ADVANCE Journal

Research Article

Volume 6, Issue 2, January 2026

Identifying and Addressing Inequity among Women, Racially Minoritized, and International STEM Faculty: A Mixed-Methods Analysis

Justin Allen Berg, University of North Dakota
C. Casey Ozaki, University of North Dakota
Donna Smith, University of North Dakota
Julia Zhao, University of North Dakota
Sarah Sletten, University of North Dakota
Sike Olateru-Olagbegi, University of North Dakota

Abstract: With funding from a National Science Foundation ADVANCE Catalyst grant (2042208), we conducted an institutional self-assessment at the University of North Dakota (UND) to ascertain the extent of inequity among STEM faculty by gender, race, and nationality. Using an intersectionality perspective, our mixed methods research design employed in-depth interviews, institutional data, and an online survey. The results showed that UND has made progress in opening pathways for women and minoritized faculty in terms of access to leadership positions, merit raises, and internal and external research awards. However, executive leadership remains relatively homogeneous; the tenure and promotion evaluation processes have hidden inequities; women continue to experience much greater bias, especially in research support; and international faculty face unrecognized challenges with visas, culture, and reactions to language and accents, which constrain their professional advancement. To address the problematic issues, we offered recommendations that focus on capacity building, leadership training, and regular equity assessments.

Contact: Justin Berg, justin.allen.berg@und.edu

Over the last 15 years, women, racially minoritized individuals, and international residents in the U.S. have entered STEM occupations, including university STEM positions, at a faster rate than men and native-born whites (AIC, 2022; NCSES, 2023). Based on data from the Integrated Postsecondary Education System (Baker & Koedel, 2024), women and racially minoritized individuals make up 26% and 20% of scholars in STEM fields, respectively. Other research, which uses different metrics, definitions, and sources, estimates the percentages to be 35% for women and 10% for racial/ethnically minoritized individuals (Bennett et al., 2020). Regarding foreign-born faculty members, recent estimates indicate that they now account for 29% of science and engineering university faculty (Elias et al., 2024). When including other STEM fields, such as those in technology, math, the social sciences, and other related disciplines, the percentage may be closer to 26%, which is the estimated percentage of foreign-born workers in all STEM occupations in the U.S. (NSB, 2024).

The positive growth rates of women and racially minoritized individuals in STEM faculty positions, however, come at a time when diversity, equity, and inclusion (DEI) policies and practices are being curtailed across the country in both the private and public sectors (Harper & Associates, 2024). As highlighted in popular media outlets, many people question the effectiveness of DEI programs and the need for DEI offices in higher education (e.g., Callaham, 2024; Confessore, 2024). If programs and offices are not outright cut (Griesbach, 2024), many believe that they should be significantly changed (Kratz, 2024).

The reduction of DEI support at institutions of higher education is unlikely to help women and racially minoritized STEM faculty reach parity in the overall U.S. labor force—which is comprised of 47% women but only 25% to 35% in STEM fields; and 23% non-white workers but only 10% to 20% in STEM fields (BLS, 2023a, 2023b). In terms of workplace demographics, international faculty are overrepresented in STEM fields, at 26% to 29% compared to their 19% representation in the U.S. labor force (BLS, 2025). Yet, international faculty face

difficulties in the university workplace that native-born faculty do not experience, as highlighted in this study.

Broadly in the U.S., international STEM faculty percentages are trending upward (Elias et al., 2024; NSB, 2024). This includes STEM students and postdoctoral fellows (AIC, 2022), implying that international scholars entering STEM university disciplines will continue to increase. Accordingly, it is important to understand foreign-born STEM faculty experiences and perceptions. Foreign-born STEM faculty report discrimination in the workplace. Exclusion from research networks; dissatisfaction with colleagues; and being less satisfied with resources, decision-making, workload, and opportunities are among the more common experiences described (Manrique & Manrique, 1999; Skachkova, 2007; Thomas & Johnson, 2004; Lawrence et al., 2014;). Notwithstanding this growing research, there is significantly less research on the experiences of foreign-born faculty as compared to other populations.

The literature on women in STEM faculty roles has established that biases and chilly climates lead to inequities that extend beyond numerical inequality. The representation of women faculty has stalled in recent years. Among the most commonly documented cases, women have experienced lower publishing rates, higher attrition, and lower satisfaction and perception of fit as compared to men (Carrigan et al., 2011; Casad et al., 2021; Huang et al., 2020; Magua et al., 2017; NSF, 2019). Precipitating factors include being perceived as less competent, experiencing gendered labor division and expectations, interpersonal chilly climates within their departments, and work-life conflict aggravated by gender biases (Grawitch & Ballard, 2016; Hayes & Bigler, 2015; Kim et al., 2014; Minor et al., 2017).

Given these workplace contexts and issues, we were awarded a National Science Foundation ADVANCE Catalyst grant (2042208) titled, *ADVANCE Catalyst: Improving Gender and Foreign-Born Equity among STEM Faculty at the University of North Dakota*. We had two primary objectives: 1) complete an institutional self-assessment of inequity at the University of North Dakota, with a focus on the intersections of gender, race, and nationality; and 2) design a five-year strategic

equity plan. In the following sections, we briefly cover an intersectionality perspective, which was the foundation to our work. Here, we describe our data sources and findings, and present some of our recommendations to promote gender, racial, and foreign-born equity in academia.

Intersectionality Perspective

Individuals have multiple social statuses simultaneously. Therefore, we used an intersectionality perspective to better understand the workplace experiences of STEM faculty. This perspective argues that various dimensions of social structures intersect in ways that support some groups of people while constraining others, depending on the individual members' locations within a multidimensional stratification system (Al-Faham et al., 2019; Hill Collins, 2000; Hill Collins, 2015). When combined, gender and racial identities are especially powerful in impacting individuals' life outcomes, including those of STEM faculty members (Blackburn, 2017; Funk & Parker, 2018), because these social statuses are rank-ordered in society with respect to system-level social and physical resources (Grant & Sleeter, 1986). For example, women faculty of color, who are in leadership positions, may experience more badgering questions and have a harder time gaining resources to accomplish their professional objectives compared to white men or even white women leaders. There is also a difference in power relations (Browne & Misra, 2003).

Another important social category, especially as it relates to STEM faculty, is nationality. Prior research found that such stratification influences foreign-born university faculty disproportionately (Gahungu, 2011; Li, 2018; Núñez, 2014). For instance, the combination of gender and nationality may negatively influence foreign-born women STEM faculty more than foreign-born men by having a compounding effect that results in fewer workplace resources and job satisfaction (Hayes & Bigler, 2015; Kim et al., 2014; Paris, 2017).

Overall, an intersectionality perspective offers a way to gain insight into the nuanced social processes and outcomes that differentiate STEM faculty in academia, as well as offer insight into who and how to empower various STEM faculty as labor

force participants—both to their benefit and to the benefit of their universities and communities.

Data and Methods

We used a mixed-methods, exploratory sequential research design to accomplish the first objective of conducting an institutional self-assessment to identify inequity among STEM faculty at the University of North Dakota (UND). This methodology examined differences from an intersectionality perspective while also capturing both quantitative differences, such as leadership demographics, contract percentages, and research awards. Comparatively hidden differences such as individual experiences in department climate and annual review processes were also captured. Data was collected using three strategies: institutional data analysis, faculty surveys, and individual faculty interviews.

Although UND is a single university, which limits the generalizability of the specific findings, it is also an institution of higher education that mirrors other universities and colleges around the country, making it a proof-of-concept case. For instance, UND has the same organizational structure as many other public institutions of higher education in terms of administrative leadership, faculty, staff, and students. UND follows federal policies regarding equal employment, salary, and promotion. It also has common STEM disciplines and supports the typical department organizational structure that includes a department chair, committees, and contract categories of teaching, research, and service. Although finding national data on tenured or tenure-track STEM faculty is difficult because there is variation by year and definitions for who is included in the population, as well as varying types of institutions of higher education, the available data would suggest that UND faculty demographics are quite similar to other colleges and universities. Specifically, women constitute 30% of STEM faculty at UND versus 25% to 35% nationally; ethnoracially minoritized individuals make up 12% of UND STEM faculty compared to 10% to 20% nationally; and international faculty comprise 30% of UND STEM faculty compared to 26% to 29% nationally (Baker & Koedel, 2024; Bennett et al., 2020; Elias et al., 2024; NSB, 2024).

Thus, because of UND's similarities in organizational structure and demographic composition, the patterns of inequity at UND can act as points of comparison for other institutions of higher education. Additionally, because the research on international STEM faculty is comparatively small, the UND findings on the experiences and perceptions of international STEM faculty can offer future research initial directions to measure and understand the roadblocks and solutions that apply to this growing and important social group.

Quantitative Methods: Institutional Data Analysis

To gather quantitative information, we worked with several offices on campus: University Analytics & Planning, Equal Opportunity & Title IX, Human Resources, Division of Research & Economic Development, and six colleges that housed STEM faculty. We used the National Science Foundation's definition of STEM and worked with the North Dakota NSF EPSCoR Office to identify STEM departments and STEM faculty on campus. Of the approximately 600 full-time faculty members—not including annual contracted instructors and non-ranked lecturers—in the 2021-2022 academic year, STEM faculty totaled 236 individuals who were either tenured or tenure-track and at the rank of assistant, associate, or full professor.

The specific measures that we used included: gender, race, U.S. residency status, university leadership (executive administration, deans, and chairs), course evaluation ratings, salary, contract percentages (teaching, research, service, administration), percent tenure-track, percent tenured, time-to-tenure, rank, research proposals, research awards, internal awards, and hiring applications and hires. These data were primarily for the academic years of 2021-22, 2022-23, and 2023-24. Although the specific numbers change somewhat, depending on the topic (course evaluations versus research proposals), the data are typically based on the 236 STEM faculty noted above. Some exceptions, however, included university leadership, hiring data, and internal awards where it either did not make sense to focus on only STEM faculty (e.g., university administration), or the breakdown by discipline, rank, and administrative position was not available (e.g., internal awards).

Quantitative Methods: Online Faculty Survey

In 2023, we also ran an online survey of UND's 236 STEM faculty and achieved 76 completed surveys for a response rate of 32%. Because the response rate is somewhat low, there may be some selection bias, where only certain faculty were motivated to take the survey. At the same time, nearly half of respondents reported not experiencing any bias, which suggests that the survey contains answers from a significant number of faculty who would not appear to be self-selecting into the survey based on their desire to express negative experiences.

The survey had 48 questions, which we designed based on the findings from our in-depth qualitative interviews and prior research on inequity among academic faculty (e.g., see Elliott & Blithe, 2021). Faculty were emailed the invitation and survey link at the end of fall semester, followed by a two-week reminder email.

Major question topics focused on University and department climates, belonging, seeing and experiencing bias, sources of bias, contract loads, equitable work environments, department chairs and colleagues, general support, research collaboration, tenure and promotion processes, merit raises, University offices and positions that help with support and belonging, viewpoints on solutions to inequity and bias, and various demographic characteristics, among a host of other variables that explored perceptions, experiences, and social identities.

It is worthwhile to note that self-report measures have known concerns (e.g., see Lira et al., 2022). Respondents can potentially answer questions based on social desirability, answering in a way that they believe is socially acceptable. Other times, respondents can demonstrate bias, where they answer differently based on the reference they are using. For example, what one person considers to be gender bias, another person may not. Consequently, we use a mixed-methods approach to triangulate self-report information from the online survey with in-depth interviews and objective data gathered from University Analytics.

Qualitative Methods: Individual Faculty Interviews

After receiving Institutional Review Board approval, we conducted four pilot interviews to assess our set of interview questions and the interview process. We then conducted 15 in-depth individual interviews with STEM faculty from four colleges and 11 departments. The recruitment strategy was an email sent to all STEM faculty that asked for volunteers. Prior to each interview, we gathered consent forms and demographic information from interviewees. Of the 15 respondents, 11 were women and four were men. On average, they worked at the university for 13.4 years, with a range of one year to 44 years. Regarding race and nationality, seven were native-born white individuals and eight were foreign-born.

Each interview was semi-structured with 16 multifaceted foundational questions that lasted 30 to 90 minutes. The interviews were conducted and recorded over Zoom, subsequently transcribed by rev.com, and separately coded into themes by three research team members. Afterward, these three team members met several times, following a grounded theory approach, which involved an interactive process of open coding, axial coding, and selective coding. From the 16 multifaceted interview questions, over a hundred codes were identified. Through the iterative process, the thematic codes were narrowed down to a couple dozen that focused on the topics of interest (e.g., bias, inequity, sources, solutions). From these codes, four primary themes emerged that set a foundation for a five-year strategic plan: 1) the tenure and promotion process, 2) research productivity and collaboration, 3) perceptions of belonging in the department and at the University, and 4) the importance of department chairs and colleagues as sources of both support and bias.

The themes that emerged from UND STEM faculty through survey and interview data highlight social processes that facilitate and hinder equity among women and foreign-born faculty. The result is that these social processes may function as hidden challenges or inequities, making it harder for them to advance professionally over long periods of time. In this study, STEM faculty identified a range of inequities and challenges, often in specific areas such as evaluation and research, which were often localized in the department. Yet, interventions to buoy STEM faculty

success and resilience were department-focused and included support from colleagues and department chairs.

COVID-19 Pandemic

The 2019 COVID pandemic occurred right before we began our project, and it had a major influence on the state university system through the initial stage of our data collection. The North Dakota University System, for example, instructed all universities and colleges in the state to transition to remote instruction through the Spring of 2020. Afterward, some courses returned to on-campus, yet the number of remote and hybrid courses increased. Through the academic year of 2020-21, there were also fewer on-campus administrative and faculty meetings and more meetings by video conferencing. During 2021, we collected objective data (e.g., contract percentages, demographic composition of faculty, salary information, etc.). By the time we began to collect perceptual data from STEM faculty in 2022 for qualitative interviews and 2023 for the online survey, educational patterns were less disrupted. Therefore, we did not ask about the effect of the pandemic on faculty members' experiences in the workplace. However, other research suggests that during those first couple of years post-pandemic (2020 and 2021), many faculty in the United States experienced anxiety, depression, and feelings of burnout (e.g., see Brandau et al., 2022). It is likely that faculty at UND had similar experiences, which may have continued through subsequent years to some extent. At the same time, the pandemic did not come up in any of the in-depth interviews or in the open-ended questions in the online survey, implying that faculty considered the source of inequity to originate from more longstanding systems and relations than a period effect like COVID-19.

Findings

Institutional Data Analysis

As our research team gathered and analyzed the data, we considered diversity, equity, and inclusion (DEI) to be conceptual tools to help us assess outcomes and processes. Similar to other universities, UND has a long list of social

categories that could be used to measure the extent of diversity on campus. We, however, focused on the demographic distributions of gender, race, and nationality. Additionally, for us, equality referred to similar outcomes, equity referred to fair social processes and opportunities, and inclusion referred to inclusive practices and a sense of belonging. With this conceptual foundation, we conducted the institutional self-assessment at UND and found that the university had some positive outcomes and some needed areas of improvement with respect to DEI.

On the positive side, a number of pathways appear to be open regarding leadership, hiring, merit raises, and internal and external awards. Approximately 41% of STEM department chairs are filled by women, a percentage that is greater than their percentage as a group at UND (i.e., 30%), suggesting that leadership opportunities are accessible in this domain. Recent hiring data indicate that over 40% of new hires were either native-born racially minoritized or international individuals, a percentage that is similar to their percentage on campus (i.e., 12% + 29% = 41%). The social group that had the largest increase in salary—which is a function of merit raises rather than annual raises because annual raises are typically a specific percentage across all faculty ranks—was foreign-born women faculty. Even though one reason for this outcome could be that they began their careers at UND with the lowest median salary, their upward progress reveals that the pathway is at least open for financial advancement. Lastly, internal awards, given out to faculty by UND to celebrate their accomplishments over the last 10 years, revealed almost an equal distribution between men (49%) and women (51%), indicating that gender bias against women may not be a roadblock to receiving university recognition. Additionally, the success rate of women STEM faculty in external grant awards was the same as that of men—both at 38%. In other words, for every 10 proposals that they submitted to external funding sponsors—including federal agencies, industries, and non-profit organizations—they were each awarded 3.8 grants, on average.

The institutional self-assessment also revealed some needed areas of improvement, especially with respect to leadership representation, tenure attainment, salary, and contract percentages. The vast majority of the university administrative

leadership in academic year 2021-22 was white (95%) and men (61%) and possibly 100% domestic-born (we were unable to confirm the birthplaces of all university leaders), which does not represent the race, gender, and nationality composition of modern-day academia. As one woman STEM faculty member noted, “My entire chain of command all the way up is male, for me.”

As noted earlier, foreign-born women STEM assistant professors begin their careers at UND with the lowest salary, approximately $4,000 lower than domestic-born women assistant professors and almost $18,000 less than men assistant professors, including foreign-born men. While exact salary comparisons are extremely difficult to make because different disciplines and colleges have greater or fewer proportions of women and racially minoritized individuals (e.g., engineering versus social sciences), as well as different disciplines garnering different market salaries (e.g., aerospace sciences versus sociology), and different fields tending to be on 12-month versus 9-month contracts (e.g., biomedical versus physical sciences), it is likely safe to conclude that the distributions of foreign-born women STEM faculty are not so weighted in one way or another to solely account for these rather large disparities. Instead, the disparities may be explained partly by differences in contract percentages. Foreign-born women STEM faculty have the lowest median contract percentage for research (35% versus 40% or higher for other groups). For STEM faculty, research is the high-status, high-reward category compared to teaching and service.

Thematic Findings

The analysis of survey and interview data reveal five cross-data themes relating to DEI at the university and among STEM faculty by tenure and promotion status, research area, and departmental unit association.

Overarching Perceptions of DEI Status at UND

According to survey results in 2023, most STEM faculty have not seen certain types of bias at UND regarding ability/disability (16%), religion (14%), and sexual orientation (13%); or in their departments regarding age (14%) and political ideology

(13%). STEM faculty also report low percentages of bias in their departments regarding ability/disability (4%), religion (3%), and sexual orientation (1%). University staff, college staff, and department staff are typically not identified as the sources of bias either.

Contemporary in-depth interviews with STEM faculty had some corroborating findings. None of the four men STEM faculty reported experiencing any type of bias; and they considered various university processes regarding tenure and promotion, merit pay, contract loads, graduate student assignments, and the distribution of research resources to be fair. Women STEM faculty, in general, also considered the policies regarding tenure and promotion and merit pay to be fair, although they had some reservations about the evaluation process. Another foreign-born woman STEM faculty member summarized it this way, “It’s pretty fair [the department policy on tenure and promotion]. It’s fair enough.”

About one-third of faculty interviewed were with the university at least 15 years. They provided unique insights into DEI at the university over decades. The STEM faculty who worked at UND the longest reported that they believed that diversity, equity, and inclusion had improved over time, though still have room to improve. A faculty member who has been at UND for over 20 years said, “I would say it’s better than it used to be, but not what it could be.” However, another long-term faculty member noted, “I think one of the negative things, an example would be tearing down all signs of visible support of diversity. So the (specific campus diversity-oriented centers) only to be placed on the third floor in offices. . . . So right now I have a lot of negative views as to how UND is approaching diversity right now.” There is recognition that more recent institutional choices regarding unit changes and integrations heavily impacted diversity-focused support services and student affairs.

Tenure, Promotion, and Evaluation Processes

Although all race, gender, and nationality groups had a median time-to-tenure of six years, domestic-born women averaged 7.55 years to attain tenure. Most of these domestic-born women self-identified as white. Interviews indicated a similar,

more nuanced trend. Most STEM faculty found the objective policies of tenure and promotion to be fair but questioned departmental experiences that impact tenure and promotion and the overall evaluation process. A STEM faculty who identified as a man explained how the evaluation process itself may become unfair,

> If you're being asked to do more service or do more teaching or something like that, and at the same time that doesn't count as much towards merit and raises or tenure and promotion, then . . . you're being judged on a different scale than other people because of what you were asked to do. . . . And people want to have it both ways. They want to say, 'No, we value teaching and we value service.' . . . But, at the same time, when it comes to a vote, those of us who are already tenured, we have to make a decision, 'Well, do we follow the policy that's in our handbook to the letter? Or, do we individually recognize the importance of having people that contribute in other ways?

Some of these evaluation processes may explain, in part, why some domestic-born women STEM faculty are receiving tenure and promotion a year and a half later, on average. Other challenging experiences that occur with both domestic and foreign-born women STEM faculty may also explain this disparity.

Research Productivity and Collaboration

There are other notable disparities with research. Even though the internal awards given out by the university are split at almost 50/50 for men and women over the last 10 years, men had a higher rate of receiving research awards (65%) while women had a higher rate of receiving service awards (67%). In part, men faculty may receive a greater percentage of the internal research awards because they submit a substantially greater proportion of UND's proposals to external funding sponsors. When focusing solely on STEM faculty between 2019 and 2021, men STEM faculty submitted 83% of STEM-related external proposals; and half were white men. Non-white STEM women were awarded the fewest external grants (5%).

Although the explanations for these disparities are not explicitly clear, some of the interview data about the comparative lack of research resources, mentoring, and

collaborations for women STEM faculty offer insight into these differences. For example, one woman STEM faculty member shared that a new faculty member, who identified as a man, was given the lab space she had previously been assigned. As a result, she has been in a lab that is “completely inadequate” for years, causing her research to stall. Despite discussing this concern and the need for mentorship with her department chair, she reports that her concerns are not being taken seriously.

Additionally, trends in interview data may help explain why women may be winning the service awards at a greater rate. Men faculty can decline more time-consuming service to protect their research time, without many social consequences. As another woman STEM faculty member explained, “So I was put in a position where I felt like I wasn’t asked to do things, I was ‘voluntold’ to do things and I couldn’t turn people down for service.”

Perceptions of Belonging, Bias, and Support in the Department and at the University

The online survey adds context to the institutional data and additional insight into presented themes. Relatively high percentages of STEM faculty see bias at UND regarding race (43%), gender (41%), and nationality (34%). Approximately 24% of STEM women report that they have experienced gender bias at UND in the last five years, while 17% of STEM faculty say that they have experienced racial bias and 16% have experienced bias based on nationality. Very few men STEM faculty report experiencing any type of bias.

Of the STEM faculty who reported experiencing bias, the following categories were identified the most frequently: low salary (50%), felt ignored (45%), felt isolated (39%), excessive emotional labor (39%), unfair teaching load (37%), unfair service load (37%), labeled “difficult” or similar (34%), passed over for research collaborations (34%), bypassed for qualified leadership opportunities (34%), sexist comments (34%), unfair number of advisee assignments (29%), and biased comments about nationality (29%) and accent (21%).

With respect to the sources of bias and the most relevant position or person who could facilitate making the work environment bias-free and equitable, STEM faculty named the same group of people. Department colleagues were, by far, the most likely to be designated as the source of bias (62%), but they were also the most likely to be identified as the people needed to make the work environment bias-free and equitable (53%). Department chairs were the second most frequently identified source of bias (38%) and the position or person who could make the work environment bias-free and equitable (51%). The main administrative person, besides the department chair that STEM faculty believed could help, was the college dean (30%). Notably, the broader UND administration was less likely to be identified as an entity that could make the work environment bias-free and equitable. Consequently, STEM faculty see department colleagues and chairs, by far, as the most problematic, and also as potentially helpful with respect to improving their work experiences when it comes to bias and social climate.

Inferential statistics models offer additional insight. Women STEM faculty were significantly more likely to see bias at UND compared to men. Holding constant the effects of tenure, rank, years at UND, college, U.S. born, race, and U.S. citizenship (which includes non-U.S. born individuals who became citizens), five logit models showed women significantly ($p<.05$) more likely than men to see bias on campus and in their departments regarding gender, ability/disability, and age. Noncitizens, however, were significantly less likely to see gender ($p=.06$) and age ($p<.05$) biases in their departments, while controlling for other factors. The in-depth interviews revealed that some noncitizens consider negative interactions with department colleagues as individual-centered problems rather than a reflection of broader social biases.

Foreign-born STEM faculty members also highlighted the challenges and biases that come with accents and national identities. This was particularly pronounced among non-white presenting foreign-born participants. Numerous participants described bias from students in their classrooms. For example, one participant said:

> When I came to States to university, I joined [XX] program and I liked it and yet I felt not fitting in, absolutely not fitting in. . . . I felt that every time I talked, people would just stare and look. I was always like, 'Well, okay, is it my English? Is it my idea absolutely dumb or totally foreign, or what's wrong with me?' . . . I don't know if you can call it microaggressions or being ignored. I started to see more and more of that.

Microaggressions and biases were described by both women and foreign-born faculty, but native-born women tended to describe more intense experiences. Also, while foreign-born women were less likely to label experiences as microaggressions or biases, they were also less likely to discuss or complain, and more likely to provide reasons.

Department Chairs and Colleagues as Sources of Both Support and Bias

The online survey also showed some positive outcomes with respect to perceptions and experiences within the department. STEM faculty considered their department chairs to be supportive in general and the person who made them feel like they belonged at UND (7.94 on a scale from 1 to 10, with 10 being highly supportive). Accordingly, STEM faculty reported a fairly high average (7.7 on a scale from 1 to 10, with 10 being a high sense of belonging) of feeling like they belonged in their departments. They also typically considered the process of being assigned teaching loads in their departments to be fair, scoring an average of 7.29 out of 10 (with 10 being very fair).

The majority of interviewees reported that they felt that UND and their departments were at least attempting to take action to improve DEI in the workplace. Women STEM faculty, in particular, tended to consider their department chairs to be important mentors and professionally supportive. "I found him supportive," said one woman faculty member, "So, he's influenced my experience here at UND positively."

Foreign-born STEM faculty also tended to consider their domestic-born department chairs to be helpful. As one foreign-born woman STEM faculty member said, "I actually had three chairs in the last 12 years. I would say all of them are very

supportive. When I bring up an issue, they would help me solve it. Very supportive." That said, foreign-born STEM faculty also emphasized support with department colleagues. One participant described,

> At the beginning, it's not that I feel I'm part of the North Dakota people, but I think all the time I feel welcome, and the people are very supportive here, especially in the (Department) side. I think the faculty, especially the senior ones, they do tend to give pretty good support about the proposal writing, teaching all those things. So I feel the first few years I might be nervous and say, "Can I be a good researcher or can I be a good teacher?" But then after I got tenure, then slowly become some senior person in the department. I feel more like, "Okay, I'm part of the family," this kind of feeling.

Thus, department chairs and colleagues, especially, are key as both the problem and critical sources of support.

Strategic Plans to Address DEI-Related Issues

As our research team finished up the first objective of conducting an institutional self-assessment, the university went through a process of significantly updating its strategic plan in 2022, UND LEADS (2024). Two of the five core values in the LEADS acronym reflect DEI core values: Learning, *Equity*, *Affinity*, Discovery, and Service. This strategic plan follows a prior institutional-sponsored task force on diversity and inclusion, which resulted in a 2020 document entitled, "Report and Recommendations to the University of North Dakota President and Leadership Team on Creating Opportunities for Diversity and Inclusion." Both the committee that guided the development of the UND LEADS Strategic Plan and the Diversity and Inclusion Task Force incorporated campus-wide participation.

Because of this existing line of momentum, our research team decided to accomplish the second objective of creating a five-year strategic equity plan by collaborating with UND administrators, such as the Vice Provost for Faculty Affairs, the Associate Vice President for Strategy and Implementation, the Associate Vice President for Human Resources, and the Associate Vice President for Community &

Belonging. We also collaborated with an internal advisory committee, which consisted of associate deans, department chairs, and STEM faculty members. In the end, rather than create a stand-alone equity plan, we chose to integrate our research and recommendations with the objectives of the University's strategic plan. We concluded that this approach would encourage university participation and, therefore, make our recommendations potentially more effective and sustainable. Accordingly, our research team made strategic recommendations in four main areas that fit with the University's strategic plan.

The Tenure and Promotion Process. Although faculty in STEM areas generally described tenure and promotion policies and criteria as fair, they reported inequities in the evaluation processes, with a greater negative impact on women. This topic falls within the Equity pillar of the University's strategic plan, especially as related to its description of "creating more just and equitable opportunities [that allow] all people to realize their potential." To do so, we recommended that the University create a system of biennial or triennial training for chairs and evaluation committees that recognize equitable conditions and experiences for faculty with respect to their service and teaching duties rather than their contract percentages. This is particularly important since unequal service and teaching tasks can set the foundation for poor tenure and promotion evaluation processes and outcomes.

Research Productivity and Collaboration. Although men and women faculty in STEM areas had similar success rates in receiving external and internal awards (in terms of a ratio of submitting to winning awards), there is inequality in the number of submissions and the amount of funding for women, and especially for international and minority women. This area falls within the University's Discovery pillar as it relates to the description, "coordinate and manage resources to support the strategic balance of breadth and depth of research, creative activity, and scholarship happening across campus." To accomplish this objective, we recommended three changes in research capacity. First, we recommend the Office of the Vice President for Research and Economic Development and each college hire a grant specialist who can help faculty write proposals and create budgets for external grant

opportunities. Within five years, the budgetary costs of the new hires could be supported by centrally pooling and distributing indirect and administrative costs/facility fees on subsequent successful grant awards. Second, we recommend initiation of a yearly grant writing workshop that recognizes the challenges of all faculty demographic groups on campus. Third, as part of service contracts with more experienced research faculty, these units should begin a research mentoring program for all new faculty.

Perceptions of Belonging in the Department and at the University. Women described seeing and experiencing bias, past and present, at UND and in their departments at a much greater rate than men, making the workplace climate regarding inclusion and belonging more challenging. This area falls within the University's Affinity pillar as it relates to the description, "cultivate physical and online campus environments that are welcoming, safe, healthy, and inclusive." We, therefore, had several recommendations. The University could enhance services to support faculty who are navigating the visa process. Colleges could offer activities to build support and belonging through book clubs, writing groups, and a work-life balance mentoring program. Departments could also host social events and design and distribute new faculty welcome packets, since they are likely to know the specific needs of their faculty.

Importance of Department Colleagues and Chairs. Department colleagues in particular, as well as department chairs, were most likely to be identified as sources of bias. At the same time, department colleagues and chairs were also reported as key individuals who help faculty experience an equitable workplace. This reality falls into the University's Affinity and Equity pillars, with the descriptions "recruit and retain a robust UND workforce" and "promote diverse perspectives and inclusive worldviews." To address this area, we proposed several recommendations. The University could create employee resource groups that support women, employees of color, and international employees. Through its University Analytics and Planning Office, it could also conduct regular climate surveys to assess bias and belonging to share with Executive Council members. Colleges could provide online

training for department chairs that covers faculty management and supervision, conflict management, supporting people with different needs, and creating a culture with values of inclusion and a sense of belonging.

Discussion and Conclusion

With the current rise in anti-DEI sentiment and reduction in DEI programs across the country, it seems especially important right now to study and communicate findings related to diversity, equity, and inclusion. As noted earlier, the National Science Foundation awarded our research team an ADVANCE Catalyst grant (no. 2042208) in 2021 to conduct an institutional self-assessment of the University of North Dakota to measure the extent of inequity among STEM faculty, particularly by gender, race, and nationality, and then to design a five-year strategic equity plan to address any identified equity issues. Although UND is a single university, it has characteristics that are similar to other universities in the U.S. It is a public, midsize, Research 1 (high research activity) university, with policies on equity, tenure and promotion, and faculty contracts. Consequently, UND may serve as a point of comparison for other universities that are striving to improve diversity, equity, and inclusion on their campuses.

Overall, UND has made progress in improving diversity, equity, and inclusion on campus, as well as making it a priority in its LEADS strategic plan. It has diversity in its STEM programs by gender, race, and especially nationality that matches national percentages and its hiring practices appear to be attracting and employing scholars from a variety of sociodemographic backgrounds. A number of pathways toward career advancement for STEM faculty at UND also appear to be open for women and racially minoritized individuals, including international STEM faculty, such as department chair leadership (several of which include foreign-born women STEM faculty), tenure and promotion policies, and internal and external research award success. As prior research finds, these types of diversity and equity outcomes have broader impacts, such as being significantly correlated with greater student success (Cross & Carman, 2021).

With respect to inclusion, a majority of STEM faculty at UND report feeling like they belong in their departments and at UND, and they express satisfaction with support received from their department chairs. These outcomes parallel the results from faculty surveys at other universities (e.g., see Stanford University, 2021). Prior research among secondary STEM teachers found that a sense of belonging is positively associated with retention (Balgopal et al., 2022). It is logical to think that this relationship would apply to postsecondary STEM faculty as well. UND and other universities, therefore, would do well to continue to broaden their faculty demographics, promote equity, and foster a sense of belonging.

At the same time, similar to other universities, UND has areas in which it can improve in terms of diversity, equity, and inclusion on campus. There is a lack of diversity in the executive positions of the administration, being filled mostly by white, native-born men. As other research discusses, such homogeneity may result in university leaders being unaware of challenges faced by many women and minority faculty, especially international scholars. They can, therefore, be less likely to make changes (Arday, 2018). There are many external and internal factors that may explain the lack of women leaders in executive positions (Tomas et al., 2010). Externally, administrative positions are comparatively tied to external labor market factors that may suit men as workers better (e.g., relocating as a new hire, hours per day, business-style management). Internally at UND, the location in a non-urban and cold environment may prompt self-selection out of the candidate pool for both genders, yet the result is even fewer potential women candidates.

There were also many hidden inequities faced by UND faculty. For example, while the tenure and promotion policies may seem fair to STEM faculty, the evaluation process can be problematic. One reason is because issues arise much earlier when women faculty are being “voluntold” to do more time-consuming service while also not receiving needed resources, mentoring, and collaboration opportunities in research. Notably, research is the portion of STEM faculty contracts that will most strongly lead to merit raises, tenure, and promotion. Hanasono et al. (2019) discuss such inequities and highlights how the relational types of service (e.g.,

mentoring, emotional labor, certain committee work) are given to women and assigned less value than task-oriented service, which has a definitive outcome and is often assigned to men. Our online survey findings corroborate this research as women STEM faculty at UND were much more likely to say they have more advisees, experience excessive emotional labor, and do more service than their contract allocation.

Where our research more specifically adds to the research literature is with international STEM faculty, who have been labeled an invisible minority on university campuses (Gahungu, 2011). Prior research has set a good foundation to understanding the experiences of foreign-born faculty in general, listing such challenges as cultural differences, loneliness, and struggles with permanent residency rights (e.g., see Collins, 2008). Other research finds that these faculty produce more research yet have lower salaries and lower job satisfaction compared to their domestic-born colleagues (Corley & Sabharwal, 2007); and they do not move into administrative positions to the same extent (Kim et al., 2020). The solutions have ranged from recommending foreign-born faculty change their behavior and gain more cultural knowledge to universities changing policies to be more supportive and building more partnerships with universities outside the U.S. (Gahungu, 2011).

Our findings corroborate some of this prior research and the findings regarding lower salaries, especially in terms of institutions needing to manage cultural differences and difficulties with immigration visas. The intersectionality perspective, however, adds nuance with our research by suggesting that it may be new foreign-born women STEM faculty, in particular, who are making the difference in salaries. They begin as assistant professors with a substantially lower starting salary and, to the best of our knowledge, no foreign-born women assistant professor is a spousal hire. In fact, this is an infrequent event at UND that typically happens with spouses of administrators. Yet, at the same time, we find that foreign-born women STEM faculty had the fastest rate of merit raises, which, to our knowledge, prior research has yet to examine. In part, this could be because prior research finds that once at the university, foreign-born women tend to produce more research results than their

domestic-born colleagues (Mamiseishvili, 2010). On the other hand, we also found that minority women STEM faculty, including international women STEM faculty, submitted fewer research proposals to external sponsors and had a lower success rate, which, consequently, may, in part, be due to a lack of resources, mentoring, and collaborations rather than effort. Importantly, we believe that it is most productive if these challenges are framed as ones of social processes rather than specific outcomes because, with a process-oriented mindset, the potential recommendations to address the differential outcomes become sustainable. Additionally, another avenue of future research is exploring the effect that the local community and state have on the promotion and retention of foreign-born women STEM faculty. A couple of our interviewees mentioned their worries about the community and state politics being less supportive of immigrants.

Accordingly, based on our NSF-supported research, we formulated several recommendations to help address the inequities we identified. Concluding that we needed to be selective with our topics when collaborating with university administration, particularly the Vice Provost for Faculty Affairs, we wrote an executive summary and strategic report to present to a selection of administrators that have comparative decision-making power regarding the topic of inequity. We focused on tenure and promotion, specifically the evaluation process, because the Provost's office had been requiring all departments to update and improve their tenure and promotion policies. Additionally, tenure and promotion equity are a well-documented need in the research literature (e.g., see Rodriguez et al., 2024), implying other scholars would have potential recommendations to help address the inequity. We also focused on research productivity and collaboration because the annual contract category is, in practice, especially consequential in determining tenure and promotion, merit raises, prestige, and other social outcomes for STEM faculty. Importantly, prior research has found that STEM inequity is highly correlated with women leaving STEM disciplines, not because of a lack of commitment but rather because of inequities in opportunities and social support (Xu, 2008). Accordingly, we also focused on perceptions of belonging. This direction seemed particularly needed

because the vast majority of the research on feelings of belonging in STEM disciplines focuses on students rather than faculty (Stachl & Baranger, 2020). Lastly, due to consistent feedback from STEM faculty that department colleagues and department chairs were the source and solution to their workplace challenges, we focused on systems that would empower department chairs.

In the end, with knowledge of the comparatively lower proposal submission rates of women and racially minoritized individuals, we aimed for changes that 1) built capacity, 2) initiated annual trainings, and 3) conducted regular equity assessments. For example, in terms of capacity, we recommended the university hire grant specialists at the university level, such as in the Division of Research and Economic Development, as well as at the college level, to support all faculty. For international STEM faculty, we recommended a cultural liaison who could facilitate immigration issues, tenure and promotion, and grant processes. This type of capacity building, in theory, would have a good return on investment for the university as more faculty submit and find success in external grant funding. Faculty retention, student development and retention, and institutional continuity are also important outcomes to consider. In terms of training, we recommended support for the department chair and evaluation committees to increase awareness of the experiences of minoritized STEM faculty and offer strategies to address potential problems or conflicts both in the evaluation process and between department colleagues. Lastly, we recommended regular equity assessments to gain insights on positive progress and remaining areas of improvement. Over time, it is our hope that these changes will be sustainable and effective.

Acknowledgements

The National Science Foundation supported this work under an ADVANCE Catalyst grant (no. 2042208). The findings, analyses, and recommendations presented in this paper are those of the authors and do not necessarily reflect the views of the National Science Foundation. We would also like to acknowledge and mention our appreciation for the guidance of our external advisory committee (Dr. Amy Wharton, Dr. Janet Twomey, and Dr. Katalin Szelenyi), our internal advisory committee at the University of North Dakota (Ms. Peggy Varberg, Dr. Anne Kelsch, Dr. Amanda Moske, Dr. Alena Kubatova, Dr. Xusheng Wang, Dr. Holly Brown-Borg, Dr. Tamba-Kuii Bailey, Dr. Zarrina Azizova, and Ms. Jennifer Moe), and our project evaluator (Dr. Thomasine Heitkamp). Additionally, we appreciate the support and comments from numerous other faculty members and professionals who we met through our presentations to North Dakota State University, Midwest Sociological Society, Energy & Environmental Research Center, and University of North Dakota's Multicultural Conference on Belonging and Inclusion. Lastly, we appreciate University of North Dakota's: Vice Provost for Faculty Affairs, Dr. Randi Tanglen; Associate Vice President for Strategy & Implementation and co-chair of the UND LEADS Implementation Committee, Dr. Ryan Zerr; Associate Vice President for Human Resources, Peggy Varberg; and Associate Vice President for Community & Belonging, Dr. Tamba-Kuii Bailey, for their advice and collaboration on this project.

References

Al-Faham, H., Davis, A. M., & Ernst, R. (2019). Intersectionality: From theory to practice. *Annual Review of Law and Social Science*, *15*, 247-265. https:doi.org/10.1146/annurev-lawsocsci-101518-042942

American Immigration Council (AIC). (2022). *Foreign-Born STEM Workers in the United States*. https://www.americanimmigrationcouncil.org/sites/default/files/research/foreign-born_stem_workers_in_the_united_states_final_0.pdf

Arday, J. (2018). Understanding race and educational leadership in higher education: Exploring the Black and ethnic minority (BME) experience. *Management in Education*, *32*(4), 192-200. https://doi.org/10.1177/0892020618791002

Baker, S. P., & Koedel, C. (2024). Diversity trends among faculty in STEM and non-STEM fields at selective public universities in the U.S. from 2016 to 2023. *Humanities and Social Sciences Communications*, *11*(1), 1149. https://doi.org/10.1057/s41599-024-03687-x

Balgopal, M. M., Weinberg, A. E., Sample McMeeking, L. B., Lin Hunter, D. E., & Wright, D. S. (2022). A sense of belonging: The role of higher education in retaining quality STEM teachers. *PLOS ONE*, *17*(8), e0272552. https://doi.org/10.1371/journal.pone.0272552

Bennett, J., Lattuca, L., Redd, K., & York, T. (2020). Strengthening pathways to faculty careers in STEM: Recommendations for systemic change to support underrepresented groups. Lessons from the APLU INCLUDES Project. *Association of Public and Land-grant Universities*.

Blackburn, H. (2017). The status of women in STEM in higher education: A review of the literature 2007–2017. *Science & Technology Libraries*, *36*(3), 235-273. https://doi.org/10.1080/0194262X.2017.1371658

Brandau, M., Vogt, M., & Garey, M. L. (2022). The impact of the COVID-19 pandemic and transition to distance learning on university faculty in the United States. *International Education Studies, 15*(3), 14-25.

Browne, I., & Misra, J. (2003). The intersection of gender and race in the labor market. *Annual Review of Sociology*, *29*(Volume 29, 2003), 487-513. https://doi.org/10.1146/annurev.soc.29.010202.100016

Bureau of Labor Statistics (BLS). (2023a). *Labor force characteristics by race and ethnicity, 2022* (1105). BLS Reports. https://www.bls.gov/opub/reports/race-and-ethnicity/2022/

Bureau of Labor Statistics (BLS). (2023b). *Women in the labor force: A databook* (1103). BLS Reports. https://www.bls.gov/opub/reports/womens-databook/2022/

Bureau of Labor Statistics (BLS). (2025). *Foreign-Born Workers: Labor Force Characteristics—2024* [News Release May 20, 2025]. https://www.bls.gov/news.release/pdf/forbrn.pdf

Callaham, S. (2024, August 27). Why 'equity' is the DEI dirty word. *Forbes*. https://www.forbes.com/sites/sheilacallaham/2024/08/27/why-equity-is-the-dei-dirty-word/

Carrigan, C., Quinn, K., & Riskin, E.A. (2011). The gendered division of labor among STEM faculty and the effects of critical mass. *Journal of Diversity in Higher Education, 4*(3), 131-145.

Casad, B. J., Franks, J. E., Garasky, C. E., Kittleman, M. M., Roesler, A. C., Hall, D.Y, & Petzel, Z. W. (2021). Gender inequality in academia: Problems and solutions for women faculty STEM. *Journal of Neuroscience Research, 99,* 13-23.

Collins, J. M. (2008). Coming to America: Challenges facing faculty coming to United States' universities. *Journal of Geography in Higher Education*, *32*(2), 179-188. https://digitalcommons.usf.edu/geo_facpub/167/

Confessore, N. (2024, Oct 16). The University of Michigan doubled down on D.E.I What went wrong? *The New York Times Magazine*. https://www.nytimes.com/2024/10/16/magazine/dei-university-michigan.html

Corley, E. A., & Sabharwal, M. (2007). Foreign-born academic scientists and engineers: Producing more and getting less than their U.S.-born peers?

Research in Higher Education, *48*(8), 909-940. https://doi.org/10.1007/s11162-007-9055-6

Cross, J. D., & Carman, C. A. (2021). The relationship between faculty diversity and student success in public community colleges. *Community College Journal of Research and Practice*, *46*(12), 855-868. https://doi.org/10.1080/10668926.2021.1910595

Elias, M. H., Sompiyachoke, K., Fernández, F. M., & Kamerlin, S. C. L. (2024). The ineligibility barrier for international researchers in US academia. *EMBO reports*, *25*(2), 457-458. https://doi.org/10.1038/s44319-023-00053-x

Elliott, M., & Blithe, S. J. (2021). Gender inequality, stress exposure, and well-being among academic faculty. *International Journal of Higher Education*, *10*(2), 240-252. https://doi.org/10.5430/ijhe.v10n2p240

Funk, C., & Parker, K. (2018). *Women and men in STEM often at odds over workplace equity*. Pew Research Center. https://www.pewresearch.org/wp-content/uploads/sites/20/2018/01/PS_2018.01.09_STEM_FINAL.pdf

Gahungu, A. (2011). Integration of foreign-born faculty in academia: Foreignness as an asset. *International Journal of Educational Leadership Preparation*, *6*(1), 1-22.

Grant, C. A., & Sleeter, C. E. (1986). Race, class, and gender in education research: An argument for integrative analysis. *Review of Educational Research*, *56*(2), 195-211. https://doi.org/10.3102/00346543056002195Grawitch, M. J. and Ballard, D. W. (2016). *The Psychologically Healthy Workplace: Building a Win-Win Environment for Organizations and Employees*. American Psychological Association.

Griesbach, R. (2024, October 18). Alabama's anti-DEI law kicks in: College offices close, websites scrubbed. *AL.com Education Lab.* https://www.al.com/educationlab/2024/08/how-alabamas-anti-dei-law-kicks-in-college-offices-closed-websites-scrubbed.html

Hanasono, L. K., Broido, E. M., Yacobucci, M. M., Root, K. V., Peña, S., & O'Neil, D. A. (2019). Secret service: Revealing gender biases in the visibility and value of

faculty service. *Journal of Diversity in Higher Education*, *12*(1), 85-98. https://doi.org/10.1037/dhe0000081

Harper, S., & Associates. (2024). *Truths about DEI on college campuses: Evidence-based expert responses to politicized misinformation.* Los Angeles: University of Southern California Race and Equity Center. https://race.usc.edu/wp-content/uploads/2024/03/Harper-and-Associates-DEI-Truths-Report.pdf

Hayes, A. R., & Bigler, R. S. (2015). Postbaccalaureate STEM students' perceptions of their training: Exploring the intersection of gender and nativity. *International Journal of Gender, Science and Technology*, *7*(2), 180-204. http://hdl.handle.net/10950/2580

Hill Collins, P. (2000). *Black Feminist Thought: Knowledge, Consciousness, and the Politics of Empowerment* (2nd ed.). Routledge. https://doi.org/10.4324/9780203900055

Hill Collins, P. (2015). Intersectionality's Definitional Dilemmas. *Annual Review of Sociology*, *41*(Volume 41, 2015), 1-20. https://doi.org/10.1146/annurev-soc-073014-112142

Huang, J., Gates, A. J., Sinatra, R., & Barabási, A. L. (2020). Historical comparison of gender inequality in scientific careers across countries and disciplines. *Proceedings of the National Academy of Sciences of the United States of America, 117*(9), 4609–4616.

Kim, D., Twombly, S. B., Wolf-Wendel, L., & Belin, A. A. (2020). Understanding career mobility of professors: Does foreign-born status matter? *Innovative Higher Education*, *45*(6), 471-488. https://doi.org/10.1007/s10755-020-09513-x

Kim, E., Hogge, I., Mok, G., & Nishida, H. (2014). Work experiences of foreign-born Asian women counseling and psychology faculty. *Journal of Multicultural Counseling and Development*, *42*(3), 147-160. https://doi.org/10.1002/j.2161-1912.2014.00051.x

Kratz, J. (2024, August 25). DEI backlash, 4 legitimate concerns to avoid. *Forbes*. https://www.forbes.com/sites/juliekratz/2024/08/25/dei-backlash-4-legitimate-concerns-to-avoid/

Lawrence, J. H., Celis, S., Kim, H. S., Lipson, S. K., & Tong, X. (2014). To stay or not to stay: Retention of Asian international faculty in STEM fields. *Higher Education, 67*(5), 511-531.

Li, Y. L. (2018). First-generation immigrant women faculty's workplace experiences in the US universities—examples from China and Taiwan. *Migration Studies*, *8*(2), 209-227. https://doi.org/10.1093/migration/mny042

Lira, B., O'Brien, J. M., Pena, P., Galla, B. M., D'Mello, S., Yeager, D. S., Defnet, A., Kautz, T., Munkacsy, K., & Duckworth, A. L. (2022). Large studies reveal how reference bias limits policy applications of self-report measures. *Scientific Reports 12*, 116-125.

Magua, W., Zhu, X., Bhattacharya, A., Filut, A., Potvien, A., Leatherberry, R., … Kaatz, A. (2017). Are female applicants disadvantaged in National Institutes of Health peer review? Combining algorithmic text mining and qualitative methods to detect evaluative differences in R01 reviewers' critiques. *Journal of Women's Health, 26*(5), 560–570. https://doi.org/10.1089/jwh.2016.6021

Mamiseishvili, K. (2010). Foreign-born women faculty work roles and productivity at research universities in the United States. *Higher Education*, *60*(2), 139-156. http://www.jstor.org/stable/40784173

Manrique, C. G., & Manrique, G. G. (1999). *The multicultural or immigrant faculty in American society* (Vol. 43). Lewiston, NY: Edwin Mellen Press.

Minor, K. N., January, S. C., Dray, K. K., & Carter-Sowell, A. R. (2017). Is it always this cold? Chilly interpersonal climates as a barrier to the well-being of early-career women faculty in STEM. *Equality, Diversity, and Inclusion: An International Journal, 38*(20), 226-245. Emerald Publishing Limited.

National Center for Science and Engineering Statistics (NCSES). (2023). *Diversity and STEM: Women, Minorities, and Persons with Disabilities 2023*. Special Report NSF 23-315. National Science Foundation. https://www.nsf.gov/reports/statistics/diversity-stem-women-minorities-persons-disabilities-2023National Science Board (NSB). (2024, May 30). *New Report Shows the Importance of Foreign-Born Talent to the U.S. STEM Workforce*

https://www.nsf.gov/nsb/news/news_summ.jsp?cntn_id=309769&org=NSB&from=news

Núñez, A.-M. (2014). Employing multilevel intersectionality in educational research: Latino identities, contexts, and college access. *Educational Researcher*, *43*(2), 85-92. https://doi.org/10.3102/0013189X14522320

Paris, S. G. (2017). Work satisfaction: Critical factors for foreign-born faculty. *Doctoral Dissertation,* Northcentral University.

tenure and promotion: A grassroots initiative. *ADVANCE Journal*, *4*(2). https://doi.org/10.5399/osu/ADVJRNL.4.2.3

Skachkova, P. (2007). Academic careers of immigrant women professors in the U.S. *Higher Education, 53*(6), 697-738.

Stachl, N. C., & Baranger, M. A. (2020). Sense of belonging within the graduate community of a research-focused STEM department: Quantitative assessment using a visual narrative and item response theory. *PLOS ONE*, *15*(5), e0233431. https://doi.org/10.1371/journal.pone.0233431

Stanford University. (2021). *Faculty: IDEAL Diversity, Equity, and Inclusion Survey*. https://ideal.stanford.edu/Thomas, J. M., & Johnson, B. J. (2004). Perspectives of international faculty members: Their experiences and stories. *Education and Society, 22*(3), 47-64.

Tomas, M., Lavie, J. M., Duran, M. D. M, & Guillamon, C. (2010). Women in academic administration at the university. *Educational Management Administration & Leadership 38(*4), 487-498.

University of North Dakota (UND). (2024). UND LEADS: A Strategic Vision for the University of North Dakota. https://und.edu/about/strategic-plan/_files/docs/und-leads-strat-plan-v2.pdf

Xu, J. Y. (2008). Gender disparity in STEM disciplines: A study of faculty attrition and turnover intentions. *Research in Higher Education*, *49*(7), 607-624. https://doi.org/10.1007/s11162-008-9097-4