex.

*"Computer science tends to have nerdier, quieter people. And so it's not just like the fact that you're a female but also even people that are seen to be a part of more social areas such as Greek life they're also seen as not as smart as these kids are less social."*

#### Now, what can I do?

Faculty and Staff are in a position to acknowledge the gender or racial disparities that exist within STEM and in doing so change the narrative surrounding stereotypes in STEM courses and majors rather than perpetuate them. This sets the expectation that there is a zero-tolerance policy for stereotypes in the classroom which students then follow.

2. **Nontraditional students feel that in STEM courses, their identity is not viewed positively or negatively, only neutral.**

#### To whom does this apply to most?

Most undergraduate students reported feeling that their social identities did not matter in STEM courses or that their core identities went unnoticed by staff and faculty. This is due to the lack of discussions on social identities in STEM. All undergraduate students associated discussions related to social identities with humanities courses and departments. Additionally, all undergraduate students in STEM majors indicated that DEI related practices and department policies are not easily accessible to them. Taken together, undergraduate students report being under the impression that identities are not of concern to STEM Faculty and Staff.

## Representative Quote

The following testimonial is from undergraduate Focus Group no. 2. This participant selected the following three core identities: ethnicity, socio-economic status, and gender.

*“In public health sciences we talk a lot about access, whether that be access to clean water, access to healthcare, like access to education. In terms of that, we talk a lot about how your socio-economic status is a big determining factor of this. I feel like I think about ethnicity and race more in my STEM classes versus in my humanities classes...when I think of my STEM classes very particular like race and ethnicity come to mind, because representation is poor. Whereas in STEM classes you kind of just sit there, absorb the knowledge, leave, and take a test.”*

## Now, what can I do?

From a Faculty and Staff point of view, this is an excellent opportunity to invest the time to express the importance of social identities in a STEM context. This may present itself in the following forms (please see recommendations for more): Construct course design to include a time to discuss social identities within the context of course material or within the context of the field as a whole. This opens up a safe space to express that STEM disciplines celebrate diversity. In doing so, nontraditional undergraduate students in STEM feel accepted in the classroom.

3. **Undergraduate students expressed that dialogue on social identities tends to be solely reserved for their humanities courses, however, discussing social identities in STEM courses is equally applicable.**

## To whom does this apply to most?

All undergraduate STEM students taking courses in both a humanities department and a STEM department, identified practices used in humanities classrooms that are equally beneficial if borrowed and used within a STEM classroom.

## Representative Quote

The following testimonial is from undergraduate Focus Group no. 4. This participant selected the following three core identities: ethnicity, race, and religious or spiritual affiliation.

*“The professor dedicated a lecture to diversity and interacting with diverse identities in the field. ‘I am a white heterosexual male in a male-dominated industry’ and acknowledging that makes a difference. Then he opened up the floor and asked the few females present, “you go ahead and talk about your experiences in groups within CS [Computer Science] and we did talk and provide feedback. I've never had an instructor like to start the first day and like we'll continually remind us throughout the course.”*

## Now, what can I do?

Work on finding effective ways during class or virtually through emails or Canvas Announcements to discuss social identities present within the field of study or to integrate current inequities in the field directly into course content. It's important to make this a practice that takes place weekly to be impactful upon the undergraduate student learning experience and to facilitate a sense of belonging.

- 4. Discussions of social identities in STEM/non-STEM courses are best accomplished through the integration of dialogue on DEI into course design and course content.**

### **To whom does this apply to most?**

All undergraduate students who are involved in multidisciplinary studies described DEI training as an effective mode to educate on social identities on Campus. However, most undergraduate students found that the most effective way to enact actionable change is through ongoing dialogues on the topic. This promotes active learning and encourages undergraduate students to actively engage in conversations to better prepare them to enter diverse workplace environments in the future.

### **Representative Quote**

The following testimonial is from undergraduate Focus Group no. 2. This participant selected the following three core identities: ethnicity, socio-economic status, and gender.

*"I remember I took one biology class where they highlighted like Nobel prize laureates or people who like were successful in the field and at the beginning of this path and like, but they made sure to kind of like show people of both genders, kind of like having success in the field because they noticed like when you see someone who likes you, who you kind of think of like as an ally, like that success you think, okay, I can do that too. Taking science classes before where it was like very male dominant and like showing all these Nobel laureates, their bunch just like old white guys. So I remember one of my professors made a purposeful decision to put in people of a wide variety of backgrounds having success in the field."*

### **Now, what can I do?**

There doesn't need to be a formal conversation to discuss identities or Diversity, Equity & Inclusion (DEI), rather the course design may be adjusted to allow for relevant conversations to take place in which identities in STEM are integrated throughout the course material. For example, incorporating the discoveries of prominent female scientists within a male-dominated field is a method to highlight diversity within the field and stay on topic. Another method to accomplish this is by dissemination of literature or publications on the topic of Women and Marginalized Communities in Science or authored by Women and Marginalized Community groups. Please see the "Cluster 3 Immediate Action Steps" for more.

## **Cluster 4: Accessibility of Resources**

- 1. When undergraduate students are asked ways in which faculty or staff members can better support their core identities, all undergraduate students agreed that faculty and staff members are unable to point them to resources for help.**

### **To whom does this apply to most?**

All undergraduate students who selected race, gender and socio-economic status as one or more of their three core identities reported feeling as though the resources to excel in STEM are present at the University of Michigan however, information on the resources is not easily accessible or they don't learn about them until late in their undergraduate career.

## Representative Quote

The following testimonial is from undergraduate Focus Group no. 2. This participant selected the following three core identities: socio-economic status, race, and gender.

*“The moment I explained to [the Professor] how I'm having a difficult time just like with my grade and how studying habits and it's like taking a toll on me especially because I want to get into medical school. That's like when the email chain just stopped when I asked for advice in that way. But I can definitely see they may be less prepared to tackle those questions with students, especially when it gets to be more like difficulties. Like whether that'd be like emotionally just like grappling with how hard the material is or needing academic support.”*

## Now, what can I do?

As Staff and Faculty, you serve as a representative for the University of Michigan resources. Through education on resources relevant to STEM fields and topics, during office hours or one-on-one appointments, Staff and Faculty may take this opportunity to guide students to existing resources on campus for support. Please see the Resource “Cheat Sheet” included in the Appendix I.

2. **Nontraditional undergraduate students navigating STEM through the use of UM Resources report a positive impact on their learning experience.**

## Who does this apply to?

All undergraduate students who selected socio-economic status, race and/or ethnicity as one or more of their core identities attributed their success in STEM to UM programs and resources. However, most undergraduate students who selected socio-economic status, race and/or ethnicity and utilized a UM program for additional support in STEM learned about the resource from a peer.

## Representative Quote

The following testimonial is from undergraduate Focus Group no. 1. This participant selected the following three core identities: socio-economic status, race, and national origin.

*“I know as like coming into U of M as an African American, I've been like probably the only one in a lot of my STEM courses. I know for me it's just been very isolating because I feel like I have nobody really to talk to and form connections with. I know that has been a similar struggle for other African Americans in STEM courses. That's kind of like the reason why some of them may steer away from STEM. More representation will help a lot of students of color stay in STEM.”*

## Now, what can I do?

The challenge for Staff and Faculty is to increase the transparency of existing resources on campus for undergraduate students to take advantage of. To support nontraditional student identities find a community in STEM, it's helpful to make an effort to increase transparency by advertising UM Resources from the first day of class onwards rather than only when undergraduate students seek help.

## II. Major Themes from Graduate Student Focus Groups

- Cluster 1. Visibility in STEM Departments
- Cluster 2. Equal Opportunity for International and Domestic graduate students
- Cluster 3. The Influence of Faculty & Staff on Department Culture
- Cluster 4. Accessibility of Graduate Student Resources

### Cluster 1: Visibility in STEM Departments

#### 1. Additional support is necessary for graduate students with childcare and caregiver responsibilities.

##### To whom does this apply to most?

All graduate students with children, in a caregiver role or with multiple family members living with them at home experience inadequate childcare support and report a lack of family-friendly policies from their graduate STEM department faculty and staff.

##### Representative Quote

The following testimonial is from graduate Focus Group no. 1. This participant selected the following three core identities: national origin, age and race.

*"I am really fortunate that my PI never held any of it against me. He totally, completely understands why I have to put my family first. Like, I'm sorry I'll be presenting this like meeting with my kid attached to my leg because school is closed, you know, like what do you do? I have heard of, you know, unsavory news or stories about how, you know, sit down, PIs hold them against you, that you don't come in over the weekend or when your kid is sick and you can't continue and experiment. And I feel like sometimes I get "mommy tracked." It means that you know, PIs like to label me as a mom so they don't really think of me seriously even when I'm talking about my work because I'm a mom."*

##### Now, what can I do?

Department Staff and Faculty may visibly express their support through the implementation of policies that are child and family-friendly. For example, when selecting lab meeting times or advising appointments, arrange them at a time keeping in mind childcare responsibilities graduate students may have. In doing so, this exemplifies to the graduate students that it is acceptable and even encouraged to find an appropriate balance of family and work. Additionally, this is an opportunity to prioritize training that reduces unconscious biases towards parenthood and childcare responsibilities. The implication being that one cannot have a family and be seriously pursuing advanced graduate studies at the same time.

#### 2. Minority graduate students frequently experience microaggressions in informal interactions in their STEM Department.

##### To whom does this apply to most?



All graduate students who selected gender, first language, race and/or ethnicity as one or more core identities report experiencing microaggressions with peers and staff at informal events or in informal interactions. All graduate students describe the microaggressions as unintentional and often related to cultural insensitivities.

### Representative Quote

The following testimonial is from graduate Focus Group no. 2. This participant selected the following three core identities: ethnicity, gender, and religious or spiritual affiliation.

*"If you want to be an ally, you first have to educate yourself to be an ally. And for example, in a university, you have the privilege. For example, I spoke to a white male lab tech who asked if I was DACA and the thing that killed me about this was number one, the correct term is a dreamer. Like you are here at the University of Michigan and you don't know that the correct term for this type of person is a dreamer. Number two, are you a DACA? That's a very insensitive question. Well, I was actually taken aback for a minute and then I was like, number one, you could have educated yourself to not only know that it's a dreamer, but also the age range into which it applies. Like this is a very charged word that you should throw out without knowing what it means. And that could have been a much better interaction for both of us."*

### Now, what can I do?

Staff and Faculty are welcome to learn about identities through discussions with graduate students, however, it's important to phrase inquiries from the point of view of a learner. Additionally, please see the Resource "Cheat Sheet" in Appendix I to consult expert educational services at the University of Michigan that may be able to provide insight into cultural practices and diverse identities.

### 3. Graduate students express that the STEM graduate programs lack diverse representation of socio-economic status.

### To whom does this apply to most?

Many graduate students are made hyper-aware of their socio-economic status in formal settings and department events. Many graduate students are made hyper-aware of their socio-economic status when discussions related to vacation plans and attending conferences arise in formal settings and department events.

### Representative Quote

The following testimonial is from graduate Focus Group no. 3. This participant selected the following three core identities: socio-economic status, national origin and physical, emotional and developmental ability.

*"Usually they're like, the parents would go to like summer camp or whatever and or like pay for them to go to summer camp. And she's like, Oh, it's kind of played off as like, Oh, it's my parents' vacation or whatever. Like a break from the kids. And it's like, I didn't do any of that. Um, you know, so that made me hyper-aware of socio-economic status, and like everyone in my department is very active in terms of being outdoors and things like that. And you know, like growing up poor, it's not an option to, um, be like outdoors-y."*

### Now, what can I do?



As Staff and Faculty, it's particularly helpful to all graduate students to be transparent about sources of funding for attending conferences and other professional development events. When planning informal and formal events, practice being mindful of barriers to access like financial burdens rather than assuming all graduate students are in a position to be able to afford to attend an event.

#### **4. Graduate students identify a lack of diverse representation in departmental committees.**

##### **To whom does this apply to most?**

Some graduate students struggle to find Staff and Faculty who share the same identity as them. Most graduate students report feeling better supported when STEM departmental committees, lecturers, and seminars feature equal gender representation and diverse identities. Diverse identities promote diversity in thought and diverse approaches to scientific questions.

##### **Representative Quote**

The following testimonial is from graduate Focus Group no. 2. This participant selected the following three core identities: Ethnicity, Sex, and Religious or Spiritual Affiliation.

*"When I was setting up my thesis committee that I fought really hard for was having an equal number of men and women on my committee. And so there is the opportunity to, to request that I had to do it though I had to do the grunt work where I reached out to these people and I specifically chose not only people whose research was relevant, I made sure to look for both men and women and to have equal numbers. But that was very much a personal burden that I took on."*

##### **Now, what can I do?**

Faculty and Staff may assist graduate students and alleviate the personal burden this causes by supporting them in the process to create equal and diverse committees. By showing that you care about diverse contributions whether it be within a committee or through the selection of guest lecturers in a speaker seminar series, graduate students take note of this effort and applaud this demonstration to bridge the gap between women and marginalized communities in STEM.

#### **5. The use of inclusive language is important to fostering a welcoming environment in STEM disciplines.**

##### **To whom does this apply to most?**

Most graduate students who identify as a caregiver or selected ethnicity or sexual orientation as one or more of their core identities noted that microaggressions are often perpetuated via insensitive language unintentionally used in conversation or via emails.

##### **Representative Quote**

The following testimonial is from graduate Focus Group no. 2. This participant selected the following three core identities: Ethnicity, Sex, and Religious or Spiritual Affiliation.

*"One thing that we constantly have a pushback on is we do not want to use the phrase happy hour on social events because it creates this burden for people to assume that this will be an event which has alcohol. And there are many people who do not drink alcohol or do drink. Now is this lack of understanding that by putting*



*the words happy hour you make people who don't drink feel discounted. You make people who have children or families feel like they can't bring their children."*

### **Now, what can I do?**

Staff and Faculty may exercise caution when writing department-wide emails that may use language that unintentionally excludes specific populations from attending social gatherings. When sending an email, use this as a collaborative opportunity to send it over to another staff or faculty member whose identities are different from yours for review. Please see the "Cluster 1 Immediate Action Steps for more examples of inclusive language use.

Additionally, the majority of graduate student situations related to microaggressions reported is unintentional, please see the "Educational Resources for DEI Topics" in the Resource "Cheat Sheet" to learn how to identify a microaggression and resolve issues related to microaggressions.

### **6. Graduate students report that equal representation of gender, race, ethnicity, and socio-economic status across STEM department Faculty and Staff is inadequate.**

### **To whom does this apply to most?**

All graduate students who selected gender, race, ethnicity, and/or socio-economic status reported difficulty finding staff and faculty mentors with similar identities. All graduate students who selected gender as a core identity and shared this identity with a PI or advisor shared that this played an impactful role in their learning experience and career.

### **Representative Quote**

The following testimonial is from graduate Focus Group no. 2. This participant selected the following three core identities: Ethnicity, Sex, and Religious or Spiritual Affiliation.

*"When there's a faculty seminar, a seminar series throughout the semesters through the fall and winter semesters, it would be nice if they would invite an equal number of male and female faculties and prioritize inviting underrepresented minority faculties. We haven't had a single URM faculty that I can think of off the top of my head."*

### **Now, what can I do?**

All graduate students agreed that one additional practice to improve equity and inclusion in STEM departments is by inviting guest speakers of diverse backgrounds to show support for the social identities of graduate students. Additionally, referring graduate students to Faculty and Staff of similar identities to form an informal mentor-mentee relationship is a way to provide support.

## **Cluster 2: Equal Opportunity for Domestic and International Graduate Students**

### **1. International students struggle to feel equally supported in terms of funding in comparison to their fellow Domestic graduate student colleagues.**



**To whom does this apply to most?**

All graduate students who identify as an international student or scholar report difficulty in finding resources at the University of Michigan that address the challenges of being an international graduate student. An example of a challenge is identifying funding for experiments that an international graduate student is eligible to apply for.

**Representative Quote**

The following testimonial is from graduate Focus Group no. 2. This participant selected the following three core identities: ethnicity, sex, and age.

*“There’s a lot more funding opportunities for domestic students than international students in general. With more funding and bigger funding, I would say yes. And a lot of the funding opportunities that domestic students are qualified for tend to be a larger size that could cover the entirety of their graduate career. Whereas international students very rarely get those opportunities.”*

**Now, what can I do?**

In particular, International graduate students look to Faculty and Staff for guidance on funding sources and professional career building. While dome funding is restricted to U.S. citizens and permanent residents due to source, more attention may be given to cataloging funding sources that international students can access. Staff and Faculty who are well-connected within the University of Michigan network and well-versed in funding applicable to International graduate students may prove to be the most helpful resource. In doing so, this prevents international graduate students from feeling disadvantaged in comparison to their domestic colleagues.

**2. Lack of resources and accommodations are offered for non-native English speakers.****To whom does this apply to most?**

All graduate students who identify as an international scholar and selected first language as a core identity described many lab situations that made them very aware of this core identity. All international graduate students reported feeling that the language barrier prevents them from forming a meaningful professional relationship with their PI or academic advisor. All graduate students who work with international graduate students agree that the language barrier is a challenge involved in paper writing and oral presentations during lab meetings. Given this, inadequate resources are offered to assist in writing and presentation skills.

**Representative Quote**

The following testimonial is from graduate Focus Group no. 4. This participant selected the following three core identities: first language, race and physical, emotional and developmental ability.

*“Graduate students who do not have English as their first language. I often notice how they’re treated differently in settings and um, people aren’t really patient with them. I guess the speed at which they can, trying to speak the English language cause it’s not their first language. English not as a first language is viewed negatively and is often picked on by the advisor. Um, and I don’t know if that happens and I’ve heard it*

*happening in other groups, but I don't have any specific examples of that. Um, but I think especially in things like presenting research and writing.”*

### **Now, what can I do?**

Staff and Faculty may need to assess the climate and see how to best meet the needs of international graduate students to make them feel welcome. Additionally, for help with writing skills or presentation write-ups reference International graduate students to the Sweetland Writing Center or the English Language Institute. Please see the Resource Sheet for more.

## **Cluster 3: The Influence of Faculty & Staff on Department Culture**

- 1. Nontraditional graduate students in STEM departments report that prioritization of mental wellbeing is not a uniform practice within each STEM department.**

### **To whom does this apply to most?**

Most graduate students who selected socio-economic status as a core identity reported that external mental health services and mindfulness events are available to them, however, within the department the value of mental wellbeing is not embraced by all Staff and Faculty.

### **Representative Quote**

The following testimonial is from graduate Focus Group no. 4. This participant selected the following three core identities: first language, race and physical, emotional and developmental ability.

*“His priority is expressing to you that you are doing something bad and he will make you feel as bad as he feels he needs to. Um, and so there's a situation where I saw I was going to have to leave the university because he told me he thought I was going to fail my prelims. I told him that I had to start therapy because I was going insane. Like I started to question my abilities and I started to emotionally question other situations in life and he just dismissed it. Like, ‘yeah, you didn't need to tell me that.’”*

### **Now, what can I do?**

Staff or Administrators need to create additional training for faculty and staff on how to identify students with possible mental health challenges and how to make appropriate referrals. To demonstrate support for mental wellbeing, it's recommended Staff and Faculty conduct frequent check-ins formally related to work and informally related to general wellbeing whether this is during lab meetings or advising appointments.

- 2. Check-in meetings with graduate students need to be redesigned to emphasize creating an educational safe space to ask work and non-work related questions. Additionally, check-in meetings need to occur more frequently to address graduate students needs in a timely manner.**

### **To whom does this apply to most?**

Many graduate students who selected ethnicity and/or sex as one or more core identities, discussed a disconnect between the Staff and Faculty in their department and the graduate students. Many graduate students reported infrequent interactions and strictly work-related talk only.

## Representative Quote

The following testimonial is from graduate Focus Group no. 3. This participant selected the following three core identities: ethnicity, sexual orientation, and religious or spiritual affiliation. This participant shared that whether it's during formal meetings or in a formal email, it's important to demonstrate a commitment to inclusive language use. Increasing correspondence will effectively lessen the gap between graduate students and staff and faculty.

*“Even at lab meetings, like when it's a formal round table, maybe going around with, um, pronouns, pretty simple. even at lab meetings, like when it's a formal round table, maybe going around with, um, pronouns, pretty simple. lecturer in the department and he has his pronouns at the, in his signature. And so I noticed it, talked to him about it, and then decided to like send an email to my entire lab department. Like, Hey, so and so did this. Why don't we all do it? Sort of thing because some people don't look at signatures and it's like a great way to be like, ‘Oh, that's something simple that I can do to help.’”*

## Now, what can I do?

For graduate students, graduate study is an opportunity to network and meet experienced professionals in the field. It's important to remember that while graduate students are working towards earning a degree, their career trajectory and professional development is equally important. In turn, graduate students appreciate personal insights from Staff & Faculty to help navigate the STEM fields.

- 3. Active participation, as well as small efforts to support DEI-related events from the staff and faculty's side, encourages participation from lab members too.**

## To whom does this apply to most?

All graduate students who reported being active participants in non-research related events like DEI training or cultural celebrations noted that Staff and Faculty often do not attend or do not encourage graduate students to attend non-research related events. Many stated that the extent to which a graduate student takes advantage of events put on by graduate student Organizations is dependent upon how much social support is provided by the Staff and Faculty they interact with.

## Representative Quote

The following testimonial is from graduate Focus Group no. 2. This participant selected the following three core identities: Ethnicity, Sex, and Religious or Spiritual Affiliation.

*“So for an example, one thing that I was impressed with was we held an event last summer in which it was just sort of a tiny little competition in the building to raise money for, um, a donation to outreach. The PI actually encouraged the lab members to partake and I thought that made a really big change cause at first nobody in that place wanted to do anything. But when the PI was interested and encouraged it, you saw them all enjoy it and be a part of it. And I thought that was really, really nice. I was really pleasantly surprised by that and I was really happy to see that.”*

## Now, what can I do?



Graduate students look to Faculty and Staff as leaders and role models. When Faculty & Staff promote and encourage DEI events this reflects upon the department's values and sends a message to graduate students that attending DEI events and pursuing interests outside of research is acceptable. Additionally, staff and faculty are in a position to lead by example. Therefore, by attending a DEI event, this demonstrates that it is acceptable to engage in DEI events even though it may not be directly related to research work.

**4. Graduate students report that work-life balance and non-academic collaboration is generally not supported by Staff and Faculty.**

**To whom does this apply to most?**

In general, most graduate students report that they do not feel supported in endeavors outside of being a graduate student or a researcher. Examples of endeavors outside of the scope of being a researcher include but are not limited to post-graduation career moves into new fields or spaces, hobbies, and extracurricular interests.

**Representative Quote**

The following testimonial is from graduate Focus Group no. 4. This participant selected the following three core identities: ethnicity, socio-economic status, and gender.

*"I think the department could better promote the strengths of the students that have maybe diverse interests by encouraging us to work outside of just the research or the GSI job that we're being paid to do and think about how we could use our other strengths and use those in different careers."*

**Now, what can I do?**

Staff and Faculty may express their support through subtle actions, for example, forwarding an email for a seminar on a different topic that may be of interest to graduate students. From working with graduate students on a personal level, it's natural to learn other goals that they are striving for, and helping them achieve goals both inside and outside the lab is a way to foster a sense of belonging in STEM academic environments.

**5. Nontraditional graduate students note the presence of conventional gender roles and the perpetuation of gender biases in STEM departmental and laboratory settings.**

**To whom does this apply to most?**

Many graduate students who reported gender as a core identity report being ascribed stereotypically gender-based personality attributes and tasks by peers, Faculty, and Staff. Gender-Based stereotypes induce hyper-awareness of gender identity and cause the academic environment to appear particularly threatening to underrepresented identities in STEM.

**Representative Quote**

The following testimonial is from graduate Focus Group no. 4. This participant selected the following three core identities:

*“So as it relates to traditional roles for females, um, so like males, students are often given responsibilities related to things like strength or you know, labor in the fields. Whereas women tend to like to do a lot more of the ordinance organization planning the projects.”*

### **Now, what can I do?**

Staff and Faculty need to oversee the involvement of graduate students in the lab to ensure all graduate students are contributing to creating a positive lab culture. Please see “Cluster 3 Immediate Action Steps” for suggestions on how to assess the lab climate via implementation of surveys.

## **Cluster 4: Accessibility of Graduate Student Resources**

- 1. Graduate students, Faculty, and Staff need to work together to create safe spaces to learn together about social identities and URM/NT student experience.**

### **To whom does this apply to most?**

All graduate students who selected race, ethnicity, sexual orientation, religious or spiritual affiliation, and/or gender as one or more of their core identities indicated combatting stereotypes and microaggressions with respect to their core identity on a daily basis is an exhausting and isolating process.

### **Representative Quote**

The following testimonial is from graduate Focus Group no. 4. This participant selected the following three core identities: first language, race and physical, emotional and developmental ability. This participant shares the importance of celebrating diversity and diversity of thought in STEM.

*“And I also do feel like being the outsider in the room can be very, um, exhausting because you constantly feel like you're the only voice of dissent. And sometimes the problem that comes is that when you have opposing or even unique ideas, they're not given as much credit as ideas that are along the same lines of thinking when the reality is the work that we do requires a diversity of thought. You want to come at your questions with ideas and experiments from different angles to try and answer the same thought. The more diversity you show, the broader impact your work has.”*

### **Now, what can I do?**

Through self-education on identity specific challenges in STEM, the Staff and Faculty may help to alleviate this burden on nontraditional graduate students. Please see the Resource “Cheat Sheet” in Appendix I to navigate educational resources and websites at the University of Michigan.

- 2. Graduate students expressed that their STEM department is not transparent in its resources to support lower socio-economic graduate students.**

### **To whom does this apply to most?**

All graduate students who selected socio-economic status as a core identity reported extreme difficulty to find financial resources over the course of their time at the University of Michigan. Most graduate students reported finding resources such as emergency funding from peers or word-of-mouth.

## Representative Quote

The following testimonial is from graduate Focus Group no. 1. This participant selected the following three core identities: socioeconomic status, sex and race.

*“The first time I was made aware of one of my core identities was when I had to register for my first conference. And depending on what your funding sources, you may have to pay for your conference out of pocket and wait potentially months to be reimbursed. And this is generally treated like it's something that's fine, but as somebody who is from a low socio-economic status home and doesn't have much of a safety net, it was very painful to deal with.”*

## Now, what can I do?

Staff and Faculty are representatives of the University of Michigan graduate program and therefore need to be able to direct graduate students to financial resources and emergency funds when necessary. To be accommodating of all socio-economic backgrounds, when presenting an opportunity such as attending a research conference, also offer to walk them through alternative funding methods or point them to a resource that is equipped to do so. In doing so, this demonstrates your awareness and acceptance of all socio-economic backgrounds. Additionally, consider connecting students to the professional organization that is sponsoring the conference for financial assistance. Please see the Resource “Cheat Sheet” for all U-M resources related to funding.

### 3. Staff and Faculty lack awareness of all the educational resources that exist to learn about diverse identities.

## To whom does this apply to most?

All graduate students who selected race or ethnicity as one or more of their core identities reported that Staff and Faculty are not knowledgeable on identity-specific resources at the University of Michigan.

## Representative Quote

The following testimonial is from graduate Focus Group no. 4. This participant selected the following three core identities: ethnicity, sex, and religious or spiritual affiliation.

*“Consult first with let's say some experts from the international center to know what are the cultural sensitivities? That would be really nice. I think that would actually help them because that would also help them be more supportive of their international and underrepresented minority community as if they themselves can approach it with a little bit of understanding and sensitivity.”*

## Now, what can I do?

Staff and Faculty are not expected to provide counseling or advising services, however, providing the Resource Sheet in this report or pointing students to additional support services is a way of expressing your support. Reach out to UM resources on behalf of students facing identity-specific challenges to create an academic safe space for all student identities. Please refer to the printable and downloadable Resource “Cheat Sheet” in Appendix I.

## Discussion

### Limitations

All information reported from the focus group interviews is self-reported data. Self-reported data cannot be independently verified and may contain sources of bias (i.e. selective memory and attribution). Given the personal nature of the questions asked in the interview, participants may have been tempted to offer socially desirable answers in the group setting. While the common themes presented emerged across all 4 focus groups in each cohort as well as across the undergraduate and graduate student populations, in future studies, interviewing participants directly one-on-one may better address this challenge.

Participants hailed from the majority of STEM disciplines, however due to accessibility to certain STEM departments more than others, not all STEM disciplines are represented in this study. In future studies, dividing up the focus groups by STEM discipline and recruiting a specific amount of participants from each discipline may eliminate this limitation.

### Current Strengths

From the 8 Focus Groups, numerous helpful University of Michigan Resources has been identified. These strengths included participants feeling well supported by the services and gaining a stronger sense of belonging within STEM fields. Taken together, the existing resources at the University of Michigan are successful in supporting women and marginalized communities in STEM.

Participants reported helpful practices such as Department-wide email blasts with regards to DEI events happening on Campus as well as identity-specific support services and student-run organizations. This allowed for graduate students to find new opportunities and engage with students of similar identities and passions.

Participants also noted that STEM Departments like the Chemistry Department, excellently prioritize equal gender representation. Many participants noted individual Professors who took an effort to integrate DEI related topics into course content. For example, discussing significant contributions of LGBTQIA+ in STEM and leading women scientists in the field.

### Challenges & Growth Areas

While some strengths were noted during focus groups, also discussed were several negative experiences when interacting with staff and faculty. The microaggressions appear to operate on both the undergraduate and graduate levels. The primary focus of Faculty and Staff is often strictly placed upon professional work-related endeavors, which leads to a lack of effort to provide support to nontraditional student identities. To improve upon this, its important for Staff and Faculty to view themselves to be in the position to make a strong impact on a students' career trajectory.

Additionally, while beneficial resources exist at the University of Michigan, the majority of focus group respondents reported that they do not learn of certain resources until late in their career. Other respondents reported that they learned of a resource from a friend who underwent a similar identity-specific experience. The University of Michigan is a large institution with many support services available to help students reach their highest potential, however, these support services are not being taken maximal advantage of.

## Future Directions

The following recommendations correspond to the clusters created to organize the key findings and major themes of this focus group report.



## Undergraduate Focus Group Recommendations:

Based on the themes from the four **undergraduate Focus Groups**, the following list of concrete recommendations emerged.

### Cluster 1 covers **Revisiting Office Hours**

#### Cluster 1 Immediate Action Steps

- Advertise office hours as an opportunity to get to know your students, beyond course content and exercise an interest in your students during Lecture. Making an effort to get to know your students and what they're interested in is a way to make a large lecture hall feel more accessible.
  - Simple fixes that would improve approachability include:
    - Making a point to maintain eye contact.
    - Open body language.
    - Encourage students especially female-identifying students to speak up and ask questions.
    - Share your professional experiences in the field with your students.
    - Demonstrate an interests in your students' career interests and STEM passions.
    - Express your willingness to speak with students outside of class.
  - During office hours, feel free to conduct an informal wellness check of your students, by simply asking: how are you doing? Always encourage your students to explore one's identities, passions and interests and in doing so, you'll demonstrate interest in learning more about students beyond course related content/exam material and appear invested in their paths.
  - Find a neutral location to host office hours. Reserve a conference room or an open space outside of the confinements of your office. Often, the prospect of piling into a small room with many students to ask questions to the professor sitting behind their computer screen is a deterring factor.
- 

### Cluster 2 covers **Representation in STEM Majors**

#### Cluster 2 Immediate Action Steps

- Department-run voluntary Mentorship Program in every STEM major between GSIs and students or Faculty and Staff and students. This endeavor requires no funding and provides nontraditional undergraduates to find faculty or staff mentors with similar identities.
- Undergraduate students appreciate events put on by the Program in Biology like "Pizza with Professors." However, invite a diverse group of Faculty to participate in this event. This same recommendation applies to guest lectures or STEM speaker series seminars. By inviting women or underrepresented represented minorities to be share their accomplishments in the field, the department expresses its support for underrepresented identity groups in STEM.
- Recognize your students strengths' and encourage students to join a research lab or pursue an extracurricular opportunity on campus. Please see the Resource "Cheat Sheet" for a variety of

resources for professional development or support.

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### Cluster 3 covers **Integrating Social Identities in STEM**

#### Cluster 3 Immediate Action Steps

- Send a departmental message at the start of each term that includes the DEI policies of that department. In doing so, students know that these principles exist in writing somewhere within their STEM Department and that it is a priority in their Department.
  - To make this step more effective and far-reaching, dedicate 2 minutes at the start of lecture during the first week of the semester to *vocalize* that you are aware and knowledgeable of DEI practices, programs and policies of the department you represent and show that you care about DEI. **Showing awareness is a form of support**
- Verbally express a willingness to learn and demonstrate open-mindedness through your actions. This is to be accomplished even through a simple introduction on the first day of a course, to say an opening statement for example: “I am learning with you, please let me know if a comment I make or a statement I say is incorrect and not respectful to you and your identities. I expect that you and your peers exercise the same respect you would have for your own Professor.”
  - In doing so, you’re creating a platform to discuss wellness and this opens up the room for students to speak with you when they feel they’ve experienced a microaggression in your classroom.
  - By serving as the role model to students, this sets a precedent of the expectations Faculty have of their students and the way that they are expected to treat one another. At the start of each class, professors often begin with announcements: maybe taking 30 seconds to talk about identities and existing support on campus.
- In addition to the end-of-semester evaluations, implement the use of a classroom climate survey for feedback every 3-5 weeks to pulse what’s going on in the classroom. Please see Appendix I for the Resource “Cheat Sheet” for climate survey examples set forth by the Center for Research on Learning and Teaching (CRLT).
  - This is **heavily recommended** for courses that involve group work or collaborative interactions. In doing so, this allows for Faculty to moderate peer interactions as well and uphold respect in the classroom at all times.
- To further mediate peer dynamics, vocalize expectations to treat one another with respect. Implement the use of a self-reporting survey for every undergraduate student to inform you of the group dynamics. Emphasize that it’s important to teach future STEM professionals how to work as a part of a diverse team.

---

### Cluster 4 covers **Accessibility of UM Resources**

#### Cluster 4 Immediate Action Steps

- This is proposed to be accomplished through a Resource Sheet, that is helpful and readily available to be disseminated during Office Hours or via Canvas to all students. This cheat sheet is located in the Appendix and lists out both academic, professional and wellness resources for students offered by UM.
- While Faculty and Staff are not expected to provide counseling or advising, by familiarizing yourself



with the resources on the Resource Sheet you'll be better equipped to point your students in the direction of additional support.

- Revisiting DEI training material is equally important. Training brings the general department up to speed, but open dialogues at Departments meetings need to be enforced to facilitate learning and progress.
    - Therefore, it's highly recommended that 30-60 minutes of Department monthly meetings is dedicated to discussing ways to better support nontraditional students in STEM classrooms or in the laboratory setting.
- 

### Graduate Focus Group Recommendations:

Based on the themes from the four **graduate Focus Groups**, the following list of concrete recommendations emerged.

#### Cluster 1 covers **Visibility in STEM**

##### Cluster 1 Immediate Action Steps

- Further emphasize gender equity through speakers, thesis defense panels and new hires to the department. For example, please take care to prioritize an equal number of male, female and URM lecturers.
  - Express an understanding for work-life balance through mindful practices.
    - For example, select lab meeting times with parenthood and caregiver responsibilities in mind.
    - For more information on childcare or parenting policies by University of Michigan please see Appendix I: Resource "Cheat Sheet."
  - Celebrate diversity through Department-wide holiday events. In doing so, this fosters an inclusive department atmosphere and serves as a way to build cultural awareness.
  - When creating informal lab events or formal lab events be mindful of all socio-economic statuses.
    - For example, if the lab is planning to attend a poster presentation or research conference, offer to assist students with navigating Rackham financial resources to cover travel expenses and accommodations.
- 

#### Cluster 2 covers **Equal Opportunities for Domestic and International graduate students**

##### Cluster 2 Immediate Action Steps

- Reach out to the International Institute or International Center on the behalf of International graduate students to provide appropriate assistance. By taking this effort, you're demonstrating the importance of securing equitable resources between International and Domestic graduate students. To access the International Institute, International Center and other international student specific resources please see the Resource "Cheat Sheet."
- Offer help or accommodations to assist non-native speakers in poster presentation, lab meeting presentation, or paper writing.

- To prevent International graduate students from feeling disadvantaged, Staff may need to assess the climate and see how to best meet the needs of International graduate students to make them feel welcome. Additionally, for help with writing skills or presentation write-ups reference International graduate students to the Sweetland Writing Center or the English Language Institute. Please see the Resource Sheet for more.
- 

### Cluster 3 covers **The Influence of Faculty & Staff on Department Culture**

#### Cluster 3 Immediate Action Steps

- From the Staff & Faculty end its important to express your support for DEI by simply encouraging your lab members to partake in DEI related events or social events.
    - If you're able to, set an example for your graduate students by attending the DEI events put on by graduate students.
  - Staff & Faculty may stand in solidarity with nontraditional students by developing additional supports and events.
  - Enhance interactions by respectfully asking about race and cultural background.
  - Create an open-door policy or weekly office hours system in a neutral location to engage with graduate students "outside" of the context of research. In doing so you're increasing accessibility for one-on-one meetings with your graduate students.
  - Acknowledge mental health and wellness by conducting informal wellness checks within the Department. This sends a message to graduate students that mental health wellness is a priority in their STEM department.
  - Encourage graduate students to engage in extracurricular activities and graduate student run events. Non-Academic collaboration and group camaraderie positively impacts a student's learning experience.
    - When Department Staff & Faculty demonstrate the importance of work-life balance, graduate students are given the impression that it's okay to pursue additional interests and hobbies that contribute to their personal and professional development.
  - Welcome questions and mandate monthly 30-minute check ins with graduate students to engage with you one-on-one to ask work and non-work related questions.
  - Encourage graduate students to apply to identity-specific grants that may be of interest. In doing so, this shows your awareness and demonstrates your support of their identity.
- 

### Cluster 4 covers **Accessibility of Graduate Student Resources**

#### Cluster 4 Immediate Action Steps

- Topic-Driven Department Meetings and Lab Meetings
- Dedicate 30 minutes of each monthly meeting to discuss DEI related programs, policies and practices.
  - Team up with Spectrum Center, International Institute, CEW+, CAPS and other Campus services to present on relevant topics.
  - By offering training such as cultural competency training, you're reducing the presence of stereotypes in the Department.
- Introduce a new Department-wide seminar series focused on DEI in the field.

- Launch Climate Surveys and Needs Assessments periodically.
  - Even more importantly, following the release of climate surveys please follow-up with graduate students in a timely manner on the results so that they're aware of actionable steps being taken.
- Send Department-wide emails promoting DEI events, programs and social gatherings put on by graduate student-run initiatives. This encourages attendance and demonstrates the important of DEI in the professional setting.
- Invest time into educating yourselves and your colleagues via University resources to better understand social identities. In doing so, you're recognizing and respecting the burden that URM and NT students carry on a daily basis. Please see the "Educational Resources Related to DEI Topics" of the Resource Cheat Sheet.
- Enter spaces like inclusivity training with a positive attitude and growth mindset, viewing them as a time waste is a disservice to yourself and your peers. Most of these events include free food but with that comes a presentation and in return, it's your duty to be respectful of the presentation.
- Mindful use of inclusive language in verbal and written communications.
  - Staff and Faculty may exercise caution when writing department-wide emails that may use language that unintentionally excludes specific populations from attending social gatherings. When sending an email, use this as a collaborative opportunity to send it over to another staff or faculty member whose identities are different from yours for approval.
  - The use of inclusive language (i.e. non-binary pronouns or language that excludes specific populations from attending social gatherings). It's important to understand that microaggressions are perpetuated via language in conversation or emails.
  - Inclusive language works to not perpetuate biases, and instead respect all identities. For example, when greeting others, avoid ladies, gentlemen, sir, ma'am, girls, guys, etc. Instead use, everyone, all, etc. In doing so, gender assumptions are not made.
- At the start of department meetings, request members to share pronouns if they're comfortable doing so. This demonstrates that you respect all gender identities and prevents any members from assuming another member's gender identity.
- Staff may assist graduate students and alleviate the personal burden this causes by supporting them in the process to create equal and diverse committees. By showing that you care about diverse contributions whether it be within a committee or through the selection of guest lecturers in a speaker seminar series, graduate students take note of this effort and applaud this demonstration to bridge the gap between women and marginalized communities in STEM.

## Conclusion

In summary, the following includes a list of 3 overarching findings that emerged from **both** undergraduate and graduate student focus group data:

- A call-to-action for increased accessibility and transparency of UM Resources. It's essential to spread the word of all the helpful resources that exist at the University of Michigan to support nontraditional



students. Staff and Faculty may play an essential role in disseminating information on academic support services, professional development services, and identity-specific services.

- Underrepresentation in STEM negatively impacts students' learning experiences. While diversifying hiring practices may be one approach, many simpler approaches exist to bridge this gap: Invite a diverse group of individuals to partake in guest lecturers, highlight the works of diverse professionals and diversify thesis committees. Staff and Faculty are in a position to showcase to students that success in STEM is achievable for all identities.
- A need to create academic safe spaces in STEM to facilitate dialogue on social identities and in the long term, increase academic engagement and persistence in STEM of underrepresented identities.

The persistence of certain themes in both sets of focus groups demonstrates that many of the systemic DEI-related issues that manifest at the Undergraduate level carry on into the Graduate level. However, as the academic environment matures, the threats in the academic environment are amplified and evolve into far more exclusionary behaviors. Therefore, it is essential that the findings offered here are given adequate responses to better support and include women and marginalized communities in STEM spaces. True progress will be seen in the professional STEM world when the needs of undergraduate and graduate students are met within academic institutions.

## Acknowledgements

Thank you to all those who participated in the 2019-2020 CEW+ Women and Marginalized Communities in STEM Focus Groups and participant surveys. The feedback provided by the participants is appreciated and valued.

Thank you to Dr. Kanakadurga Singer at Michigan Medicine for her integral assistance in the development of this focus group study and Dr. Angela Ebreo for her wisdom and feedback in the making of this report.

Thank you to CEW+ donors The Jean Campell Research and the Irma Wyman Program endowment funds for supporting the focus groups, focus group findings, and the CEW+ COUNTS Toolkit.

Lastly, a special thank you to CEW+ Director Dr. Tiffany Marra for her continuous support and guidance throughout every step of this endeavor.

## Appendices

### Appendix A: Participant Sign-Up

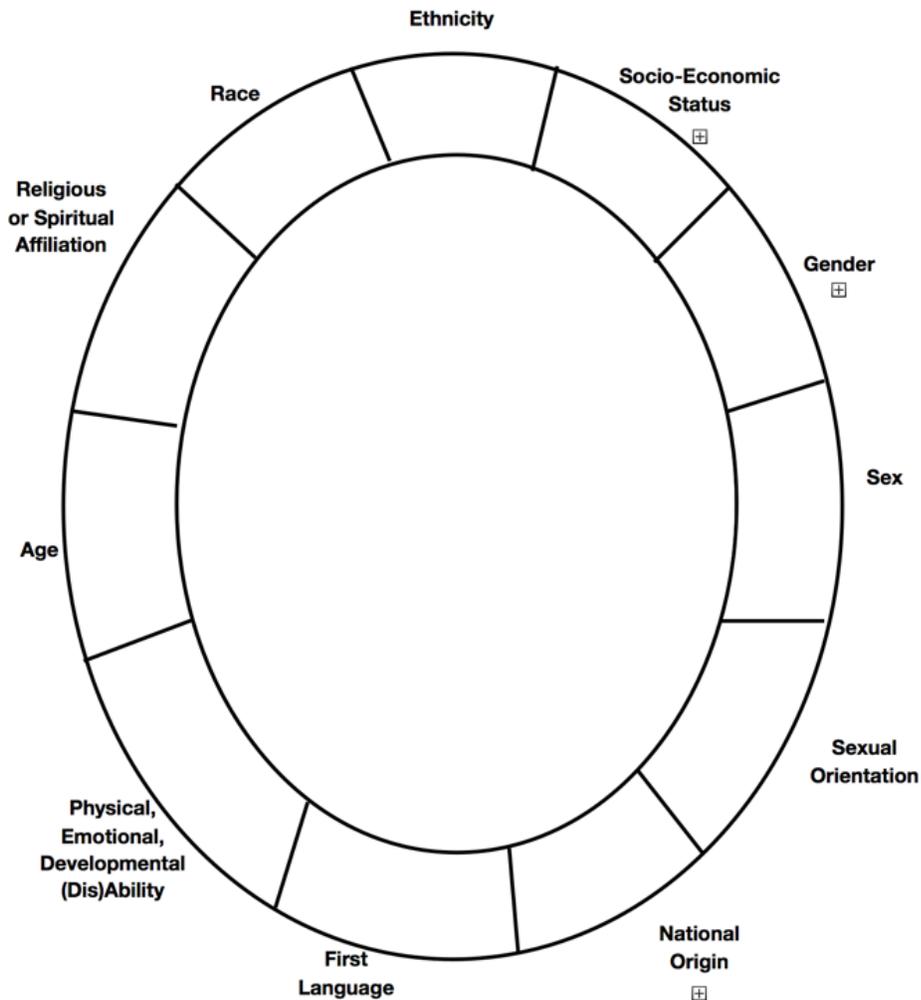
Undergraduate Participant Sign-Up

[Jane Doe Sample](#)

Graduate Participant Sign-Up

[John Doe Sample](#)

### Appendix B: Social Identities Wheel



## Appendix C: Electronic Consent Form

### Consent to Participate in Focus Group

You have been asked to participate in a focus group sponsored by the Center for the Education of Women+ (CEW+). The purpose of the group is to try and identify challenges faced by women and marginalized communities in STEM courses at the University of Michigan. The information learned in the focus groups will be used to design a Canvas training module on nontraditional students intended to enhance how University of Michigan staff and faculty support women and marginalized communities in STEM.

You can choose whether or not to participate in the focus group and stop at any time. Although the focus group will be transcript recorded, your responses will remain anonymous and no names will be mentioned in the report.

There are no right or wrong answers to the focus group questions. We want to hear many different viewpoints and would like to hear from everyone. We hope you can be honest even when your responses may not be in agreement with the rest of the group. In respect for each other, we ask that only one individual speak at a time in the group and that responses made by all participants be kept confidential.

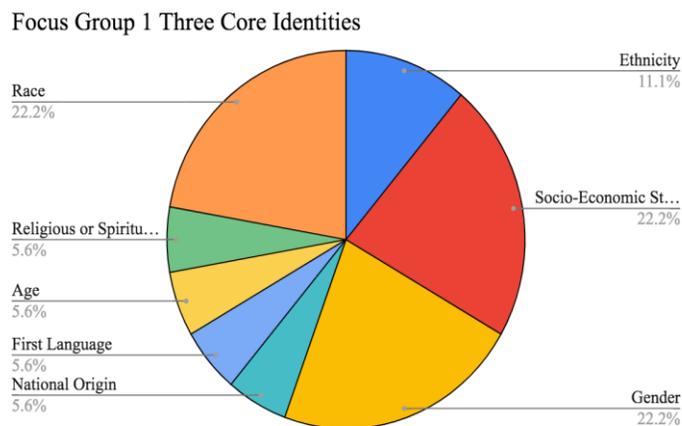
I understand this information and agree to participate fully under the conditions stated above:

Electronic Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix D: Pre-Survey Identity Analysis

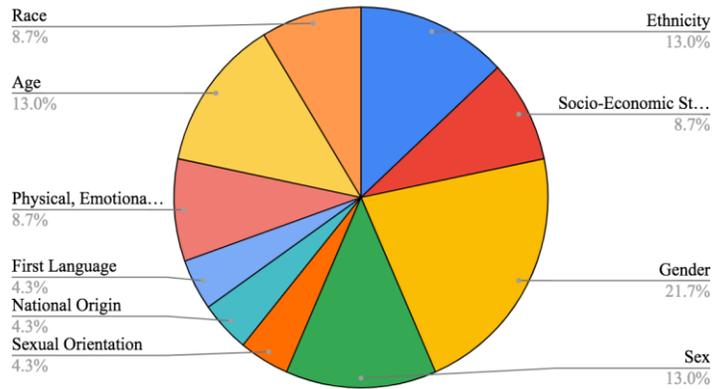
### Undergraduate Pre-Survey Analysis

The analysis of the pre-survey results took place prior to the start of the focus group and involved grouping together the most common core identities across each focus group in order to draw connections between selected most salient core identities and shared experiences or emergent themes.



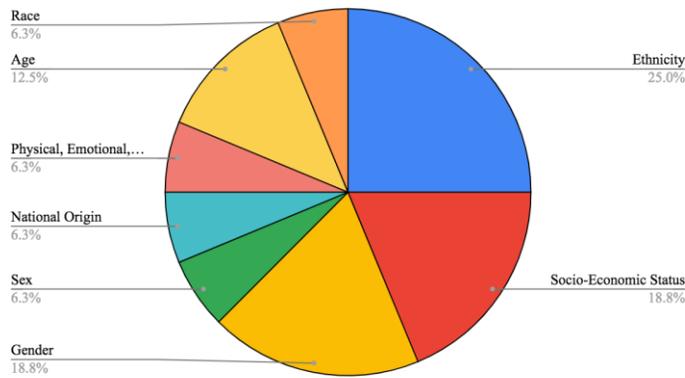
**Figure 1. November 8, Focus Group #1** Focus Group 1 participants selected socio-economic status, gender and race as the top 3 most salient core identities.

Focus Group 2 Three Core Identities



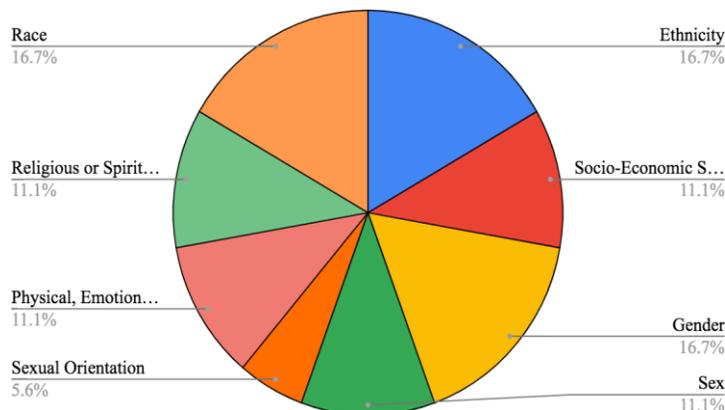
**Figure 2. November 8, Focus Group #2** Focus Group 2 participants selected gender, age, ethnicity and sex as the top 3 most salient core identities.

Focus Group 3 Three Core Identities



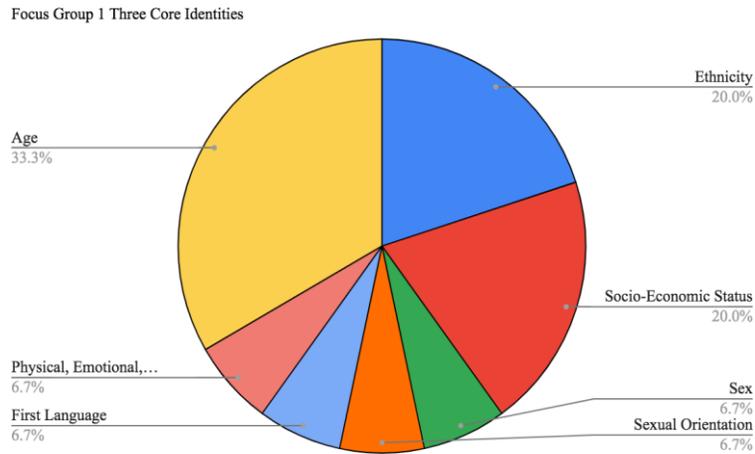
**Figure 3. November 15, Focus Group #3** Focus Group 3 participants selected socio-economic status, ethnicity and gender as the top 3 most salient core identities.

Focus Group 4 Three Core Identities

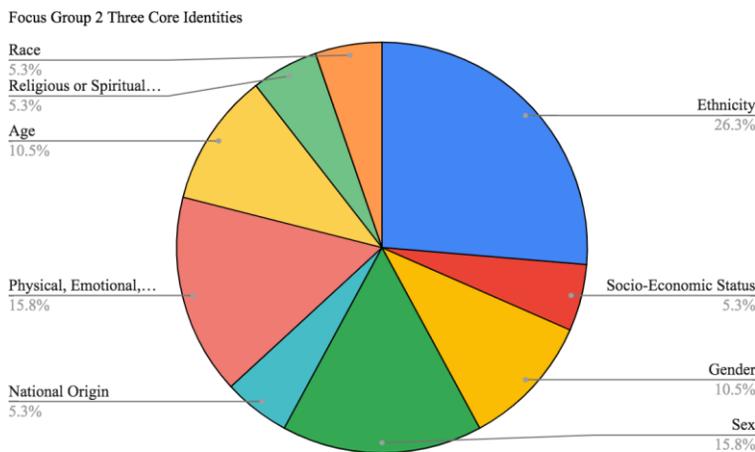


**Figure 4. December 4, Focus Group #4** Focus Group 4 participants selected race, ethnicity and gender as the top 3 most salient core identities.

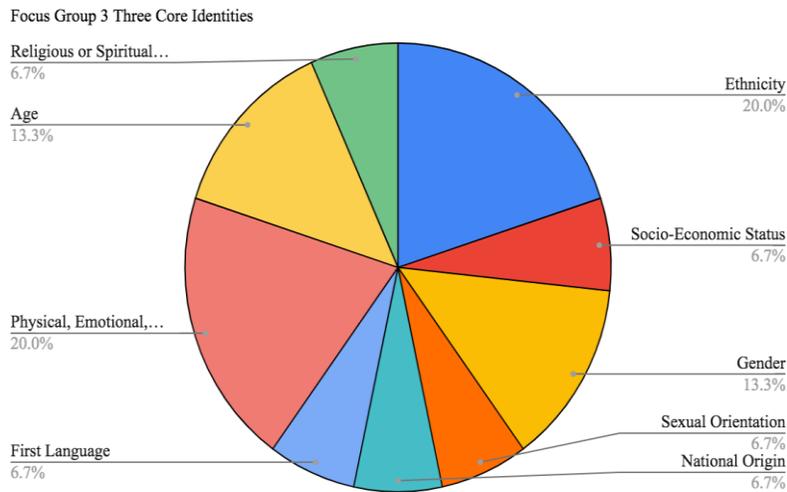
### Graduate Pre-Survey Analysis



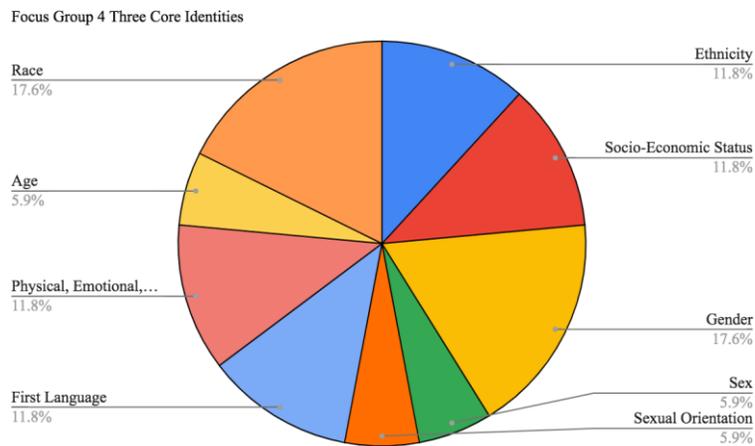
**Figure 1. January 27, Focus Group #1** Focus Group 1 participants selected age, ethnicity, and socio-economic status as the top 3 most salient core identities.



**Figure 3. January 27, Focus Group #2** Focus Group 2 participants selected sex, ethnicity, and physical, emotional, developmental ability as the top 3 most salient core identities.



**Figure 3. February 3, Focus Group #3** Focus Group 3 participants selected gender, ethnicity, and physical, emotional, developmental ability as the top 3 most salient core identities.



**Figure 4. February 3, Focus Group #4** Focus Group 4 participants selected race, gender, and physical, emotional, developmental ability as the top 3 most salient core identities.

Appendix E: Focus Group Agenda

[Focus Group Agenda Sample](#)

Appendix F: Focus Group Protocol

*Hello and Welcome. Thank you for taking the time to discuss your experiences and impressions of being a STEM student at the University of Michigan. You have been selected to provide insight into the STEM programs, departments, and majors. The information you provide is confidential and will be used for evaluation and evaluation research purposes. We have some predetermined questions to ask regarding your perception of the program and your experience with various program activities. Because we want to accurately*

*document your responses, we will be recording this session. Any transcription of the recording will not contain your name. You will be provided with a number upon check-in. To help us keep this information as confidential as possible, please state only your number. Please do not mention the name of your mentor or the name of your institution in your responses. Do you have any questions before we begin?*

### Focus Group Guidelines

1. Listen attentively with sensitivity and empathy
2. All group participants have something to offer no matter what their education, experience, or background
3. We want YOU to do the talking
  - a. We would like everyone to participate
  - b. I may call on you if I haven't heard from you but you can "pass" and not reply to specific questions
4. There are no right or wrong answers
  - a. Every person's experiences and opinions are important
  - b. Please share your perspective, regardless of whether others agree or disagree
  - c. We want to hear a wide range of opinions
5. What is said in this room stays here
  - a. We want folks to feel comfortable sharing when sensitive issues come up
  - b. Please avoid being judgmental or personally critical
6. We will be recording the responses
  - a. We want to capture everything so we can accurately represent your opinions
  - b. We won't identify anyone by name in our report.

## Appendix G: Focus Group Discussion Guide

### Undergraduate

Our first set of questions focus upon your experiences in the classroom, within courses related to your major.

1. Can you provide an example of a classroom situation that makes your core identity salient?
2. In this situation you just mentioned, do you think your classmates perceive your identity positively, negatively or neutrally? Why?
3. In the situation, you mentioned, in what ONE way does focusing on your identity affect your interaction with your classmates?
4. In the situation, you mentioned, in what ONE way does focusing on your identity affect your interaction with your instructor(s)?
5. In the situation, you mentioned, in what ONE way does focusing on your identity affect your behavior in the classroom? Why?

The next set of questions focuses on your perceptions of DEI-related practices, programs, and policies.

1. Think of a course in which issues related to gender equity & inclusion arise. What ONE classroom practice do you think could be changed to improve gender equity & inclusion in your department? Why?



2. Think of the most gender supportive course you've taken in your major. What ONE element of this course makes it supportive? Why?
3. Think of your major department in general. What ONE program or policy could be implemented to improve its responses to issues of gender equity and inclusion? Why?
4. Can you provide an example of a situation when a faculty or staff member supported your core identities?
5. What is the MOST important thing that allies (people with identities different from yours) can do to show their support?
6. Let's revisit the first question...
7. How can UM Staff and Faculty better support and include women and marginalized communities in STEM courses and majors?

## Graduate

Our first set of questions focus on your experiences within the lab environment.

1. Can you provide an example of a lab situation or interaction in your department that made you very aware of one of your core identities?
2. In the situation you mentioned, do you think your colleagues in the lab and/or department view your identity positively, negatively or neutrally? Why?
3. In the situation you mentioned, how did your increased awareness about your core identity affect your interaction with your colleagues in your lab?
4. In the situation you mentioned, how did your increased awareness about your core identity affect your interactions with your PI? To clarify, PI stands for Principal Investigator.
5. In the situation you mentioned, how did your increased awareness about your core identity affect your behavior in the department as a whole? Department in this context includes and is not limited to your research lab, grad student colleagues, interactions with postdocs, PI and general faculty members.

The next set of questions focuses on your perceptions of DEI-related practices, programs, and policies.

Suppose you're given the opportunity to voice your opinions on equity and inclusion as related to your graduate department.

1. Think of an event in a formal setting in which issues related to equity and inclusion arise. Examples of a formal setting include but are not limited to a committee meeting, program event, one-on-one meeting with a PI or advisor.
  - a. What one additional practice do you think could be changed to improve equity and inclusion during formal events in your department? Why?
2. Think of an event in an informal setting in which issues related to equity and inclusion arise. Examples of an informal setting include but is not limited to day-to-day interactions and casual discourse or conversation.
  - a. What one additional practice do you think could be changed to improve equity and including during events in informal settings? Why?



3. Think of the most supportive interaction and/or situation in your departmental program.
  - a. What one element of this interaction and or situation made it supportive?
4. Think of your major department in general.
  - a. What one program or policy could be implemented to improve its responses to issues of equity and inclusion? Why?
5. Can you provide an example of a situation when a faculty or staff member supported your core identities?
6. What is the most important thing that allies can do to show their support? To clarify, allies in this context means individuals with identities different from yours.
7. Think of your graduate program department in general. How can UM staff, faculty, and graduate students promote the strengths of those from diverse backgrounds within the department?
8. Let's revisit the first questions...
  - a. How can UM Staff and Faculty better support and include women and marginalized communities in STEM courses and majors?

## Appendix H: Codes

### Undergraduate

color code	
	faculty representation
	humanities versus STEM example
	office hours experience
	sharing an identity
	example of faculty/staff supporting students
	Experienced STEM stereotype
	identity is viewed neutrally
	classroom representation

	discussing social identities in STEM courses/majors
	career development strategies or classroom practices
	redacted information
	unwelcoming/uncomfortable environment
	Identification of a barrier
	Students supporting students
	Identity impacts ability to ask questions and interact with faculty
	a drawback due to large lecture hall format
	a positive result of discussing social identities in non-STEM courses/majors
	The participant(s) reflected upon a graduate student experience/interaction.
	racial disparity
	conventional gender roles

## Graduate

Color code	
	PI/Faculty representation
	Internationally Trained PIs/Scholars
	Graduate Student Representation
	Conventional Gender Roles
	Work Life Balance
	Negative Lab Culture
	International Graduate Student Experience
	Program Implementation or Graduate Student Resource
	Identification of Barriers
	Gender Disparity
	Racial Disparity

Example of Faculty/Staff Supporting Students	Example of Faculty/Staff Supporting Students
Impact of Social Identities on interaction with your PI	Impact of Social Identities on interaction with your PI
Graduate Student Solidarity	Graduate Student Solidarity
Minority Student Experience	Minority Student Experience
Microaggression or Stereotype	Microaggression or Stereotype

### Appendix I: Nontraditional Students in STEM Resource “Cheat Sheet”

This focus group study included students from those who need a variety of support services. This Resource Sheet is a culmination of resources collected from focus group participants and covers UM resources existing to support nontraditional student identities through educational, academic, professional and financial services.

To bookmark and search proceed to: [Downloadable Resource Sheet](#)

To print and distribute: [Printable Resource Sheet](#)