

## Overview

More diverse students enrolling in higher education but not all students have an equal opportunity to earn their degree. Students with marginalized genders, races, and backgrounds earned lower grades in science, technology, engineering, and mathematics (STEM) courses, are more likely to change out of a STEM major, and less likely to earn a STEM degree than their majoritized peers are. In parallel, researchers have increasingly more access to universities' institutional data and student learning data, offering unprecedented insight into student outcomes. Current research using institutional data has largely ignored applications to diversity, equity, and inclusion (DEI) issues. Thus, there is a significant opportunity to apply institutional data toward understanding and addressing equity gaps across the curriculum in higher education. There is then a critical need to develop tools specifically designed to analyze institutions' and departments' current state of equity that lower the barriers for institutions to identify and address DEI issues. This proposal seeks to develop a departmental equity report that can be broadly deployed at higher education institutions to identify and prompt action on inequities in grades and degree attainment within STEM departments. To determine the efficacy of this approach, this project will use a combination of focus groups, interviews, and surveys of STEM faculty and staff. Failure to act means that inequitable STEM environments will remain the norm, pushing out promising STEM students, resulting in lost economic opportunities for students and an insufficient number of STEM graduates to support the nation's future needs.

## Intellectual Merit

We will develop an automated series of analyses that could be broadly deployed at higher education institutions. These analyses, along with supporting text, will constitute an automated *departmental equity report* that supports identifying and prompting action on inequalities within STEM departments. This goal will be accomplished through a series of focus groups with STEM departmental leadership, think-aloud interviews with STEM faculty and staff reading through the reports developed through the analyses, and surveys to assess longitudinal impact of STEM faculty and staff using the reports. Alongside these research activities, this proposal will accelerate development of our prototype of the departmental equity reports, allowing for interactivity and the ability to add in custom departmental data. The expected outcomes are 1) an automated series of analysis that can be deployed across departments and institutions to identify and prompt action on inequities in STEM, 2) an evidence base supporting the use of institutional data for identifying and acting upon inequities within STEM, 3) deeper knowledge about the DEI knowledge and experience STEM faculty bring when working with and interpreting DEI data, and 4) increased knowledge about how the visualization of such data influences how viewers make sense of the underlying data, leading to a series of best practices for developing analyses and visualizations to identify and prompt action on DEI issues.

## Broader Impacts

The data infrastructure underlying these reports are built capacities and do not depend on external funding. Therefore, we expect the departmental equity reports to be useful beyond the funding period and continue to make an impact. We also expect the departmental equity reports created from this proposal will enable departments to identify and address pressing inequities within their programs. Additionally, this project will train the participating STEM faculty in working with departmental-level equity data. More broadly, we expect that participants will have increased knowledge about inequities in STEM and how they manifest in their department. The knowledge generated from this proposal is also expected to provide guidance to others about training faculty in the use of department-level equity data. As research-intensive institutions are increasingly making institutional data accessible to their researchers, the tools developed from this report are expected to be applicable to and deployable at institutions similar to Michigan. Doing so can contribute to the full STEM participation of currently marginalized groups such as women and underrepresented minority students and result in more equitable STEM education.