Attachment 6: Research and Media Usage

(2024). "Contingent Appointments and the Academic Profession." Academe 110(3): 60-75.

The article discusses the challenges faced by part-time and non-tenure-track faculty in higher education, highlighting the increasing fragmentation and instability of faculty work. It emphasizes the declining proportion of faculty appointed to tenure-line positions, posing a threat to academic freedom. The report recognizes the structural problems faced by contingent faculty, such as isolation, lack of governance representation, and insufficient pay, impacting academic freedom. Recommendations are provided to transition to a higher proportion of tenurable positions and enhance academic freedom and professional integration for faculty in contingent positions. CITED: National Center for Science and Engineering Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering: Fall 2021, https://ncses.nsf.gov/pubs/nsf23312/assets/nsf23312.pdf.

(2024). **NEWS** "News at a glance: Domestic U.S. postdocs, edited pig organs, and the Milky Way's central black hole." Science.org https://www.science.org/content/article/news-glance-domestic-u-s-postdocs-edited-pig-organs-and-milky-way-s-central-black-hole.

The number of U.S. citizens and permanent residents working as postdoctoral researchers in the United States, especially in the biological and biomedical sciences, fell sharply in 2022, the National Science Foundation said last week. The 8% decline, from about 30,000 to 27,000, is the largest year-to-year percentage-wise drop in the history of the agency's Survey of Graduate Students and Postdoctorates in Science and Engineering, which has collected data since 1980. Meanwhile, the number of postdocs with temporary visas increased from about 34,000 to 35,000. The downturn in domestic postdoc numbers underscores concerns that the academic community is facing a postdoc shortage and that early-career scientists are increasingly favoring higher paid positions in industry. Several groups have recommended how the government could better support postdocs.

(2025). **BOOK** "MEASURING THE 21ST CENTURY SCIENCE AND ENGINEERING WORKFORCE POPULATION: EVOLVING NEEDS", National Academies Press.

The National Science Foundation's National Center for Science and Engineering Statistics (NCSES), one of the nation's principal statistical agencies, is charged to collect, acquire, analyze, report, and disseminate statistical data related to the science and engineering enterprise in the United States and other nations that is relevant and useful to practitioners, researchers, policymakers, and to the public. NCSES data, based primarily on several flagship surveys, have become the major evidence base for American science and technology policy, and the agency is well respected globally for these data. This report assesses and provides guidance on NCSES's approach to measuring the science and engineering workforce population in the United States. It also proposes a framework for measuring the science and engineering workforce in the next decade and beyond, with flexibility to examine emerging issues related to this unique population while at the same time allowing for stability in the estimation of key trends.

All rights reserved. CITED: National Center for Science and Engineering Statistics. (2017b). 2017–2019 Survey of Graduate Students and Postdoctorates in Science and Engineering: OMB Supporting Statement Section A. National Science Foundation. Available: https://www.reginfo.gov/public/do/PRAViewDocument?ref_nbr=201709-3145-001 [November 9, 2017].

Aggarwal, P., et al. (2025). "Experiences of Psychology Applicants from the Global South: Faculty and Student Perspectives on How to Overcome Barriers to Inclusive Education." Journal of International Students 15(4): 21-51.

Although vital to efforts to promote global psychological science, applicants from the Global South continue to experience numerous challenges in securing postbaccalaureate research positions and admission to graduate programs in the Global North. In the present study, international students and applicants (N = 81, Mage = 25.5 years, 82.7% women) from Asia, Africa, and Latin America completed an online survey about their professional experiences prior to pursuing graduate school in the Global North, challenges faced while applying, and strategies for successfully navigating the application process. We also surveyed faculty members (N = 56, Mage = 46.0 years, 67.9% women) in graduate programs in the Global North about their experiences recruiting international applicants in their programs/labs and asked them to provide recommendations to students for successful application outcomes. Inductive content analysis yielded a total of 59 themes across 4 categories. The implications for education and training in psychology are discussed. CITED: National Center for Science and Engineering Statistics. (2023a). Survey of graduate students and postdoctorates in science and engineering. NSF 23-312. Alexandria, VA: National Science Foundation. https://ncses.nsf.gov/pubs/nsf23312

Akhtar, S. (2025). **DISSERTATION** "Building an Evidence-Based Framework for Evaluating Institutional Research Offices: A Mixed Methods Approach to Standards Development". United States -- Virginia, US, Marymount University: 189.

Institutional research offices (IROs) are essential to supporting institutional effectiveness in higher education, yet no widely adopted, evidence-based standards currently exist to evaluate their performance. This study addresses that gap by developing professional standards to assess IRO effectiveness at nonprofit public and private colleges and universities in the United States. Grounded in Terenzini’s three tiers of organizational intelligence and continuous quality improvement principles, the study responds to a longstanding call in the literature for systematic evaluation of IR offices. The research questions focused on identifying core IRO functions and establishing a framework to develop comprehensive standards.This study employed a sequential explanatory mixed methods design using the 2021 National Survey of Institutional Research Offices to quantitatively identify the most critical IRO functions. Compliance reporting and decision support emerged as top functions and were the basis of the standards developed in this study. Draft standards were refined and validated through a qualitative expert panel review (n = 9) using a modified Delphi approach. The research design combined survey analysis and expert feedback to ensure both empirical grounding and professional relevance.Key findings reveal strong

support among IR leaders for the development of formalized standards. Thematic analysis of the feedback confirmed the validity, applicability, and usefulness of the proposed standards. This study contributes to the IR field by creating standards that provide a valuable self-assessment tool for IR leaders and promote continuous improvement, professional accountability, and evidence-based decision making. It also developed a framework to use to develop additional standards. Future research should test these standards across a broader range of institutional types, explore their long-term impact on institutional effectiveness, and add to the two standards created in this study. CITED: National Center for Science and Engineering Statistics. (2023). Survey of graduate students and postdoctorates in science and engineering. National Science Foundation. https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2023

Anderson, B. N. and G. S. Littlejohn (2024). "“Oh, That’s Engineering?” Complicating Black Women Educators’ Understanding of Engineering Practices in Urban Elementary Schools." Journal of Pre-College Engineering Education Research 14(1).

In most teacher preparation programs, a focus on standards and curricula with STEM concepts, specifically engineering, are largely missing from the teacher licensure requirements. There have been few opportunities for teacher educators to teach, learn, and reflect on the nuanced complexities of STEM, specifically engineering concepts and practices in urban elementary schools. This university-school-community partnership, led by Black women, focused on the early exploration of STEM with high-ability/gifted Black girls, caregivers, and their Black women educators. In this qualitative study, Black women teachers were able to disrupt assumptions and stereotypes of STEM, particularly in engineering, and identify challenges of associating STEM perspectives to their everyday experiences and teaching with elementary school students. This essay explores and problematizes their assumptions, values, and utilization of engineering praxis for Black girls, their teachers, and their communities. © 2024, Purdue University Press. All rights reserved. CITED: National Center for Science and Engineering Statistics. (2020). Survey of graduate students and postdoctorates in science and engineering, 2020. National Science Foundation. https://ncses.nsf.gov/pubs/nsf22319/table/2-1

Anderson, S. (2023). **NEWS** "International Students Key To AI As Researchers And Entrepreneurs." Forbes.com https://www.forbes.com/sites/stuartanderson/2023/07/16/international-students-key-to-ai-as-researchers-and-entrepreneurs/.

CITED: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering, 2021.

Aumiller, J. G. (2025). DISSERTATION Mentoring International Biomedical Postdoctoral Fellows From India: A Phenomenological Study of Barriers and Best Practices, University of Maryland, Baltimore. Dissertation (Doctor of Philosophy).

CITED: National Center for Science and Engineering Statistics (NCSES) (2023). Survey of Graduate Students and Postdoctorates in Science

and Engineering. NSF 23-312. https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2021

Bahnson, M., et al. (2024). "Change is Hard: Transitions and the Liminal Positionality of Postdoctoral Fellows in Engineering and Computer Science." Studies in Engineering Education 5(2): 92-110.

CITED: National Center for Science and Engineering Statistics (NCSES). (2019). Survey of graduate students and postdoctorates in science and engineering: Fall 2019. NSF 21–318. Alexandria, VA: NSF. Retrieved January 20, 2022. [Report]. https://ncses.nsf.gov/pubs/nsf21318/

Bahnson, M., et al. (2024). "(Mis)alignments between postdoctoral and supervisors' perceptions of mentorship competencies in engineering and computer science." Journal of Engineering Education 113(4): 1115-1145.

Background: Postdoctoral training holds an increasingly important place in preparation for leading academic and research positions. While little empirical research has described postdoctoral training beyond the sciences, across all fields, “misaligned expectations” are often touted as a key source of postdoctoral strife. Purpose/Hypothesis: This article describes mentorship competency beliefs within engineering and computer science fields, which increasingly engage in postdoctoral training. Design/Method: An embedded mixed-methods design was used to quantitatively identify mentorship profiles from survey data using latent profile analysis (LPA) from a sample of n = 118 postdoctoral scholars and n = 165 postdoctoral supervisors. Qualitative thematic analysis of interviews with n = 29 postdoctoral scholars and n = 20 postdoctoral supervisors was used to identify meaning in the differences between quantitative profiles. The combination of LPA with thematic analysis enabled the triangulation of distinct postdoctoral mentorship profile definitions. Results: LPA identified six postdoctoral fellow profiles and four supervisor profiles, which became clearly definable through thematic analysis. Postdoc profiles included Technical Manager, Autonomy Focused Advisor, Stretched Mentor, Well-Rounded Mentor, Exemplar Mentor, and Leader-Mentor, while supervisor profiles included Autonomous Mentor, Reflective Mentor, Research Lab Mentor, and Confident Leader-Mentor. Some of these are aligned, but several are not, giving insight into the phenomenon of “misaligned expectations” in postdoctoral literature. Conclusions: The mentorship profiles illustrate the misalignment in expectations, which leads to negative mentorship experiences for many postdoctoral scholars. CITED: National Center for Science and Engineering Statistics (NCSES). (2023). Survey of graduate students and postdoctorates in science and engineering (pp. 23–312). NSF.

Bahnson, M., et al. (2025). "Content Analysis of Postdoctoral Mentorship Plans and Missed Opportunities to Align with Theory and Best Practices." International Journal of Engineering Education 41(1): 18-33.

Postdoctoral training holds an increasingly important position in securing high-impact research and academic positions in engineering and computer science. High-quality mentorship contributes to the success of postdoctoral trainees, but existing literature demonstrates postdocs from outside of the US, women, and racial minorities who experience

stereotypes are provided less mentorship, and less successful outcomes than their white and male counterparts. Further, trainees who originate from outside of the US hold more than half of the postdoctoral positions in the US. Increasingly, funding agencies within the US require postdoctoral mentorship plans, but it is unclear to what end and if they are helpful or simply performative. Specifically, to date, no research has investigated the content of mentorship plans, their alignment to theory and existing research, or the needs of postdoctoral trainees particularly those from outside of the US, women, and racial minorities. As part of a larger project investigating postdoctoral mentorship, we analyzed 54 postdoctoral mentoring plans to identify how they align with recommendations from content supported by theory and literature. We find marginal alignment with best practices, with much room for improvement, including tailoring and specificity. From this work, a postdoctoral mentorship blueprint and rubric for plan evaluation are offered as tools to improve the uniqueness, specificity, and utility of mentorship plans. CITED: Survey of Graduate Students and Postdoctorates in Science and Engineering. National Center for Science and Engineering Statistics (NCSES)) 2023 NSF 23-312 Alexandria, VA

Bernstein, D. (2024). "A Path to Gender Equity in the Geosciences: Empowering Women Postdocs." Bulletin of the American Meteorological Society 105(3): E686-E689.

CITED: National Center for Science and Engineering Statistics, 2023: Survey of graduate students and postdoctorates in science and engineering (GSS) 2021. National Science Foundation, accessed 12 February 2024, https://ncses.nsf.gov/pubs/nsf23312.

Bing, X. and X. Wan (2025). "Configurational impact of motivational factors on postdoctoral job satisfaction." Scientific Reports 15(1).

Postdoctoral researchers play a critical role in advancing global science, yet widespread job dissatisfaction threatens both their retention and research productivity. Although prior studies have identified discrete factors affecting postdoctoral job satisfaction, the complex, configurational relationships among them remain poorly understood. To bridge this gap, our study draws on Herzberg’s Two-Factor Theory and employs fuzzy-set Qualitative Comparative Analysis (fsQCA) to explore how different configurations of key motivational factors jointly shape postdoctoral job satisfaction. Analyzing data from the 2023 Nature Global Postdoctoral Survey, we identified eight distinct configurational pathways—five associated with high satisfaction and three with low. These findings provide actionable evidence for institutions to tailor support strategies that better serve postdoctoral needs....In this context, the number of PDRs has grown substantially across various countries. Indeed, according to the National Science Foundation, the number of PDRs in science and engineering at U.S. universities rose by 4.9% in a single year, from 62,750 in 2022 to 65,850 in 2023 (National Center for Science and Engineering Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering)....

Bourke, A. M., et al. (2023). "A European perspective on structural barriers to women's career progression in neuroscience." Nature Neuroscience 26(11): 1842-1847.

Despite an unprecedented number of women entering neuroscience, and decades-long recruitment and retention efforts, women continue to be disproportionately underrepresented in European academic tenure-track faculty and leadership positions. This Perspective focuses on two major career points where women exhibit diminished representation: the transition from postdoctoral fellow to junior professor and the promotion to more senior (tenured) faculty positions. We discuss below recently implemented country-specific and Europe-wide initiatives supporting equal career progression and propose further concrete steps to be taken to break down the structural barriers that prevent women's progression up the academic career ladder as European neuroscientists. CITED: National Center for Science and Engineering Statistics (NCSES). Survey of Graduate Students and Postdoctorates in Science and Engineering (National Science Foundation, 2023); https://ncses.nsf.gov/pubs/nsf23312 (accessed 07 September 2023).

Burt, B. A., et al. (2025). "Adjusting to Graduate School: Black Male Students Experience Racial Isolation, Negotiate Intra-Group Connections, and Balance Belonging." Policy Insights from the Behavioral and Brain Sciences 12(2): 155-163.

Successful socialization to graduate school requires sociocultural adjustments (within one's personal life, negotiating the university, and navigating the surrounding community). Through exploratory, semi-structured, one-on-one interviews and thematic analysis, this study of 50 Black men in engineering graduate programs explores the sociocultural adjustments some students make to adjust to graduate education. Coding participants' responses yielded three primary sociocultural adjustments: 1) navigating racial isolation; 2) negotiating intra-racial connections; and 3) balancing belonging and emotional guarding. The findings, focused on students' wellness, offer insights into students' broader experiences and can assist stakeholders in better supporting students' whole selves and their persistence. CITED: National Center for Science and Engineering Statistics (NCSES). (2022). Survey of graduate students and postdoctorates in science and engineering. NSF 22-319. National Science Foundation. https://ncses.nsf.gov/pubs/nsf22319/

Cabbolet, M. (2025). "To All Who Believe in Science as an Open Discussion of New Ideas: A Call for Reforms to Reverse the Politicization of Science." Journal of Academic Ethics 23(4): 2167-2176.

Science seems to be flourishing like never before. However, science has become politicized up to the point where it has become the rule rather than the exception that dissenting submissions-i.e. manuscripts submitted for publication and research proposals submitted for funding that are critical of an accepted view or that propose a new view-are rejected by pseudoskeptical review, which is distinctly unethical. As this is detrimental not only to the career perspectives of those who dare to question the mainstream but also to the development of knowledge, in this opinion piece we call for reforms in science to the benefit of all. CITED: NCSES (National Center for Science and Engineering Statistics) (2025). Survey of graduate students and postdoctorates in science and engineering: Fall 2023. NSF 25-317. U.S. National Science Foundation. Available at https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2023

Cadena, M. A., et al. (2023). "Insights and strategies for improving equity in graduate school admissions." Cell 186(17): 3529-3547.

Applying to graduate school can be particularly challenging for students from historically minoritized backgrounds due to a hidden curriculum in the graduate admissions process. To address this issue, a team of volunteer STEM trainees established the Cienti ' fico Latino Graduate Student Mentorship Initiative (CL-GSMI) in 2019 to support applicants from historically minoritized backgrounds. CL-GSMI is designed to improve access to critical resources, including information, mentorship, and financial support, and has assisted 443 students in applying and matriculating to graduate school. Using program evaluation data from 2020 to 2021, we highlight areas in graduate school admissions that can be improved to promote equity and inclusion. CITED: National Center for Science and Engineering Statistics (2022). Survey of Graduate Students and Postdoctorates in Science and Engineering (National Science Foundation)

Costello, K., et al. (2025). "Associations between gender, parenthood, and family and career planning in United States doctoral students." Behaviour Research and Therapy 191: 10.

Academic culture is generally not conducive to parenthood and work-life balance, which may contribute to the disproportionate drop-out of women from academic careers. The extent to which doctoral students experience systemic biases (e.g., gender-based discrimination) and personal conflicts (e.g., geographic flexibility) related to their gender and parental status, factors that may impact their future career trajectories, remains understudied. Doctoral students (n = 330; 55.5 % women, 25.2 % current parents) completed an online questionnaire examining the associations of gender and parental status on choice of doctoral degree program, experiences while in graduate school, and future career and personal plans. Doctoral students without children were more likely to be enrolled in STEM programs. Men were significantly more likely to be partnered, have children, be enrolled in funded programs, and report higher household incomes. Parents and women were less flexible about relocating for graduate school or post-graduation. Women relied more on family for childcare and external funding (e.g., loans and loved ones). Fathers reported the highest perceived social support, while mothers reported the lowest. No differences were observed in second-shift work or satisfaction with second-shift responsibilities. Women anticipated significantly greater delays in childbearing compared to men. Results suggest that women experience significant conflicts between professional and personal aspirations as early as graduate school and highlight the need for institutional supports and resources to more successfully retain women and parents in academic careers. CITED: National Center for Science and Engineering Statistics (NCSES). (2024). Survey of graduate students and postdoctorates in science and engineering. National Science Foundation (NSF 24-319). Retrieved July 1 from https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2022.

Cui, Q. and J. Harshman (2023). "Reforming Doctoral Education through the Lens of Professional Socialization to Train the Next Generation of Chemists." Jacs Au: 10.

Several national organizations in the United States have questioned the effectiveness of doctoral education in chemistry in preparing and training doctoral students for their desired professional pathways outside of academia. This study investigates the knowledge and skills that chemists with a doctorate across academic and nonacademic job sectors perceive to be necessary for their careers and the ways that these chemists require and/or value certain skillsets over others depending on their job sector. Based on a prior qualitative study, a survey was distributed to gather knowledge and skills needed by chemists with a doctorate in different job sectors. Findings based on 412 responses provide evidence that many 21st century skills beyond technical chemistry knowledge affect success in many types of workplaces. Further, academic and nonacademic job sectors were found to require different skills. The findings question the learning goals of graduate education programs that exclusively target technical skills and knowledge mastery versus those programs that incorporate concepts from professional socialization theory to broaden their scope. The results of this empirical investigation can be used to illuminate those learning targets that currently are less emphasized, to provide all doctoral students with the greatest opportunities for career success. CITED: National Science Foundation. Survey of Graduate Students and Postdoctorates in Science and Engineering Fall 2015; National Science Board: Washington, D.C., 2015.

De Maio, J. L. and A. Macias (2024). "Best Practices and the Need for Research on MA Degree Programs in Political Science." PS: Political Science & Politics 57(4): 545-551.

Recent research suggests that master's (MA) education in the United States could be restructured to better meet the expectations of students who seek nonacademic careers. This article considers the state of terminal MA degree programs in political science to assess whether they are preparing students to enter the workforce. We examine programs across various dimensions and supplement this analysis with survey data to gain additional information about the purpose of terminal MA degree programs. The results suggest that their reconceptualization is needed in the discipline of political science. CITED: The GSS is an annual measurement of information provided by approximately 700 academic institutions in the United States and its territories by the National Center for Education Statistics. See https://ncses.nsf.gov/surveys/graduatestudents-postdoctorates-s-e/2021.

Devereux, E. (2023). "Perceived Reputational and Administrative Capacity Biases & the Role of Carnegie Classifications in Funding Review Processes." Research Management Review 26(1): 41-78.

Previous research on issues of social equity in funding distributions across institutions of higher education has pointed to reputation and administrative capacity biases in peer reviews of proposals, among other concerns. Further research is needed to identify what contributes to perceived biases and enables institutions to signal competitiveness to sponsors based on the principal-agent and resource dependency theories. For this study, a quantitative analysis was conducted on publicly available datasets to explore relationships among Carnegie Classification rankings, institutional control types, administrative capacities, and sponsored research and foundation funding levels. The study population included Carnegie Classifications of four-

year institutions. Data sources included the Carnegie Classification 2018 Public Data Report, National Science Foundation's HERD FY2017 Survey, U.S. Department of Education's IPEDS 2016-2017 report, and the Council for Advancement and Support of Education's VSE FY2016-2017 report. Direct linear relationships were found between institutional rankings and administrative capacities and institutional funding levels. Further, funding source distributions differed by institutional control type. Increasing funding distributions to minority institutions and researchers will promote research development and improve social equity across funding mechanisms....The CC data are collected through the National Center for Education Statistics (NCES) survey, Integrated Postsecondary Education Data Systems (IPED), the NSF HERD, and Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS)....

Dill, D. D. (2023). **BOOK CHAPTER** "Management and governance of the modern university: Variations in the United States". Handbook on Higher Education Management and Governance, Edward Elgar Publishing Ltd.: 96-111.

CITED: National Center for Science and Engineering Statistics (NCSES) (2021a). Survey of Graduate Students and Postdoctorates in Science and Engineering: Fall 2019. NSF 21-318. Alexandria, VA: National Science Foundation. https://ncses.nsf.gov/pubs/nsf21318/.

Donkor, B., et al. (2024). "The Goal of Doctoral Education in Chemistry: Faculty Perspectives." Journal of Chemical Education 101(8): 3050-3061.

This study examines the overarching goal(s) of doctoral education in chemistry (DEC) from the perspective of research-active faculty. Faculty perspectives on DEC's goals are explored through comprehensive faculty interviews designed in accordance with teacher-centered systemic reform framework. Interviews were conducted with 46 faculty members, employing an interview protocol refined through iterative input and consensus-building. Six interrelated goals were identified: two primary goals (preparing students to be competitive for future careers and cultivating independent scientists) and four secondary goals (fostering expertise, nurturing critical thinkers, generating novel research, and contributing to institutional rankings). Further analysis of faculty responses yielded three key insights: Preparing students for a career and preparing students to be independent scientists are convergent goals; students may be receiving imbalanced preparation for their actual careers; faculty expressed varying levels of confidence in identifying program goals. Implications for future research and program designers are outlined based on these findings. Overall, this research provides insights into DEC, emphasizing the importance of well-rounded graduates equipped with expertise, critical thinking skills, and adaptability to address emerging challenges. CITED: National Science Foundation. Survey of Graduate Students and Postdoctorates in Science and Engineering Fall 2015; National Science Board: Washington, D.C., 2015.

Driks, H., et al. (2025). "A trainee-led approach to tackling gender inequity in immunology." Immunology and cell biology 103(3): 265-269.

: Gender inequities persist in science, with women encountering significant barriers at various career stages, particularly in fields such as Immunology. This article highlights the work of Immunologists for Gender Equity (IgEquity), a trainee-led organization within the ImmunoX

Program at the University of California, San Francisco (UCSF), which is committed to addressing these disparities. Through initiatives focused on community building, mentorship, outreach and advocacy, IgEquity seeks to advance gender equity in academia. We emphasize the critical role that trainee-led organizations can play in driving change and underscore the importance of institutional support in creating lasting, systemic progress toward gender equity in the scientific community. CITED: Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS). 2022. https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2022#data. Accessed November 20, 2024.

Eibschutz, L. S., et al. (2024). "Graduate Mentorship Research Program: Innovation, Diversity, Research, Improvement." Journal of the American College of Radiology 21(1): 210-213.

CITED: National Science Foundation Survey of graduate students and postdoctorates in science and engineering (GSS) Available at: https://www.nsf.gov/statistics/srvygradpostdoc Date accessed: March 23, 2023

Fanshel, R. Z. (2025). **DISSERTATION "**Anti-Racist and Decolonial Organizational Change Work in Agricultural Higher Education**"**. United States -- California, University of California, Berkeley: 317.

Agriculture colleges at Historically White Land Grant Universities (HWLGUs) were founded by selling of Indigenous land via the First Morrill Act of 1862 and still receive public funding to produce an educated workforce trained to serve each state’s agri-food system needs. Yet the HWLGU public service mission is premised on ideological/institutional and organizational logics of racism and colonization, evidenced by the ways in which their agricultural research, educational programs, and campus services create inequitable access and experiences among minoritized populations. Race-based inequities also pervade the U.S. agri-food system, across issues of labor, access, and health. In the last decade, many HWLGUs began acknowledging that their organizational logics create and uphold white supremacy. They are questioning, and seeking to address, how they perpetuate simultaneous educational and agri-food system injustices. Yet pursuing organizational change in deeply entrenched, historically-shaped agricultural colleges is complex and multi-level. Little is known about how universities are integrating anti-racism and decolonization into their everyday organizational practices and educational approaches, and about the ideas, strategies, and discourses proponents of change mobilize. Previous research has highlighted the broader discursive, cognitive, social, and organizational barriers that can impede anti-racist and decolonial change in academic culture, but little exists with regard to agricultural education. I conducted a mixed methods in-depth case study of the University of California (UC) Berkeley College of Natural Resources (CNR) to investigate how one HWLGU envisions and enacts—and inhibits—organizational change to advance anti-racism and decolonization in their agricultural education. I draw on critical and abolitionist university studies as an overarching framework, and also employ an interdisciplinary mix of critical theories that address racism and colonialism; organizational theories on inequality and change-making; and critical pedagogy of agri-food systems. My research design includes: (a) 129 in-depth, semi-structured interviews with 75 individual CNR faculty, staff, students, postdoctoral scholars, and administrators; (b)

interviewee identity surveys; (c) content analysis analysis of organizational artifacts; (d) critical visual examination of agricultural teaching and research spaces; and (e) critical reflexivity and critical autoethnographic practices. The case consists of four substudies that each examine different levels and processes for envisioning, enacting, and contesting organizational change. Study 1, “The First Morrill Act and Its Afterlife: Settler Conquest, White Supremacy, and the Founding of the University of California Agricultural Education,” examines the development of agricultural settler conquest and white supremacy from the beginning of the U.S. occupation of California in 1846 through the first six decades of the UC College of Agriculture. Across two chapters I analyze archival texts, secondary sources, and physical spaces to uncover CNR’s historically-specific development and entrenchment of racist and settler colonial ideologies/ institutions. Study 2, “The 2020 Racial Justice Movement and Organizational Change Possibilities in the College of Natural Resources,” provides an “ecosystem view” of ideas, discourse, and perceptions of change circulating in CNR in the 2020 context through two semi-longitudinal interviews with 45 agricultural scholars and administrators with different professional positions and personal identities. Studies 3 and 4 investigate two interventions within CNR to understand how actors mobilize change practices and counter-hegemonic discourse to try to enact anti-racism and decolonization. Study 3, “The Campus Foodscape as Praxis: Participatory Mapping, Pedagogy, and Organizational Change,” examines the six-year UC Berkeley Foodscape Mapping Project, which used the campus as a living laboratory for members to generate agri-food systems knowle ge while developing programs, campaigns, and cartographic resources to advance equity. Across three chapters I analyze the ways in which a multi-year organizational change project that used pedagogical and research practices aimed at participatory, student-led learning experiences worked, and not, and what this reveals about change-making processes in CNR. Study 4, “The ‘Critical Engagements in Anti-Racist Environmental Scholarship’ Course as a Site of Organizational Change,” investigates a course developed by doctoral students during the national racial justice protests of 2020 for members of CNR’s largest department to engage in collaborative learning to deepen understandings of anti-racism in academia, and through action projects, attempt to change departmental structures and culture. The course was distinctive in that it was a learning environment that aimed to flatten traditional academic hierarchies: graduate students, faculty, staff, and postdoctoral scholars took the class together, and the teaching team consisted of doctoral students. I examine how the course cultivated an undertheorized relational and affective aspect of organizational change work which I call “feeling of community.” Previous scholarship has largely ignored racism and colonization in agricultural education, despite land grant universities’ explicit mandate to serve the public through agricultural research, education, and outreach. A large body of literature examines how higher education fails racially and otherwise minoritized communities, and while some scholars provide roadmaps to addressing racism, there are few studies of what these efforts are doing. My multi-level, thick analysis of the University of California, Berkeley, College of Natural Resources provides a rigorous understanding of the processes, agents, and constraints of change-making work. These analytical tools can be used to assess how other Historically White Land Grant University agricultural colleges approach anti-racism

and decolonization, and whether their actions lead to transformative learning and change. CITED: National Center for Science and Engineering Statistics. (2022). Survey of graduate students and postdoctorates in science and engineering (GSS) 2022. https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2022

Francesco, L. and M. Andrea (2025). **BOOK** "A Research Agenda for Migration and Innovation". Cheltenham, Edward Elgar Publishing.

Elgar Research Agendas outline the future of research in a given area. Leading scholars are given the space to explore their subject in provocative ways, and map out the potential directions of travel. They are relevant but also visionary. Forward-looking and innovative, Elgar Research Agendas are an essential resource for PhD students, scholars and anybody who wants to be at the forefront of research.This Research Agenda presents an incisive overview of economic research on the multiple links between international migration and innovation. It both examines the key conceptual issues, explores data and methodological challenges and draws on the most recent empirical evidence to provide novel insights into the migration-innovation nexus and its significance for policy and practice.Expert scholars analyze the role of migrants in driving innovation, particularly through knowledge diffusion and diversity across workplaces, cities and regions. They engage with these central themes across varied historical and socio-economic contexts, evaluating the contributions of key actors such as migrant inventors and scientists, international students, and ethnic entrepreneurs within both their host and home countries. In so doing, this Research Agenda ultimately advocates for greater integration of migration policies into broader innovation strategies and for a more careful evaluation of global talent flows and their economic effects.Interdisciplinary in scope, this timely Research Agenda will benefit students and academics in migration studies, economic geography, economics of innovation, human geography and innovation policy. It is also an invaluable resource for policy makers, practitioners and government officers working in areas related to migration or innovation. CITED: The NSF Survey of Graduate Students and Postdoctorates in Science and Engineering lists 65,681 postdoctoral appointees and 29,661 nonfaculty researchers in the 2020 Survey (NCSES, 2022: p. 10, Table 1–1).

Ganguli, I. and M. MacGarvie (2025). **WORKING PAPER** "International Students, Immigration Policies and Implications for Innovation." NBER Working Papers(34184-34286): 1-25.

CITED: The NSF Survey of Graduate Students and Postdoctorates in Science and Engineering lists 65,681 postdoctoral appointees and 29,661 nonfaculty researchers in the 2020 Survey (NCSES 2022, p. 10, Table 1-1).

Garcia, K. A., et al. (2024). **BOOK CHAPTER** "Enhancing the Success of Latina Postdoctoral Scholars at Hispanic-Serving Institutions". Student Success and Intersectionality at Hispanic-Serving Institutions: Policy and Practice, Springer Science+Business Media: 227-240.

While the number of Latina/o/e students entering higher education continues to grow, particularly among HSIs, the number of Latina/o/e faculty who can help support students and serve as role models has not grown at the same rate. Efforts to diversify faculty frame the issues around the low numbers of Latina/o/e doctoral students. However,

Latina/o/e doctoral students and postdoctoral fellows in the pipeline often receive little mentorship for the competitive job market in academia. Therefore, this chapter examines Latina postdoc experiences at large HSIs and identifies supportive practices and structures that facilitate their advancement into faculty careers. The chapter draws from the collective testimonios of four Latina postdoctoral fellows at various HSIs to offer practical implications for developing a peer community within and across HSIs. Additionally, the chapter presents a Framework for Creating Collectivist Support Structures for Latina Postdocs that is grounded in Latina epistemologies and centered on collectivist support structures and a culture of caring to help support Latina's transition into faculty positions. The framework includes three areas of support: (1) fostering academic growth for Latina scholars, (2) creating opportunities for professional/career development, and (3) building institutional support and community. © Springer Nature Switzerland AG 2024. CITED: National Center for Science and Engineering and Statistics. (2022). Survey of graduate students and postdoctorates in science and engineering (GSS).

Gary, S., et al. (2025). **ISSUE PAPER** "Considerations for supporting postdoctoral scholars experiencing sexual harassment in higher education", National Academies Press.

Postdoctoral scholars are particularly vulnerable to sexual harassment because of their early career stage, a lack of clear institutional policies, and dyadic relationships with their advisors, among other factors. Recent surveys and listening sessions have reiterated this issue, indicating that workplace bullying, harassment, and discrimination are chief concerns to postdoctoral scholars and that power imbalances are a cross-cutting theme contributing to harassment, bullying, and questionable behaviors by mentors and principal investigators. It is within environments of generalized disrespect and incivility that much sexual harassment occurs. This issue paper builds on the findings and recommendations in the 2018 report Sexual Harassment of Women: Climate, Culture, and Consequences in Academic Sciences, Engineering, and Medicine by providing more information related to implementing the report's recommendation to diffuse the hierarchical and dependent relationships between faculty and their trainees (e.g., students, postdoctoral fellows, residents). Through this paper, individual scholars, higher education leaders, and practitioners from the Action Collaborative's Response Working Group describe key institutional considerations and challenges in supporting postdoctoral scholars experiencing sexual harassment in higher education. © . All rights reserved. CITED: NCSES. (2021). Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS). National Science Foundation. https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2021#data

Gowder, C. (2024). **BLOG** "Useful Stats: 40+ year trends in postgraduate science, engineering, and health." SSTi Blog https://ssti.org/blog/useful-stats-40-year-trends-postgraduate-science-engineering-and-health.

The number of graduate students in science, engineering, and health has grown from approximately 328,000 to 760,000 from 1975 to 2021, a 132% increase, according to the National Science Foundation’s (NSF) Survey of

Graduate Students and Postdoctorates in Science and Engineering (GSS). When compared to a 60% increase (from 9.7 to 15.4 million) in total undergraduate enrollment across all fields of study over the same time period, the scale of growth can be better seen. However, while the number of graduate students in science has seen an upward trend over the 46-year period, the number of graduate students in engineering has stagnated since 2014.

Gullo, T., et al. (2025). **WORKING PAPER** "Estimating the Economic and Budgetary Effects of Research Investments." NBER Working Papers(3341-3398): 1-30.

... See, for example, Smith et al. (2024), in a brief from the National Center for Science and Engineering Statistics (NCSES) presenting data from the NCSES Survey of Graduate Students and Postdoctorates in Science and Engineering (among other data sources), on trends in graduate enrollment and post-doctoral appointments by citizenship status. ...

Haacker, R., et al. (2024). "Improving Postdoctoral Training Programs through Alumni Perspectives and Experiences." Bulletin of the American Meteorological Society 105(1): E206-E217.

The Advanced Study Program (ASP) at the National Center for Atmospheric Research has supported the career development of postdoctoral fellows for over 60 years. This study of ASP alumni helps better understand their career paths and provides a window into the geoscience community. It examines career aspirations and job satisfaction, as well as experiences with mentoring and attitudes about diversity and inclusion in the workplace. While about half of ASP alumni today work in academia, job changes and pursuit of careers outside of academia are in-creasing. Former ASP participants are actively engaged in mentoring and are supportive of efforts in diversity, equity, and inclusion (DEI). Alumni who identify as women reported feeling less sup-ported by their employers in their career growth and in their service activities such as mentoring than alumni who identify as men. The study also found that women engage in a broader range of DEI activities and mentor more often out of altruistic reasons rather than as an expectation of their position. In addition to mastering research and teaching skills, future postdocs will need training in leadership, grant writing, DEI, and project management to succeed in today's geosci-ence workforce. CITED: National Center for Science and Engineering Statistics, 2021: Survey of graduate students and postdoctorates in science and engineering: Fall 2019. NSF 21-318, National Science Foundation, https://ncses.nsf.gov/pubs/nsf21318/.

Hall-Byers, N. M. and J. M. Jones (2023). **BOOK CHAPTER** "WHY AREN’T MORE BLACK MEN INTERESTED IN PSYCHOLOGY?" Unveiling the Cloak of Invisibility: Why Black Males are Absent in STEM Disciplines, Emerald Group Publishing Ltd.: 125-136.

CITED: National Science Foundation. (2021). Survey of graduate students and postdoctorates in science and engineering: Fall 2019. National Center for Science and Engineering Statistics. https://ncses.nsf.gov/pubs/nsf21318

Hallinan, V. and K. Nguyen (2024). **NEWS** "Navigating the Postdoc Office." Inside Higher Ed

https://www.insidehighered.com/opinion/career-advice/carpe-careers/2024/07/29/benefits-administrative-job-postdoc-office-opinion.

Postdoctoral positions are becoming a normalized step in academic training across many fields, including the humanities and social sciences: the “2022 Survey of Graduate Students and Postdoctorates in Science and Engineering” reported that there were 62,750 postdocs across science, engineering and health fields in the United States.

Han, H. A., et al. (2025). "Becoming a resilient scientist series: an intervention program." Frontiers in Education 10: 13.

Compared to the general population, science trainees experience challenges and heightened stressors that often lead to adverse mental health outcomes. With COVID-19, the stressors of social distancing, isolation, truncated lab time, and uncertainty about the future have all likely exacerbated these issues. Now, more than ever, practical and effective interventions are vitally needed to address the core causes of stress among science trainees and increase their resilience. This paper introduces a new resilience program targeted to biomedical trainees and scientists - Becoming a Resilient Scientist Series (BRS), a 5-part workshop complemented by facilitated group discussions all aimed at bolstering resilience, particularly in the context of academic and research environments. To assess the program's efficacy, participants completed resilience measures and related assessments before and after completing the series. The results suggest that BRS is associated with improvements in trainee resilience (primary outcome) and with reductions in perceived stress, anxiety, and work-related presenteeism, as well as enhancements in adaptability, self-awareness, and self-efficacy (secondary outcomes). Furthermore, program participants reported a high level of satisfaction, a strong willingness to recommend the program to others, and perceived positive changes in their resilience skills. To the best of our knowledge, this is the first resilience program designed explicitly for biomedical trainees and scientists, tailored to their unique professional culture and work environment. CITED: National Science Foundation (2022). Survey of graduate students and Postdoctorates in science and engineering. Available at: https://www.nsf.gov/statistics/srvygradpostdoc/

Holtz, A. and B. T. Papineau (2024). "Examining the female-talker default in experimental language acquisition research." Infant and Child Development 33(1).

Experimental research on language acquisition and development regularly employs auditory stimuli as part of the methodology. This project analyses the apparent standard practice of using female speakers to produce these experimental materials and the potential consequences of such a practice. To situate the discussion in the current scientific landscape we present a systematic review of published literature between 2017 and 2022 to establish how prevalent this practice is. The review finds a strong bias in favour of female-spoken stimuli across publications in a curated set of nine journals. We discuss this result in light of gender-based workplace inequality, changing caregiver expectations and the reliability of infants' assumed female voice preference. This project seeks to encourage researchers to consider how diversifying the stimuli used in these types of studies would lead to both a more inclusive and representative research landscape, as well as

ensure that our research results are generalizable. © 2023 The Authors. Infant and Child Development published by John Wiley & Sons Ltd. CITED: National Center for Science and Engineering Statistics (NCSES). (2020). Survey of Graduate Students and Post doctorates in Science and Engineering, Fall 2018. Alexandria, VA: National Science Foundation. http://ncsesdata.nsf.gov/gradpostdoc/

Kahn, S. and M. MacGarvie (2024). "New evidence on international postdocs in the US: Less pay, different experiences." Research Policy 53(9): 17.

Post-doctoral scholars play a critical role in the innovation workforce and contribute to most scientific publications by US institutions. More than half of US postdoctoral scholars are temporary residents; of these, most earned PhDs abroad. We describe the experiences of international postdocs and find that salaries and many other dimensions of postdoc experiences are different for temporary residents, particularly those trained abroad, while on some dimensions - career guidance, recognition for their work, and work hours - their experiences are similar to those of US citizens and permanent residents. Productivity does not explain the different experiences; temporary residents have higher research productivity. Better matches with supervisors somewhat attenuate these differences, as does speaking English as a first language. However, even controlling for the quality of the match, language and productivity, foreign-educated temporary residents in particular have different experiences along several dimensions: salary and some benefits, involvement in grants and teaching, supervisor mentoring and collaboration outside the lab). Experiences are associated with postdocs' overall assessments of their positions and with changing their intentions to leave or remain in the US. CITED: National Center for Science and Engineering Statistics (NCSES), 2022. Survey of Graduate Students and Postdoctorates in Science and Engineering. NSF 22-319. National Science Foundation, Alexandria, VA. April 5, 2022. Available at. https://ncses.nsf.gov/pubs/nsf22319/.

Kappel, E. S., et al. (2023). "INTRODUCTION TO THE SPECIAL ISSUE ON BUILDING DIVERSITY, EQUITY, AND INCLUSION IN THE OCEAN SCIENCES." Oceanography 36(4): 6-9.

CITED: NCSES (National Center for Science and Engineering Statistics). 2021. Survey of Graduate Students and Postdoctorates in Science and Engineering: Fall 2019. NSF 21-318, National Science Foundation, Alexandria, VA, 257 pp., https://ncses.nsf.gov/pubs/nsf21318/.

Kehdinga George, F. (2024). **BOOK** "Theorising Research, Innovation and Internationalisation in African Higher Education". Auckland Park [South Africa], UJ Press.

The African higher education landscape has experienced a myriad of success and challenges in the past five decades. This has turned the landscape into a complex one, enmeshed in a rich dose of colonial legacies, globalisation, decolonisation, COVID-19, and internationalisation focused on North-South partnerships amongst others. While researchers globally have contributed immensely to the growth of research in African higher education, scholars within the African higher education landscape have also contributed immensely to the growth in higher education both on the African continent and globally. The fact

that some African universities make it into the top 500 universities worldwide in different rankings testifies to this assertion. This book explores all things research, innovation and internationalisation on the African continent. It is a must-have for everyone interested in African Higher education....Data was collected from graduate students and postdoctorates in science and engineering (GSS). The survey of graduate students and postdoctorates in science and engineering (GSS) is an annual census of all academic institutions in the United States and its erritories (Guam and Puerto Rico) granting research-based masters' degrees or doctorates in science and engineering or selected health fields, as of the autumn of the survey year....

Kevin, C. (2024). **BOOK** "The Impostor Phenomenon : Psychological Research, Theory, and Interventions". Washington, DC, American Psychological Association.

This book offers a scientific investigation into the impostor phenomenon, a concept that has long been misunderstood in popular culture. Much of the conventional wisdom about the impostor phenomenon is driven by intuitive, common-sense based recommendations about how to cope with and conquer impostor feelings. Unfortunately, much of this discourse is neither rooted in nor informed by empirical research. There are many important theoretical and methodological questions regarding the impostor phenomenon that remain unanswered, such as whether the impostor phenomenon is a personality trait at the core of one's identity, or merely a predisposition triggered by circumstances or fears of being evaluated. This book describes the theoretical underpinnings of the impostor phenomenon along with common measurement issues, implications for mental health and achievement, its relative prevalence among various population groups, and practical applications of the concept in psychotherapy and mental health treatment more broadly. CITED: National Science Foundation. (2017). Survey of graduate students and postdoctorates in science and engineering. https://ncsesdata.nsf.gov/gradpostdoc/2017/

Kezar, A. and J. P. Matias Dizon (2024). **BOOK CHAPTER** "The Gig Academy: changing the global face of academy labour". Research Handbook on Academic Labour Markets, Edward Elgar Publishing Ltd.: 91-104.

This chapter explores the features of the Gig Academy within the USA and how this shapes the work lives of faculty and staff on campus and is also transforming leadership. It is critical to understand these trends because they are fundamentally changing the nature of academic labour into one which is profoundly exploitative, and which negatively impacts the quality of teaching and learning, and student learning and success, in numerous countries including the USA. The key aspects of these changing trends include hypercontingency, outsourcing, micro-entrepreneurship, managerial influence over supply and demand of workers, shifting economic risk to workers, and technology as a means of reducing labour costs. After providing an overview of the Gig Academy, the manner in which it reshapes the work lives of faculty and staff are reviewed in detail. © The Editor and Contributors Severally 2024. All rights reserved. CITED: National Center for Science and Engineering Statistics (NCSES). 2023. Survey of Graduate Students and Postdoctorates in Science and Engineering. NSF 23-312. Alexandria, VA: National Science Foundation.

https://ncses.nsf.gov/pubs/nsf23312/table/5-3#section14022 (table 5-3). Accessed 15 July 2023.

Kim, H. (2025). "Global mobility of the recent STEM postdoctoral workforce registered in ORCID." Quantitative Science Studies 6: 12.

Postdoctoral researchers contribute to scientific, technological, and societal innovations under the supervision of academic faculty and domain experts. Their international movements facilitate the advancement and diffusion of knowledge and thus are important for research and development. To understand postdoctoral mobility at a global scale, this paper analyzes self-reported career trajectories of postdoctoral researchers by leveraging Open Researcher and Contributor ID (ORCID), focusing on five STEM fields: Biological Sciences, Biomedical and Clinical Sciences, Chemical Sciences, Engineering, and Physical Sciences. The United States and European countries are major destinations for the first postdoctoral position across the selected fields, and three Asian countries—China, Japan, and the Republic of Korea—also attract postdoctoral researchers in Chemical Sciences and Engineering. Gender differences are observed for some specific cases mainly due to the tendency that female postdoctoral researchers are more likely to stay in a single country or less likely to move to the United States for the second postdoctoral position compared to male postdoctoral researchers. The results would be leveraged to design science and technology policies for postdoctoral researchers in consideration of additional factors, such as culture and language....s. According to the 2019 U.S. Survey of Graduate Students and Postdoc torates in Science and Engineering, 55.5% of 66,247 U.S. postdocs who participated in the sur vey were temporary visa holders, and the others were U.S. citizens or permanent residents (Arbeit & Yamaner, 2021)...

Kim, K. W. (2023). **DISSERTATION** "Institutional Barriers to the Diversification of Academic Workforce. Department of Sociology", Harvard University. Dissertation (Doctor of Philosophy).

CITED: National Center for Science and Engineering Statistics, and Mike Yamaner. 2022. Survey of Graduate Students and Postdoctorates in Science and Engineering: Fall 2020. NSF 22-319. Alexandria, VA: National Science Foundation.

Kim, Y. H., et al. (2023). "The rocky road to translational science: An analysis of Clinical and Translational Science Awards." Research Evaluation 32(2): 332-347.

Studies point out that the productivity decline in biomedicine is in significant part due to difficulties in translating basic science into clinical application. To promote translational research, the US NIH launched the Clinical and Translational Science Awards (CTSA) program in 2006. Prior evaluations of the CTSA program often assumed that the key to translation is inter-organizational collaboration or multidisciplinarity; hence, changes in either of these were measured as evidence of translational science. However, using novel measures of translational science, this study examines the relationship between CTSAs and translational science per se. We define 'translational science' as basic science that has translational features, and we employ two distinct, complementary measures of translational science based on publication data. Using 115 Carnegie R1 universities and their translational science

publications, we find that receiving a CTSA does not obviously cause receiving institutions to conduct more translational science. Furthermore, our Principal Investigator-level analysis shows that those who received direct support from the CTSA program had already generated more translational science than others and that their research behavior did not change significantly after receiving a CTSA. Future evaluation research can adopt our novel measures of translational science and evaluation research design in the assessment of translational research activities. Finally, we conclude with a discussion of the implications of our findings for science governance. CITED: NSF Survey of Graduate Students and Post-doctorates in Science & Engineering https://www.nsf.gov/statistics/srvygradpostdoc/pub_data.cfm (accessed11 Aug 2020).

Knight, D. B., et al. (2024). "PhD Student Funding Patterns: Placing Biomedical, Biological, and Biosystems Engineering in the Context of Engineering Sub-disciplines, Biological Sciences, and Other STEM Disciplines." Biomedical Engineering Education: 1-12.

Whether doctoral students are funded primarily by fellowships, research assistantships, or teaching assistantships impacts their degree completion, time to degree, learning outcomes, and short- and long-term career outcomes. Variations in funding patterns have been studied at the broad field level but not comparing engineering sub-disciplines. We addressed two research questions: How do PhD student funding mechanisms vary across engineering sub-disciplines? And how does variation in funding mechanisms across engineering sub-disciplines map onto the larger STEM disciplinary landscape? We analyzed 103,373 engineering and computing responses to the U.S. Survey of Earned Doctorates collected between 2007 and 2016. We conducted analysis of variance with Bonferroni post hoc comparisons to examine variation in funding across sub-disciplines. Then, we conducted a k-means cluster analysis on percentage variables for fellowship, research, and teaching assistantship funding mechanism with STEM sub-discipline as the unit of analysis. A statistically significantly greater percentage of biomedical/biological engineering doctoral students were funded via a fellowship, compared to every other engineering sub-discipline. Consequently, biomedical/biological engineering had significantly lower proportions of students supported via research and teaching assistantships than nearly all other engineering sub-disciplines. We identified five clusters. The majority of engineering sub-disciplines grouped together into a cluster with high research assistantships and low teaching assistantships. Biomedical/biological engineering clustered in the high fellowships grouping with most other biological sciences but no other engineering sub-disciplines. Biomedical/biological engineering behaves much more like biological and life sciences in utilizing fellowships to fund graduate students, far more than other engineering sub-disciplines. Our study provides further evidence of the prevalence of fellowships in life sciences and how it stretches into biomedical/biological engineering. The majority of engineering sub-disciplines relied more on research assistantships to fund graduate study. The lack of uniformity provides an opportunity to diversify student experiences during their graduate programs but also necessitates an awareness to the advantages and disadvantages that different funding portfolios can bestow on students....One potential avenue for more detailed analysis is the Survey

of Graduate Students and Postdoctorates in Science and Engineering managed by National Center for Science and Engineering Statistics, a census survey in which institutions report more detailed funding information on their graduate students....

Kramarczuk, K. (2025). "THINKING ISSUES: Why My Computing Majors Read Social Theory." ACM Inroads 16(3): 11-13.

How can ChatGPT and other AI models unintentionally reinforce sexist stereotypes and patriarchal thinking through data poisoning?To what extent can AI data poisoning cause dangerous economic misinformation in minority communities?How does AI-generated medical misinformation impact individuals from different socioeconomic classes, considering their varied levels of access to official healthcare? CITED: National Center for Science and Engineering Statistics. Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS). National Science Foundation (2023); https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2023#survey-info

Laitner, M. H., et al. (2024). **BOOK** "The State of the U.S. Biomedical and Health Research Enterprise: Strategies for Achieving a Healthier America", National Academies Press.

The U.S. biomedical research enterprise has played a vital role in advancing science, human health, and the economy. It has contributed significantly to fields such as agriculture, environmental remediation, job creation, and technological innovation. Over the past 80 years, landmark achievements include reducing cancer mortality, developing HIV/AIDS treatments, sequencing the human genome, and creating vaccines that mitigated the impact of the COVID-19 pandemic. The enterprise has grown remarkably in less than a century and holds even greater potential for future success. However, its progress is hindered by a lack of high-level national coordination, a fragmented funding system, and a declining workforce. The State of the U.S. Biomedical and Health Research Enterprise: Strategies for Achieving a Healthier America addresses these challenges in five key areas-strategic vision, funding, health equity, coordination and convergence science, and workforce development-offering a roadmap that could be used to sustain U.S. leadership in global health. © 2024 by the National Academy of Sciences. All rights reserved. CITED: NSF NCSES. 2022a. Survey of graduate students and postdoctorates in science and engineering: Fall 2020. Available at: https://ncses.nsf.gov/pubs/nsf22319#section10695 (accessed May 27, 2024). National Academies of Sciences, Engineering, and Medicine. 2024. AND Yamaner, M. 2022. Survey of graduate students and postdoctorates in science and engineering: Fall 2020. National Science Foundation, National Center for Science and Engineering Statistics. Available at: https://ncses.nsf.gov/pubs/nsf22319#section10695 (accessed June 20, 2024).

Langin, K. (2024). **NEWS** "Fewer U.S. scientists are pursuing postdoc positions, new data show." Sciencemag.org: doi: 10.1126/science.z1322i1124c.

FULL TEXT: https://www.science.org/content/article/fewer-u-s-scientists-are-pursuing-postdoc-positions-new-data-show New data released by the U.S. National Science Foundation (NSF) reveal a sharp drop in the number of U.S. citizens working as postdocs, especially in the biological

and biomedical sciences. The trend underscores concerns that the academic community is facing a postdoc shortage and that early-career scientists are increasingly favoring higher paid positions outside academia....The data come from NSF’s Survey of Graduate Students and Postdoctorates in Science and Engineering, which compiles employment data from academic institutions and estimates the number of STEM graduate students and postdocs across the country....

Larry, D., et al. (2023). **REPORT** "Silicon Triangle : The United States, Taiwan, China, and Global Semiconductor Security". Stanford, California, Hoover Institution Press.

The United States, Taiwan, and China are bound within a'silicon triangle.'Semiconductors link our geopolitics, our ongoing economic prosperity, and our technological competitiveness. This book draws on the deliberations of a multidisciplinary Hoover Institution–Asia Society working group of technologists, economists, military strategists, industry players, and regional policy experts to contemplate the dynamic global supply chain in semiconductors—one in which US industry faces growing vulnerabilities, China aggressively promotes home-grown semiconductor mastery, and Taiwan finds itself with a crucial monopoly on high-end logic chips sought by buyers globally. Silicon Triangle seeks to present a balanced view of how policies of the United States and its partners around semiconductors can increase the resilience of shared supply chains—and contribute to deterring conflict in the Taiwan Strait. CITED: National Center for Science and Engineering Statistics, “Survey of Graduate Students and Postdoctorates in Science and Engineering, Fall 2021,” Table 4-20a, January 2023

Lee, E., et al. (2023). **CONFERENCE PAPER** "Engineering graduate students' perceptions of challenges and stressors: A comparison of master's vs. doctoral students and domestic vs. international students". ASEE Annual Conference and Exposition, Conference Proceedings, American Society for Engineering Education.

The purpose of this study is to better understand engineering graduate students' perceived stressors and challenges while considering degree and citizenship status. In spite of the growing attention on the need to create inclusive learning environments by supporting equitable participation of students, academic and research cultures in engineering graduate education are still characterized as unwelcoming. The existence of the large master's (degree status) and international (citizenship status) student populations is also often overlooked. In this study, we identified perceived academic and psychological stressors for four different engineering graduate student groups with varied degree (e.g., master's and doctoral) and citizenship status (e.g., domestic and international) and compared similarities or differences in the student's identified stressors between the groups. We also explored the perceived challenges regarding the identified stressors for different student groups, focusing on unique challenges being associated with degree or citizenship. We did so by conducting an explanatory mixed-methods study using a dataset collected from 2019 to 2021 from students (n=376) enrolled in a mandatory graduate seminar course focused on promoting equity in STEM. The findings illuminate unique stressors for specific student groups and generate a nuanced understanding of why and how different groups of students feel pressure from the identified stressors,

which are often related to individual or institutional attributes associated with degree or citizenship. © American Society for Engineering Education, 2023. CITED: National Science Foundation [NSF]. (2019). “Survey of Graduate Students and Postdoctorates in Science and Engineering.” Alexandria, VA, USA, 2019. Accessed on: Feb., 1, 2023. [Online]. Available at http://ncsesdata.nsf.gov/gradpostdoc/.

Lee, J. S., et al. (2025). "Monitoring environmental microbiomes: Alignment of microbiology and computational biology competencies within a culturally integrated curriculum and research framework." Molecular Ecology Resources 25(2): 1-13.

We have developed a flexible undergraduate curriculum that leverages the place-based research of environmental microbiomes to increase the number of Indigenous researchers in microbiology, data science and scientific computing. Monitoring Environmental Microbiomes (MEM) provides a curriculum and research framework designed to integrate an Indigenous approach when conducting authentic scientific research and to build interest and confidence at the undergraduate level. MEM has been successfully implemented as a short summer workshop to introduce computing practices in microbiome analysis. Based on self-assessed student knowledge of topics and skills, increased scientific confidence and interest in genomics careers were observed. We propose MEM be incorporated in a scalable course-based research experience for undergraduate institutions, including tribal colleges and universities, community colleges and other minority serving institutions. This coupled curricular and research framework explicitly considers cultural perspectives, access and equity to train a diverse future workforce that is more informed to engage in microbiome research and to translate microbiome science to benefit community and environmental health. CITED: National Science Foundation. (2018). Survey of graduate students and postdoctorates in science and engineering fall 2016. National Science Foundation Research.

Li, Y. (2024). **DISSERTATION** "Charting New Waters: Navigating Intersectional Identities in STEM — A Focus on Asian International Women". United States -- Florida, The Florida State University: 152.

This study illuminates the nuanced experiences of Asian international women students in Computer and Mathematical Sciences, and Engineering doctoral programs in the United States, a domain historically shaped by male dominance, White supremacy, and Western ideologies. While existing literature on gender and racial-ethnic disparities in Science, Technology, Engineering, and Math has utilized an intersectionality framework, this investigation reveals the particular ways in which AIS women's identities are constructed and negotiated within these spaces.Employing narrative inquiries and a counter-storytelling approach, the research uncovers the intersectionality of race, foreign status, and gender identity among these scholars, demonstrating how these dimensions interact uniquely for AIS women. Key findings reveal a pronounced de-emphasis of racial identity in favor of a strong STEM identity, a strategic response to systemic marginalization and racial challenges. This prioritization reflects a culturally embedded respect for meritocracy and academic achievement, reshaped in the U.S. context by their experiences of racialization and othering.The study also highlights the salient gender identity of AIS women, exacerbated by the masculine

culture of CME fields. Despite the external assumption of privilege due to their Asian and international status, these women confront significant gender stereotypes and discrimination. Their strong STEM identity, fostered through resilience and the pursuit of academic and professional excellence, emerges as a counter to traditional gender norms and a mechanism for navigating the complex landscape of gender and racial inequality in STEM.The research proposes a new conceptual framework integrating the intersectionality of AIS women's identities with the Looking-Glass Self theory, offering a comprehensive understanding of their experiences across different cultural and social contexts. This framework challenges the prevailing deficit thinking about AIS women in CME, emphasizing the complexity and resilience of their identity construction in the face of multifaceted inequalities.Implications of this study are vast, suggesting changes in research, policy, and practice to better support AIS women in STEM. By recognizing the intertwined nature of their gender, foreign, and racial identities, this research calls for a more nuanced approach in academic support, mentorship, and policy formulation to foster an inclusive environment that acknowledges and addresses the unique challenges faced by AIS women in CME fields. CITED: National Center for Science and Engineering Statistics. (2018). Survey of graduate students and postdoctorates in science and engineering. National Science Foundation. Alexandria, VA.

Liera, R. and G. Ortega (2025). "Postdoctoral Scholars of Color and Their Perceptions of Equity-Minded Mentoring Practices." Journal of Diversity in Higher Education: 12.

Postdoctoral positions have become prominent as a next step for aspiring tenure-track faculty members. Postdoctoral positions provide postdocs with opportunities to become independent researchers, including leading large, grant-funded research projects, publishing, and writing grant proposals. However, postdocs of color often encounter challenges accessing quality mentorship. Thus, we designed this study to understand the mentoring practices postdocs of color perceived as equitable and ethical. We applied Griffin's equity-minded mentoring model to analyze interview data from 15 faculty members of color who had postdoctoral positions before becoming tenure-track faculty. We found that when postdocs of color perceived their supervisors as collegial and trusting, they described their postdoctoral experiences as equitable and ethical as they prepare for tenure-track faculty careers. Equity-minded mentoring seemed to facilitate developmental relationships, considering the racialized and gendered dynamics that postdocs of color could encounter as tenure-track faculty members. Our findings suggest that administrative leaders, faculty, and postdoctoral program offices could transform postdoctoral training to be more equitable and ethical, specifically for postdocs of color. CITED: National Center for Science and Engineering Statistics. (2024). Survey of graduate students and postdoctorates in science and engineering: 2022. National Science Foundation. https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2022#data

Lo, B. K., et al. (2024). "Examining the associations between mental health, life balance, work-method autonomy, and perceived boundary control among postdoctoral fellows." Frontiers in Psychology 15: 10.

High mental health risks and life imbalance among postdoctoral fellows (postdocs) are persistent concerns in academia. However, little is known about the relationship between these two subjects and whether autonomy at work is linked to life balance among postdocs. Online survey responses from 117 postdocs (59% women; 49% non-Hispanic white) were assessed using multiple linear regression analysis to examine whether the work-method autonomy and perceived boundary control of postdocs were linked to life balance. Additionally, logistic regression analysis was used to examine whether postdocs who reported better life balance had lower risks of reporting mood disorder symptoms. We found that 39%, 27%, and 45% of postdocs reported anxiety, depressive, and anxiety-or-depressive disorder symptoms, respectively. Both work-method autonomy and perceived boundary control were positively associated with life balance [B = 0.40, 95% CI = [0.20-0.60]; B = 0.50, 95% CI = [0.32-0.67], respectively]. Postdocs with greater life balance had decreased odds of reporting mood disorder symptoms [anxiety disorder symptoms: adjusted OR = 0.55, 95% CI = (0.37-0.82); depressive disorder symptoms: adjusted OR = 0.31, 95% CI = (0.18-0.55); anxiety-or-depressive disorder symptoms: adjusted OR = 0.42, 95% CI = (0.27-0.65)]. Postdocs' mental health appeared to be influenced by life balance, which may be enhanced by providing work-method autonomy and increasing perceived boundary control. CITED: National Center for Science and Engineering Statistics (2024). Survey of Graduate Students and Postdoctorates in Science and Engineering. Alexandria, VA. Available at: https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2022 (accessed March 31, 2024).

Majumdar, S. (2025). "America’s Brain Drain: International Scientists and the Shifting Global Landscape." International Higher Education(125): 13-14.

Despite their central role in US research and innovation, international doctoral students now face significant instability, as restrictive immigration policies, declining research funding, and an unwelcoming climate push international scientists to seek careers abroad. Competing nations are seizing the moment through targeted recruitment of scientific talent and funding incentives. Without reform, the United States risks ceding its long-held edge in science and technology to global competitors.... According to the 2023 NSF Survey of Graduate Students and Postdoctorates in Science and Engineering, the international graduate student population (master degrees and PhDs) has grown sixfold over the past forty years, from 13.7 percent (50,302) in 1980 to 39.4 percent (322,287) in 2023. Among STEM PhD students specifically, 40.7 percent (125,030) were on temporary visas in 2023. Postdoctoral appointments are even more dependent on international talent: 57.9 percent (38,149) were international in 2023, compared with 35.4 percent (6,506) in 1980....

Majumdar, S. (2025). **BOOK** "Thriving as an International Scientist: Professional Development for Global STEM Citizens", University of California Press.

The first career guide specifically tailored to the unique needs of international STEM PhDs For foreign-born scientists holding temporary visas in the US, building a career while navigating the antiquated and restrictive American immigration system takes resilience and creativity.

In this book, Sonali Majumdar, a fellow immigrant scientist and a professional development advisor for international doctoral students in engineering and the natural sciences, shares her expertise of how international scientists can be empowered to flourish in any career. Unlike other professional development guides, Thriving as an International Scientist foregrounds the unique needs and skills of immigrant STEM PhDs at all career stages and across diverse sectors. Through recommendations for best practices of professional development and career design as well as stories of international scientists, this book also provides concrete, culturally appropriate tools for managers, faculty advisors, and other mentors. With a combination of hard-nosed advice and nurturing encouragement, Majumdar delivers a much-needed guide to help these often overlooked scientists forge a successful career path. © 2025 by Sonali Majumdar. CITED: National Center for Science and Engineering Statistics (NCSES). 2025. “Survey of Graduate Students and Postdoctorates in Science and Engineering: Fall 2023.” NSF 25-317. https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2023.

Marcia, M. (2024). "Keeping America 'Science Strong'." Proceedings of the National Academy of Sciences 121(40): e2417071121.

CITED: National Center for Science and Engineering Statistics (NCSES), “Survey of graduate students and postdoctorates in science and engineering” (NSF 24-319, National Science Foundation, Alexandria, VA, 2024). https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2022

Martin, C. L., et al. (2025). **REPORT** "Science Philanthropy Indicators Report 2025." Science Philanthropy Alliance https://indicators.sciphil.org/.

...Graduate Students and Postdocs: The primary data source for this section is the NSF National Center for Science & Engineering Statistics Survey of Graduate Students and Postdoctorates in Science and Engineering. We combine the most recent survey data release (FY 2024, published in February 2026) with historical survey data for all full-time graduate students (1980-2024), doctoral students only (2017-2024), master’s students only (2017-2024), and postdocs (2010-2024) in science, engineering, and health fields. Part-time students are excluded in our analysis. We combine the data for science and health fields under the discipline “Science.”...

McGee, E. O., et al. (2024). **CONFERENCE PAPER** "Unveiling Demographic Influences and Differential Career Preferences among Engineering Graduate Students: A Comparative Analysis of Mechanical, Electrical, and Computer Engineers." Proceedings of the ASEE Annual Conference & Exposition: 1-23.

In the last decade, engineering education has undergone significant transformation, with mechanical, electrical, and computer engineering emerging as the most popular and fastestgrowing engineering disciplines. However, there is a significant gap in the literature on how engineers from these disciplines differ in career trajectories and attitudes, especially regarding race and gender diversity. Existing research emphasizes the unique social dynamics within specific engineering fields and their potential to attract diverse students and support varied career paths (Brawner et al., 2012). To probe these distinctions, our study, grounded in Social Cognitive Career Theory (SCCT; Lent et al., 1994) and

Critical Race Theory (CRT; Crenshaw et al., 1995), investigates the career pathways and attitudes of engineering graduate students. Leveraging a dataset of 847 engineering graduate students, we examine differences across these three engineering disciplines and the impact of demographic factors like race and gender on career decisions and attitudes. Findings suggest that clear demographic distinctions emerged at the intersection of race and gender: female students across all disciplines displayed a greater preference for nonprofit careers compared to their male counterparts, while underrepresented racially minoritized (URM, that is Blacks or African Americans, Hispanics or Latinx, and American Indians or Alaska Natives) students exhibited a stronger inclination toward entrepreneurial endeavors than their non-URM, that is White and Asian, peers. Even after accounting for these demographic variables, it is noteworthy that computer engineering students exhibited a higher level of interest in nonprofit positions and careers in K-12 education compared to their counterparts in mechanical and electrical engineering. Disparities in attitudes were also observed; URMs were more concerned with racial justice issues and experienced greater racerelated stress. Similarly, computer engineering students were more involved in racial justice activities. These findings underscore the complex interaction of demographic and disciplinary differences and the unique position of computer engineering in promoting social justice interests. This study contributes to the broader discourse on engineering education, providing valuable insights into its evolving landscape while also highlighting the necessity for further research to explore the specific factors within computer engineering that might encourage greater diversity and social justice initiatives....Moreover, a nuanced understanding of the impact of U.S. citizenship status is important given the findings from the National Science Foundation Survey of Graduate Students and Postdoctorates in Science and Engineering (2019) that revealed that a substantial portion, exceeding 50%, of graduate students in engineering fields are international students....

Mendez, S. L. and K. Watson (2023). **CONFERENCE PAPER** "Why STEM? The External Factors Influencing International STEM Postdoctoral Scholars' Career Decision". ASEE Annual Conference and Exposition, Conference Proceedings, American Society for Engineering Education.

This research paper explores the external factors that influence international STEM postdoctoral scholars to pursue a career in science, technology, engineering, and mathematics (STEM). Understanding these factors may be critical as the U.S. grapples with the need to broaden and diversify participation in the global STEM workforce. Duffy and Dik (2009) identified four key external factors that influence a person's career decision: (1) family expectations and needs, (2) life circumstances, (3) spiritual and religious reasons, and (4) social service motivations. Using an instrumental case study design (Stake, 1995), interviews with 20 international STEM postdoctoral scholars occurred to explore the external factors that influenced their STEM career decision deductively. Three themes emerged: (1) parents were highly encouraging, (2) a love of science was nurtured in school, and (3) they were eager to engage in and promote scientific innovation. These findings illustrate the ways in which family, schools, and community influence the STEM career trajectories of international postdoctoral scholars. This knowledge base can be valuable when seeking to recruit and

retain them in the U.S. STEM workforce. The identified factors also could be particularly instructive to U.S. primary and secondary school teachers and administrators, as well as U.S. higher education faculty. © American Society for Engineering Education, 2023. CITED: National Center for Science and Engineering Statistics (NCSES). (2023). Survey of Graduate Students and Postdoctorates in Science and Engineering (NSF 23-312). National Science Foundation. https://ncses.nsf.gov/pubs/nsf23312.

Milliken, L. and J. Neufeld (2024). **REPORT** "PRACTICAL WAYS TO MODERNIZE THE SCHEDULE A LIST: An analysis of responses to the Department of Labor's recent Request for Information." IFP https://ifp.org/schedule-a-comments-analysis/.

CITED: National Center for Science and Engineering Statistics (NCSES), Survey of Graduate Students and Post Doctorates in Science and Engineering, Table 2-4, Graduate students in science, engineering, and health broad fields, by degree program, citizenship, ethnicity, and race: 2021 (2023), https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2021#surveyinfo.

Muro, M. and S. Methkupally (2025). **REPORT** "Mapping the AI economy: Which regions are ready for the next technological leap?" Brookings https://www.brookings.edu/wp-content/uploads/2025/06/Mapping-AI-readiness-final.pdf.

...Part-time and full-time post-doctorate researchers in Computer and Information Science Fields (GSS codes 410 to 416), Mathematics and Statistics Fields (GSS codes 403 to 405), and Engineering Fields (Select GSS codes between 101 and 116) enrolled at an institution from the Survey of Graduate Students and Postdoctorates in Science and Engineering, 2023. ...

National Academies of Sciences, E., et al. (2025). **REPORT** "Transforming Undergraduate STEM Education : Supporting Equitable and Effective Teaching". Washington, DC, National Academies Press.

Society will not fully benefit from development and use of future discoveries and innovations if we do not provide full access and opportunity to engage in effective STEM education - and we may lack the information, tools, and resources needed to address future challenges facing our planet. Commonly used methods of teaching undergraduate STEM education benefit only a relatively small percentage of learners, leading many to choose not to enroll in STEM courses or pursue STEM careers. This trend severely limits participation in the STEM careers that play a critical role in our nation's prosperity. High quality instruction, learning, and engagement in STEM should be a key priority for colleges and universities across the United States. Transforming Undergraduate STEM Education: Supporting Equitable and Effective Teaching calls on leaders of institutions and academic units, instructors, and other stakeholders to leverage their important roles to improve the landscape of undergraduate STEM education so that all students can thrive. As one step toward addressing inequities and transforming undergraduate STEM education, this report presents a set of Principles for Equitable and Effective Teaching. These Principles provide guidance for instruction that draw on decades of research on teaching, learning and equity. Transforming Undergraduate STEM Education provides guidance for improving teaching and related changes to the institutional context that are needed

to support instructors and enable student-centered undergraduate STEM education. CITED: National Center for Science and Engineering Statistics (NCSES). Survey of Graduate Students and Postdoctorates in Science and Engineering: Fall 2021. National Science Foundation. https://ncses.nsf.gov/pubs/nsf23312

National Academies of Sciences, E., et al. (2023). **REPORT** "Defense Research Capacity at Historically Black Colleges and Universities and Other Minority Institutions : Transitioning From Good Intentions to Measurable Outcomes". Washington, D.C., National Academies Press.

Historically Black Colleges and Universities (HBCUs) and other minority institutions (MIs) represent a valuable resource to expand the Department of Defense's (DoD) government and extramural workforce and science and technology enterprise. The more than 400 public and private HBCUs, Tribal Colleges and Universities, Hispanic-Serving Institutions, and other two- and four-year MIs are positioned to make strong and uniquely important contributions to the defense research enterprise, offering DoD an opportunity to widen its talent pool and diversify STEM research and ultimately strengthen its ability to support national security. Defense Research Capacity at Historically Black Colleges and Universities and Other Minority Institutions examines the status of DoD research at HBCUs and MIs, including the methods and means necessary to advance research capacity at these institutions in order to comprehensively address the national security and defense needs of the United States. This report offers recommendations to guide DoD, Congress, HBCU/MIs, and partnering entities in supporting and strengthening the role of these institutions in defense research. A strategic commitment will translate into increased opportunities for HBCU/MIs to diversify the future American academic, industrial, and government STEM workforce upon which DoD will depend....Additional R&D information was obtained from NSF’s institutional profiles, which are based on surveys such as the Survey of Graduate Students and Postdoctorates in Science and Engineering and the Higher Education and R&D Survey (HERD)....

Nguyen, T. (2024). **DISSERTATION** "Stereotype Threat as a Source of Academic Burden Among International Students: An Exploratory Study", Roberts Wesleyan College (Rochester). Dissertation (Doctor of Psychology).

CITED: National Center for Science and Engineering Statistics (NCSES). 2023. Survey of Graduate Students and Postdoctorates in Science and Engineering. NSF 23-312. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf23312.

Olszewski, T. D., et al. (2024). **REPORT** "Characterizing the Loss of Talent From the U.S. STEM Ecosystem." IDA SCIENCE & TECHNOLOGY POLICY INSTITUTE https://www.ida.org/-/media/feature/publications/c/ch/characterizing-the-loss-of-talent-from-the-us-stem-ecosystem/product-3001891.ashx.

CITED: Source: 2017 through 2021: NSF NCSES. Survey of Graduate Students and Postdoctorates in Science and Engineering.

Orellana, M. A., et al. (2025). "Integrative review in PhD admissions: A case study of efficiently minimizing bias while maximizing the student narrative." PLoS One 20(6): 12.

Developing scientific and medical innovations continue to be limited by lack of diverse representation among leaders and learners. One key gateway for these goals is graduate school admissions, but comprehensive consideration of all components of applications, which is needed to reduce systemic bias in admissions, is resource intensive. This case study details the conceptualization of an integrative application review process to challenge and improve classic application review frameworks which gatekeep admissions opportunities from under-represented (UR) applicants. PhD applicant cohorts to a longstanding Clinical and Translational Sciences PhD TL1 program were assessed using one of three review processes: traditional, algorithmic, or a novel integrative review process. Admissions results from each review process were pooled across matriculation years to attain a testable sample size. Effects modification models were used to assess odds of reaching each admissions phase, adjusting for UR status and review process. Results showed that classic admissions review processes were prone to bias towards admission of specific students while integrative application review did not demonstrate this trend. The Mayo Clinic Graduate School of Biomedical Sciences Clinical and Translational Sciences training program has steadily recruited and trained successful and diverse trainee cohorts over the last decade from many underrepresented backgrounds. The final adoption of an integrative application review process allows streamlined graduate school admissions of diverse student cohorts, prioritizing self-driven narratives and minimizing subjective biases where possible to allow fair assessment of learners. CITED: National Center for Science and Engineering Statistics NCSES. Survey of graduate students and postdoctorates in science and engineering. National Science Foundation; 2023.

Oyerinde, I. A. (2023). **DISSERTATION** "Assessment of Youth-Friendly Health Services and Quality from Users' Perspectives." United States -- Alabama, The University of Alabama: 54.

BackgroundYouth-Friendly Health Services (YFHS) are one of those services recommended by the World Health Organization (WHO) to address adolescent and young people's sexual health needs. YFHS are sexual and reproductive health services that are accessible, acceptable, appropriate, effective, and equitable for young people. Therefore, this study aims to assess the utilization and perceived quality of Youth-Friendly Health Services among the users.MethodThe study design was descriptive cross-sectional. A total of 122 respondents from the University of Alabama, Tuscaloosa, were recruited and sampled using a validated semi-structured self-administered questionnaire to collect data.ResultsOf the 122 participants recruited, 5 were excluded due to age, and 117 respondents aged 18 – 24 were included for further analysis of this study. The 117 respondents were 59.8% males and 40.2% females; 87.2% were heterosexual, 53.8% were from urban areas, and 65.8% were living with both parents. The majority (72.6%) were from middle-income families, 17.1% from low-income, and 9.4% from high-income families. This study revealed low awareness (17.9%) and low utilization (11.1%) of YFHS among young people. About 15.4% of those who ever visited the school health center (SHC) for YFHS rated the service as good, 53.8% were comfortable going to SHC for YFHS, 30.8% were comfortable discussing their sexuality with the healthcare provider, 38.5% were extremely satisfied with the services received. The quality of service from the

users’ perspective was low. Factors associated with the utilization of YHFS include gender, family income, accessibility, and appropriateness of the YFHS at a statistically significant value of p<0.001, 0.018, 0.046, and 0.048, respectively.ConclusionsAwareness and utilization of YFHS in this study were relatively low. The quality of YFHS provided at the student health center did not meet all the five components of YFHS. More than half of the users perceived the YFHS at the school health center as inaccessible and unacceptable. Awareness of YFHS should be aired in the university through health promotion, health education programs, and sharing of media materials. Also, campus-wide health interventions, campaigns, and outreach should be organized to increase the health-seeking behavior of young people. Policymakers and health advocate should formulate and strategically implement policies to improve the quality of YFHS provided at the health center. CITED: National Science Foundation Survey of Graduate Students and Postdoctorates in Science and Engineering, Public Use Microdata files, National Foundation for American Policy. U.S. students include lawful permanent residents. Nsfs, Forbes 2021

Perez, R. J., et al. (2023). "(Mis)Alignment of Challenges and Strategies in Promoting Inclusive Racial Climates in STEM Graduate Departments." AERA Open 9.

This descriptive qualitative study used racialized organizations (Ray, 2019) as a lens to examine how 27 faculty, administrators, and postdoctoral fellows in STEM departments at two institutions understood the problems that underlie negative racial climate, the strategies they used to improve racial climate, and the alignment between problems and solutions. Participants did not discuss racism and White supremacy as factors that contribute to negative racial climate. Instead, they indicated a weak STEM pipeline, and lack of faculty engagement created negative climate. Because participants did not attend to how racism and White supremacy fostered negative climate, their strategies (e.g., increased recruitment, committees, workshops) left systemic racism intact and (un)intentionally amplified labor for racially minoritized graduate students and faculty champions who often led change efforts with little support. These findings can help move departments away from intervention-centered models of change and toward more systemic approaches that contest how racialized organizations operate. © The Author(s) 2023. CITED: National Science Foundation. (2020). National Center for Science and Engineering Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering. https://ncsesdata.nsf.gov/gradpostdoc/2016/html/GSS2016_DST_16.html

Phelps, S. O. (2025). **DISSERTATION** "Breaking Barriers, Building Futures: African American Women's Persistence in STEM Graduate Programs". Department of Instructional Support Programs, Alabama State University. Dissertation (Doctor of Philosophy).

CITED: National Center for Science and Engineering Statistics. (2025). Survey of Graduate Students and Postdoctorates in Science and Engineering: Fall 2023 (NSF 25-317). https://ncses.nsf.gov/pubs/nsf25317 AND National Center for Science and Engineering Statistics. (2022). Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS). https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2022

Rhoades, G. (2023). "Postdoc Identity, Jurisdictional Issues, Ideologies, and Unions: Considerations in Organizing Professionals." Labor Studies Journal 48(2): 101-120.

This study of U.S. postdocs and unions analyzes the public discourse of national entities, a national postdoc advocacy group, and of local postdoc unions and their collective bargaining agreements. The analytical focus and findings address: (a) postdocs' identity as "professors-in-training" or exploited employees; (b) the professional jurisdictional issues and due process rights identified as problematic and on which postdocs' bargaining is focused; and (c) broader ideologies and social justice issues that characterize postdocs' working conditions and that inform their mobilizing. The findings offer insights into organizing professionals in a time when their status/work is being degraded. © 2023 UALE. CITED: NSF. 2017. National Center for Science and Engineering Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering. Arlington, VA: National Science Foundation. AND NSF. 2019. National Center for Science and Engineering Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering, NSF, 21–318. Arlington, VA: National Science Foundation.

Rosinger, K., et al. (2026). "Reconstructing PhD Admissions Through Organizational Learning." Journal of Higher Education 97(1): 22-57.

The goal of this study was to assess the outcomes of a grant-funded intervention designed to provide comprehensive training and support for holistic admissions in 26 STEM PhD programs at five California research universities. This pilot intervention combined a flexible, research-based model of holistic review, training for faculty involved with admissions, and informal coaching in how to critically analyze and redesign their admissions processes. Using a theoretical framework centered on organizational learning as a mechanism of equity-minded change, we assessed evidence of learning in two ways: 1) adoption of admissions practices that align with a new paradigm, and 2) changes in the racial and gender composition of applicants, admits, and enrollees. Drawing on administrative and survey data from participating programs, we find evidence suggestive of positive, sustained changes in both adoption of new admissions practices and racial diversity. This indicates that systemic, scaffolded approaches may promote more equitable processes and outcomes in the graduate and professional education context. CITED: Survey of Graduate Students and Postdoctorates in Science and Engineering. (2022). National center for science and engineering statistics. https://ncses.nsf.gov/surveys/graduate-students

Rotjan, R. D., et al. (2023). "COBRA Master Class: Providing deep-sea expedition leadership training to accelerate early career advancement." Frontiers in Marine Science 10.

Leading deep-sea research expeditions requires a breadth of training and experience, and the opportunities for Early Career Researchers (ECRs) to obtain focused mentorship on expedition leadership are scarce. To address the need for leadership training in deep-sea expeditionary science, the Crustal Ocean Biosphere Research Accelerator (COBRA) launched a 14-week virtual Master Class with both synchronous and asynchronous components to empower students with the skills and tools to successfully design, propose, and execute deep-sea oceanographic field

research. The Master Class offered customized and distributed training approaches and created an open-access syllabus with resources, including reading material, lectures, and on-line resources freely-available on the Master Class website (cobra.pubpub.org). All students were Early Career Researchers (ECRs, defined here as advanced graduate students, postdoctoral scientists, early career faculty, or individuals with substantial industry, government, or NGO experience) and designated throughout as COBRA Fellows. Fellows engaged in topics related to choosing the appropriate deep-sea research asset for their Capstone "dream cruise" project, learning about funding sources and how to tailor proposals to meet those source requirements, and working through an essential checklist of pre-expedition planning and operations. The Master Class covered leading an expedition at sea, at-sea operations, and ship-board etiquette, and the strengths and challenges of telepresence. It also included post-expedition training on data management strategies and report preparation and outputs. Throughout the Master Class, Fellows also discussed education and outreach, international ocean law and policy, and the importance and challenges of team science. Fellows further learned about how to develop concepts respectfully with regard to geographic and cultural considerations of their intended study sites. An assessment of initial outcomes from the first iteration of the COBRA Master Class reinforces the need for such training and shows great promise with one-quarter of the Fellows having submitted a research proposal to national funding agencies within six months of the end of the class. As deep-sea research continues to accelerate in scope and speed, providing equitable access to expedition training is a top priority to enable the next generation of deep-sea science leadership. Copyright © 2023 Rotjan, Bell, Huber, Wheat, Fisher, Sylvan, McManus, Bigham, Cambronero-Solano, Cordier, Goode, Leonard, Murdock, Paula, Ponsoni, Roa-Varón, Seabrook, Shomberg, Van Audenhaege and Orcutt. CITED: National Center for Science and Engineering Statistics (NCSES) (2022). Survey of Graduate Students and Postdoctorates in Science and Engineering. NSF 22-319 (Alexandria, VA: National Science Foundation). Available at: https://ncses.nsf.gov/pubs/nsf22319/

Rushing, S. M. (2024). **DISSERTATION** "A Quantitative Study Examining African American and Other Historically Underrepresented Racial Minority Undergraduate Stem Students' Persistence at a Four-Year Institution", Hampton University. Dissertation (Doctor of Philosophy).

CITED: National Center for Science and Engineering Statistics. (2021b). Survey of Graduate Students and Postdoctorates in Science and Engineering: Fall 2019 (GSS 2019). NSF 21-318. Alexandria, VA: National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf21318.

Saade, E. (2025). **DISSERTATION** "Understanding the Mentorship Experiences of Underrepresented Minority STEM Leaders". United States -- California, Pepperdine University: 187.

There is a growing need to diversify the science, technology, engineering, and math (STEM) workforce to better address complex societal challenges and drive innovation. However, persistent disparities limit the retention and advancement of underrepresented minorities (URMs) as leaders in STEM. Mentorship has emerged as a promising practice to address these challenges, yet a gap in the literature remains regarding the impact mentorship had on URM STEM leaders' personal and professional

development. This study responds to that gap by exploring the lived experiences of URM STEM leaders and their perceptions of how mentorship shaped their career development, psychosocial growth, and identity formation. Guided by Kram’s (1985) mentor role theory and culturally responsive mentorship (CRM), the researcher conducted a qualitative phenomenological study to better understand these experiences.The study sample included 11 URM STEM leaders residing in the United States. Based on semi-structured interviews, eight themes emerged related to career and psychosocial development, cultural identity and meaningful alignment, and the role of mentorship on establishing a STEM identity. Upon review of the themes and literature, four study conclusions were developed: (a) trust-based mentorship enables honest dialogue, lifelong connections, and meaningful personal and professional growth; (b) an identity-centered approach yields more authentic, effective, and affirming mentorship experiences; (c) cultural identity and meaningful alignment are key factors in mentor selection; and (d) mentorship plays a crucial role in shaping URMs' STEM identity. These four study conclusions highlight the necessity of adopting an identity-centered approach to enable effective mentorship for URMs in STEM. As a result, this study builds upon Kram’s (1985) mentor role theory by proposing a foundational component—referred to as the identity-centered foundation—that precedes and strengthens the traditional career and psychosocial functions of mentorship. CITED: National Center for Science and Engineering Statistics. (2023b). Survey of graduate students and postdoctorates in science and engineering (NSF 23-312). National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf23312

Sarraju, A., et al. (2023). "The leaky pipeline of diverse race and ethnicity representation in academic science and technology training in the United States, 2003-2019." PLoS One 18(4): e0284945.

INTRODUCTION: Diverse race and ethnicity representation remains lacking in science and technology (S&T) careers in the United States (US). Due to systematic barriers across S&T training stages, there may be sequential loss of diverse representation leading to low representation, often conceptualized as a leaky pipeline. We aimed to quantify the contemporary leaky pipeline of S&T training in the US. METHODS: We analyzed US S&T degree data, stratified by sex and then by race or ethnicity, obtained from survey data the National Science Foundation and the National Center for Science and Engineering Statistics. We assessed changes in race and ethnicity representation in 2019 at two major S&T transition points: bachelor to doctorate degrees (2003-2019) and doctorate degrees to postdoctoral positions (2010-2019). We quantified representation changes at each point as the ratio of representation in the later stage to earlier stage (representation ratio [RR]). We assessed secular trends in the representation ratio through univariate linear regression. RESULTS: For 2019, the survey data included for bachelor degrees, 12,714,921 men and 10.612,879 women; for doctorate degrees 14,259 men and 12,860 women; and for postdoctoral data, 11,361 men and 8.672 women. In 2019, we observed that Black, Asian, and Hispanic women had comparable loss of representation among women in the bachelor to doctorate transition (RR 0.86, 95% confidence interval [CI] 0.81-0.92; RR 0.85, 95% CI 0.81-0.89; and RR 0.82, 95% CI 0.77-0.87, respectively), while among men, Black and Asian men had the greatest loss of representation (Black men RR 0.72, 95% CI 0.66-0.78; Asian men RR 0.73,

95% CI 0.70-0.77)]. We observed that Black men (RR 0.60, 95% CI 0.51-0.69) and Black women (RR 0.56, 95% CI 0.49-0.63) experienced the greatest loss of representation among men and women, respectively, in the doctorate to postdoctoral transition. Black women had a statistically significant decrease in their representation ratio in the doctorate to postdoctoral transition from 2010 to 2019 (p-trend = 0.02). CONCLUSION: We quantified diverse race and ethnicity representation in contemporary US S&T training and found that Black men and women experienced the most consistent loss in representation across the S&T training pipeline. Findings should spur efforts to mitigate the structural racism and systemic barriers underpinning such disparities....We obtained cross-sectional 2003–2019 S&T (which included all reported science and engi neering fields) degree data from the National Science Foundation and the National Center for Science and Engineering Statistics which was comprised of findings from the National Survey of College Graduates, the Survey of Doctorate Recipients, and the Survey of Graduate Students and Postdoctorates in Science and Engineering (2010–2019)....

Schaller, M. D. (2023). "Research productivity and training support for doctoral students in the biological and biomedical sciences." Faseb Bioadvances 5(3): 131-148.

Training of doctoral students as part of the next generation of the biomedical workforce is essential for sustaining the scientific enterprise in the United States. Training primarily occurs at institutions of higher education, and these trainees comprise an important part of the workforce at these institutions. Federal investment in the support of doctoral students in the biological and biomedical sciences is distributed differently than the distribution of students across different types of institutions, for example, public vs private. Institutions in states that historically receive less federal support for research also receive less support for doctoral student training. Doctorates at different types of institution exhibit little difference in research productivity, with the exception of citations, and subsequent receipt of additional NIH awards. Thus, training outcomes, which are related to the quality of the student and training environment, are similar across different institutions. Research productivity of doctoral students does not correlate with the number of F31s awarded to an institution. Factors that correlate with F31 funding include R01 funding levels and program size. The findings suggest strategies for institutions to increase success at securing F31s and modification of policy to promote more equitable distribution of F31s across institutions. CITED: National Center for Science and Engineering Statistics (NCSES). Survey of Graduate Students and Postdoctorates in Science and Engineering: Fall 2019. Alexandria; 2021. National Center for Science and Engineering Statistics. (1985–2019) Survey of Graduate Students and Postdoctorates in Science and Engineering. National Science Foundation.

Sedlacek, Q. C., et al. (2025). "STEM Disciplines are More Diverse Than Undergraduate Courses Depict." Science & Education: 37.

College STEM curricula that depict scholars with marginalized identities could benefit students by disrupting pervasive and harmful stereotypes. Textbook analyses suggest that this potential has not yet been realized. However, textbook analyses do not present a complete picture of curricula, which also include slide presentations,

assignments, lectures, and other materials. Given the methodological challenge of capturing depictions of marginalized scholars across complete curricula, a survey of college STEM instructors-asking them to holistically evaluate depictions of diversity throughout their curricula-could provide a valuable complement to past textbook analysis research. We surveyed STEM instructors at large US universities (final n = 712 at 57 institutions), asking them to estimate the percentages of individual scholars depicted in their undergraduate STEM courses who are scholars of color, women, or LGBTQ + . We compared responses with the demographics of recent Ph.D. recipients in corresponding STEM disciplines using data collected by the US government through its Survey of Earned Doctorates (SED), an annual census of Ph.D. recipients in the USA. Based on conservative interpretations of SED data and instructors' estimates, we find undergraduate courses in biology, computer science, and engineering tend to under-depict scholars of color, while courses in agriculture, biology, and health sciences tend to under-depict women (compared to the percentages of scholars of color and women among recent doctoral recipients in these disciplines). Although the SED has to date gathered limited data about LGBTQ + identities, we find evidence that LGBTQ + scholars might be under-depicted as well, with the lowest rates of depiction in chemistry and engineering. CITED: National Science Foundation National Center for Science and Engineering Statistics (NSF NCSES). (2021b). Survey of Graduate Students and Postdoctorates in Science and Engineering. https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2021

Shvadron, D. (2024). **DISSERTATION** "Essays on Corporate Science and Firms' Interactions With Academia". United States -- North Carolina, Duke University: 298.

Corporate science plays a critical role in the modern research landscape, with firms making substantial investments in internal research and development and engaging extensively with academic institutions. Understanding the dynamics that drive corporate participation in scientific research is crucial for fostering innovation and technological progress. This dissertation explores the complex factors that shape firms' incentives to invest in science and the outcomes resulting from their engagement with the broader academic community.The first study examines how firms' ability to capture value from their scientific investments influences their incentives to conduct additional research. By exploiting an exogenous reduction in patent protection, I find that firms respond to weaker intellectual property rights by reducing subsequent research in affected areas, particularly in areas with thinner markets for technology. This suggests that patents and commercialization capabilities act as strategic substitutes. The results imply that stronger patents encourage corporate research but also shift the locus of research from larger to smaller firms and startups.Shifting the focus outside the firm, the second study investigates why firms produce scientific research and share it publicly. Using data on corporate publications between 1990 and 2012, I show that external scientists build upon firms' research, producing findings that firms subsequently incorporate into their own innovations. To account for potential bias arising from the unobserved quality of the underlying science, I develop an instrumental variable based on the quasi-random assignment of manuscripts to journal issues. The results reveal that follow-on research

by external scientists drives firms’ subsequent scientific investments and patenting outcomes, with benefits being more pronounced for technological leaders, firms with complementary assets, and those in emerging fields. Moreover, follow-on research serves to validate the quality of firms’ science, which is particularly valuable when there is greater uncertainty surrounding the research.The third study introduces DISCERN 2.0, a major update and extension of the DISCERN dataset, which tracks the innovative output of U.S. public firms over the past four decades. The new version incorporates several key improvements, including extended coverage to 2021, the adoption of PatentsView and OpenAlex as primary data sources, and the inclusion of pre-grant patent applications and patent reassignment information. These enhancements enable researchers to investigate emerging trends and dynamic effects in corporate research and invention. An analysis of trends using DISCERN 2.0 reveals significant increases in corporate scientific publications related to quantum computing, AI, and robotics, highlighting the growing investments and prominent role of large firms in advancing these science-based technologies.The final chapter focuses on the funding of scientific training in the United States. Using a comprehensive dataset spanning 75 years of doctoral dissertations, I examine the sources of financial support for PhD students, the fields they pursue, and how funding patterns have evolved over time. The analysis reveals significant shifts in funding sources, particularly within the government and private sectors, and highlights the substantial impact of different funding organizations’ scale and subject matter priorities on the share of U.S. PhD graduates in specific fields. Notably, government funding plays a crucial role in determining the annual number of scientists produced by the U.S. higher education system, with an average of 80 additional domestic PhD graduates for every 100 dissertations funded.Collectively, these studies contribute to our understanding of the key drivers of corporate scientific research and innovation. They underscore the importance of intellectual property protection, engagement with the broader scientific community, and the role of funding in shaping the scientific workforce. By providing ne insights and valuable data resources, this dissertation lays the groundwork for further research on the dynamics of corporate science and its impact on technological progress. Ultimately, the findings presented here have important implications for firms seeking to optimize their R&D strategies and for policymakers aiming to foster an environment conducive to scientific advancement and economic growth. CITED: National Science Foundation. (2022). Survey of graduate students and postdoctorates in science and engineering (gss) [Available at https://ncses.nsf.gov/surveys/graduatestudents-postdoctorates-s-e/2022].

Shvadron, D., et al. (2025). **WORKING PAPER** "Funding the U.S. Scientific Training Ecosystem: New Data, Methods, and Evidence." NBER Working Papers(33868-33974): 1-41.

CITED: National Science Foundation. 2022. Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS). Available at https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2022.

Simon, M., et al. (2023). **BOOK** "Assessing the Contributions of Higher Education : Knowledge for a Disordered World". Northampton, Edward Elgar Publishing.

Despite the broad engagement of higher education institutions in most social sectors, limited thinking and hyper-individualistic approaches have dominated discussions of their value to society. Advocating a more rigorous and comprehensive approach, this insightful book discusses the broad range of contributions made by higher education and the many issues entailed in theorising, observing, measuring and evaluating those contributions.Prepared by a group of leading international scholars, the chapters investigate the multiple interconnections between higher education and society and the vast range of social, economic, political and cultural functions carried out by universities, colleges and institutes and their personnel. The benefits of higher education include employable graduates, new knowledge via research and scholarship, climate science and global connections, and the structuring of economic and social opportunities for whole populations, as well as work and advice for government at all levels. Higher education not only lifts earnings and augments careers, it also immerses students in knowledge, helps to shape them as people, and fosters productivity, democracy, tolerance and international understanding. The book highlights the value added by higher education for persons, organisations, communities, cities, nations, and the world. It also focuses on inequalities in the distribution of that value, and finds that the tools for assessing higher education are neither adequate nor complete as yet.International and interdisciplinary in scope, this book will prove an invaluable resource to students and scholars of higher education, educational policy and social policy. It will also prove a useful resource to both university executives and tertiary education policymakers who want to make higher education more effectively accountable to the public. CITED: National Center for Science and Engineering Statistics (NCES). (2018). Survey of graduate students and postdoctorates in science and engineering. http://ncsesdata.nsf.gov/gradpostdoc/

Sims, R., et al. (2025). **CONFERENCE PAPER** "Piloting the EMPOWERS Program: Inaugurating Student-Centered Holistic Mentorship for STEM Practitioners in Academia". ASEE Annual Conference and Exposition, Conference Proceedings, American Society for Engineering Education.

Attention to mental health and inclusion are critical for the retention and success of STEM graduate students. Faculty advisors are key to fostering these essential aspects of the graduate experience within the academic system. However, most faculty advisors are unaware of how to mentor holistically (considering students' mental, physical, and emotional well-being in addition to their academic work) to benefit their students and themselves. At the same time, graduate students are often unaware of how to approach their faculty advisors in a respectable yet firm manner. At Clemson University, the EMPOWERS (Evaluating Mentoring Practices for Optimal Work-life balance in Education and Research in STEM graduate studies) program trains faculty advisors on how to mentor using evidence-based techniques and to promote the mental, physical and emotional well-being of their graduate students. Within EMPOWERS, faculty and graduate student mentors learn key aspects of holistic mentoring--a comprehensive bidirectional approach to mentorship that integrates career

and psychosocial support to foster a supportive relationship promoting personal and professional enrichment--from modules developed by University facultyThis graduate student-centered, mixed-methods study focuses on our initial research and evaluation efforts of EMPOWERS through three piloted instruments: 1) We examine the results of a piloted graduate student mental health, well-being, and inclusion survey, 2) We explore quantitative and qualitative results of an evaluation survey, and 3) We present the results of interviews with EMPOWERS graduate student participants on their mentoring self-efficacy. Results from our pilot study will ultimately culminate in two surveys and one interview protocol intended for use in future EMPOWERS work to measure changes in graduate students' perceptions of personal well-being, self-efficacy, and inclusion. Additionally, the long-lasting effects of this program and study aim to provide practical and holistic mentoring training for both faculty and graduate students broadly throughout STEM. © American Society for Engineering Education, 2025. CITED: National Science Foundation, “Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS) 2022,” Fall 2022. Accessed: Mar. 22, 2024. [Online]. Available: https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2022

Singh, N. C., et al. (2025). "A new education agenda based on The International Science and Evidence Based Education Assessment." npj Science of Learning 10(1).

The International Science and Evidence Based Education Assessment examined whether current education systems develop each person’s full potential (aligned with the UN Declaration of Human Rights) and contribute to Sustainable Development Goal 4. Embracing a multidisciplinary approach, nearly 300 scientists from 45 countries conducted the assessment, calling for a shift in education’s focus from economic growth to fostering human flourishing. Key findings included (a) the need for an integrative approach to learning, (b) moving beyond meritocracy and exploring potentiality as a better measure of student learning potential, and (c) using technology judiciously for scalable, equitable, and personalised learning. This paper seeks to highlight themes that were foundational to the assessment but not fully discussed within it. It advocates a global, transdisciplinary research agenda to close evidence gaps and inform policy to consider the complexity of the educational system and the need to think beyond existing conventions....Source - National Center for Science and Engineering Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering, 2021. The figure shows the underrepresentation of Hispanic, Black, and Native American students in science and engineering graduate pro grammes at master’s and doctoral level in the United States (https://ncses.nsf.gov/ pubs/nsf23315/report/graduate-enrolment-in-science-and-engineering)....

Solomon, E. D., et al. (2025). "Seeking help as a strategy for ethical and professional decision-making in research: Perspectives of researchers from East Asia and the United States." Accountability in Research-Ethics Integrity and Policy 32(6): 963-985.

Background: A person's cultural background shapes how they interpret and navigate problems. Given that large numbers of international researchers work and train in the U.S. we sought to better

understand how researchers use the decision-making strategy of seeking help to navigate ethical and professional challenges.Methods: Participants (N = 300) were researchers working or training in the U.S. who were born in East Asia (EA) or born in the U.S. They completed a screening survey; then a subset completed think-aloud interviews (n = 66) focused on how they would respond to three hypothetical research scenarios.Results: Thematic analysis of the transcripts showed that seeking help was a commonly endorsed strategy, with some nuances between groups. Themes included seeking help in the form of getting advice, seeking someone to help solve the problem, and gathering information. Endorsement of the seeking help strategy frequently depended on participants' relationships; desiring to seek help from people they trusted. Notably, EA participants tended to prefer seeking help in ways that avoided reputational harm to others.Conclusion: A better understanding of how researchers from different cultural backgrounds use decision-making strategies can inform how to make educational programs more inclusive and comprehensive to more effectively develop researchers' ethical and professional decision-making skills. CITED: National Science Foundation. 2015. “National Center for Science and Engineering Statistics. Postdoctoral Appointees in Science, Engineering, and Health in All Institutions, by Field: 1979-2015.” Survey of Graduate Students and Postdoctorates in Science and Engineering. https://ncsesdata.nsf.gov/datatables/gradpostdoc/2015/html/GSS2015_DST_27.html

Soto Sullivan, C. M., et al. (2023). "Work–Family Balance Satisfaction of Racially and Ethnically Minoritized Postdoctoral Scholars in the STEM Fields." Journal of Career Development 50(6): 1263-1278.

Postdoctoral scholars encounter challenges as they navigate the gap between graduate school and employment positions, one of which includes the challenge of work–family conflict and balance. We used structural equation modeling to test goal endorsement as a possible cultural moderator of the indirect relationship between work demand and work–family conflict. Results revealed that the indirect effect between work demand and work-family conflict was significant at low, but not high, levels of communal goal endorsement. In turn, work–family conflict was found to be a significant negative predictor of work–family balance satisfaction. Results suggest that minoritized postdoctoral scholars’ high value of communion serves as a protective factor in reducing the deleterious effects of challenging work environments on work–family conflict and satisfaction with work–family balance. Empirical and practical implications of the findings are presented. © The Author(s) 2023. CITED: National Center for Science and Engineering Statistics. (2017). Survey of graduate students and postdoctorates in science and engineering fall 2015. Available at https://ncsesdata.nsf.gov/datatables/gradpostdoc/2015/

Southern, D. E., et al. (2023). "Boundary spanning leadership in community-centered geoscience research." Journal of Geoscience Education 71(4): 553-565.

CITED: National Science Foundation. (2016). Survey of graduate students and postdoctorates in science and engineering. https://ncsesdata.nsf.gov/gradpostdoc/2014/ AND National Science

Foundation. (2018). Survey of graduate students and postdoctorates in science and engineering. https://www.nsf.gov/statistics/srvygradpostdoc/

Srinivasan, J., et al. (2024). "Evaluating a National Biomedical Training Program Using QuantCrit: Revealing Disparities in Research Self-efficacy for Women of Color Undergraduates." CBE Life Sciences Education 23(4).

Program evaluation for interventions aimed at enhancing diversity can fall short when the evaluation unintentionally reifies the exclusion of multiple marginalized student experiences. The present study presents a Quantitative Critical Race Theory (QuantCrit) approach to program evaluation to understand outcomes for Women of Color undergraduates involved in a national biomedical training program called the Building Infrastructure Leading to Diversity (BUILD) initiative. Using longitudinal data, we examined the impact of participation in the BUILD Scholars programs and BUILD-developed novel biomedical curriculum on undergraduate's research self-efficacy. Employing propensity score matching and multiple regression models, we found that Black women who participated in the BUILD scholars program reported higher research self-efficacy, whereas Latine and White undergraduate BUILD scholars had lower research self-efficacy. Additionally, Latine women who participated in novel biomedical curricula reported significantly lower research self-efficacy. We contend that disaggregated and intersectional analyses of subpopulations are necessary for improving understanding of program interventions and identifying areas where systems of exclusion may continue to harm students from minoritized backgrounds. We provide recommendations for future quantitative program evaluation practices and research in science, technology, engineering, mathematics, and medicine (STEMM) equity efforts. © 2024 J. Srinivasan et al. CITED: National Center for Science and Engineering Statistics. (2022). Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS). Table 2-1. Demographic characteristics of graduate students, postdoctoral appointees, and doctorate-holding nonfaculty researchers in science, engineering, and health: 2022. Retrieved January 2024, from https://ncses.nsf.gov/surveys/graduate-students-postdoctoratess-e/2022#data

Tornés Blanco, A. (2025). **DISSERTATION** "Impacts of Social Isolation on Behavior and Physiology in Drosophila melanogaster". United States -- Michigan, University of Michigan: 141.

Social isolation (SI) disrupts emotion, physiology, and behavior across species. Drosophila melanogaster recognizes and responds to SI variably along a spectrum of behavior ranging from aggression to sleep. Here we demonstrate that SI influences motivational drives and health metrics in Drosophila, and we outline new molecular mechanisms through which it does so. Behavioral measures at single-fly resolution revealed that SI increased feeding compared to group housed (GH) flies, and that the SI feeding drives were homeostatic, but not hedonic. SI also compromised stress resistance and modulated aging. Temporal manipulations revealed that the effects of SI manifest after four days and are fully reversible upon changes in social environment. Dissection of the molecular mechanisms underlying the effects of SI revealed select neurons and neuropeptides that mediate their effects. We observed that inhibition of neurons that express the conserved neuropeptides NPF (the homolog of mammalian NPY) or brain insulins, as well as loss of the neuropeptides

themselves, protected flies from the effects of SI. SI increased the mRNA levels of these genes and their abundance in the adult fly brain, and activation of NPF-or insulin-producing neurons was sufficient to mimic SI effects. Epistasis experiments suggest that NPF acts upstream of brain insulins in the same pathway, or overlapping pathways, to influence physiology and aging throughout the animal in response to social experience. Analysis of metabolomic responses in the brains of SI and group housed (GH) flies revealed NPF- and insulin-dependent changes. A notable decrease was observed in branched chain amino acids (BCAAs), glucose, and trehalose metabolites during SI in control flies, but not in insulin and NPF mutants. This suggests that the brain orchestrates coordinated changes in BCAA biosynthesis, glycolysis, and gluconeogenesis in the brain and periphery in response to social perception. Overall, our findings provide a model where SI triggers upstream NPF signaling, resulting in downstream insulin regulation to alter metabolism, feeding, and health at a whole organismal level. Future work expanding on these findings will include targeted metabolic manipulations to test the hypothesis generated from our pathway enrichment, as well as potentially expand on the healthspan impacts of isolation on lifespan. CITED: National Center for Science and Engineering Statistics (NCSES). Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS) | 2022. https://ncses.nsf.gov/surveys/graduatestudents-postdoctorates-s-e/2022 (2022).

Wang, Q., et al. (2025). "Hierarchical Count Echo State Network Models with Application to Graduate Student Enrollments." Data Science in Science 4(1): 1-14.

...The data in this paper were extracted from the Survey ofGraduate Students and Postdocs in Science and Engineering(GSS), an annual census of all academic institutions in theUnited States that grant research-based graduate degrees.The data are available at https://ncses.nsf.gov/surveys/gradu-ate-students-postdoctorates-s-e/2023#data....

Wasiak, A. M. and J. H. Challis (2025). "Trends in gender representation of women as authors and participants over five decades of the journal of biomechanics." Journal of Biomechanics 193: 4.

The study's purposes were, by analyzing all Journal of Biomechanics publications from one year in each of six decades, to quantify in those published studies 1) the contribution of female authors, 2) the inclusion of female participants, and 3) if female or male authors were more likely to conduct studies with only female participants. All research articles published in the Journal of Biomechanics for one year of each decade, 1970 to 2020, were analyzed. Two trained assessors identified the gender of the authors of 1490 research papers, and the gender and number of participants in the studies. The proportion of women as authors grew over the decades from 5.5 % in 1970 to 26.5 % in 2020. Women as first or last author had a similar pattern (4.9 % - 1970; 43.3 % - 2020). There were 658 experimental studies with human participants, but not all of them reported the gender of their participants and/or the number of participants. In studies reporting gender, in 1980 52.4 % had male participants only, 9.5 % women only, and 38.1 % were mixed; by 2020 these numbers were 23.1 %, 11.0 %, and 65.9 %. Female authors were more likely than male authors to produce studies with female only participants (p <

0.001). To improve the reporting and proportions of the genders in studies journal guidelines, their editors and reviewers, and funding agencies all have a role to play. This study provides benchmark data that future research can be used to monitor changes in gender representation among authors and participants in biomechanics studies. CITED: National Center for Science and Engineering Statistics, 2022. Survey of Graduate Students and Postdoctorates in Science and Engineering. Retrieved from Alexandria, VA: https://ncses.nsf.gov/pubs/nsf22319/.

Wiggins, J., et al. (2023). **CONFERENCE PAPER** "Doing Academia Differently: The Creation of a Cohort-Based Postdoctoral Scholars Program for Emerging Engineering Faculty". ASEE Annual Conference and Exposition, Conference Proceedings, American Society for Engineering Education.

The postdoctoral to professoriate pathway is a conventional path to develop significant engineering faculty talent and diversify the engineering academia workforce. Relatively few studies have examined the science, technology, engineering, and mathematics (STEM) postdoc experience, even though these scholars have faced structural and interpersonal challenges as they navigate the transition to faculty positions. Even less literature exists about the experiences of underrepresented minority (URM) postdocs in STEM. Data suggest that the number of URM postdocs is abysmal, revealing the need for more empirical studies and practical recommendations for recruiting, supporting, and retaining these individuals. This paper examines the work and community of a public land grant university's College of Engineering Leading Engineering as Agents of Change and Equity (LEGACY) program. LEGACY was founded under Dean Ayanna Howard and influenced by Dr. Monica Cox's research work and lived experience with the mission to diversify the next generation of engineering leaders in academia. With a focus on intersectional mentorship, the purpose of the postdoc program is to create well-rounded scholars versed in research, teaching, and service. Using artifacts and postdoc reflections, this study aims to explore the experiences of the first cohort of LEGACY postdoc scholars to understand how a newly created intersectional mentorship model facilitates scholars' progression toward faculty positions while curating an inclusive community and culture for scholars. The intersectional mentorship model framing this postdoc program is based on research conducted by Dr. Cox, with some adaptations from Walker et al.'s (2009) The Formation of Scholars, which presents a multiple apprenticeship framework that offers a holistic approach to mentoring for scholars. The three mentor types in the program are primary (focused on research), secondary (focused on teaching and/or service), and intersectional (aligned with identities of scholars' choosing). This integrated model engages scholars, mentors, and members of the administrative team in authentic dialogue to promote a culture that differs from traditional models of postdoctoral mentorship and development. Initial findings show that to maximize the progression of postdoctoral scholars, it is important to understand and address their self-identified issues surrounding mentorship and professional barriers that impede their success. The target audiences of this work are institutional programs, individuals who work with postdoctoral scholars, and those with an interest in diversifying and retaining future URM STEM faculty. Authors offer suggestions about ways to support, mentor, and build an inclusive community for postdocs that help them become independent, confident, and competent emerging faculty who can succeed in

academia. © American Society for Engineering Education, 2023. CITED: National Science Foundation. (2016). Survey of graduate students and postdoctorates in science and engineering. Retrieved from https://ncsesdata.nsf.gov/gradpostdoc/2016/

Wigginton, N. S. (2026). "Fully Accounting for America's Research Investments: Far from being passive recipients of federal research dollars, universities pour in substantial resources of their own. It's time to do a better job of documenting those investments." Issues in Science & Technology 42(2): 93-96.

The article argues that current metrics underreport the significant financial and infrastructural investments universities make to support the national research enterprise, calling for more accurate accounting. Topics include flaws in federal research expenditure surveys, the need for transparent quantification of institutional contributions; and collective actions to better demonstrate universities' essential role in innovation.... The Survey of Graduate Students and Postdoctorates in Science and Engineering, for instance, reports that nearly 60% of 2023 PhD students in science, engineering, and health are supported using institutional funds, but differences in definitions and metrics (and who completes the surveys within an institution) can vary significantly, and the data linkages across these surveys are unclear....

Williams, H. J. (2025). **REPORT** "Furthering Intelligence Research: How the National Intelligence University Can Fill Critical Gaps for Intelligence Research." RAND https://www.rand.org/pubs/research_reports/RRA2172-1.html.

CITED: National Science Foundation, “Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS),” National Center for Science and Engineering Statistics, webpage, undated. As of March 22, 2023: https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-s-e/2021

Wosen, J. (2023). **NEWS** "Academia’s postdoc system is teetering, imperiling efforts to diversify life sciences." Statnews.com https://www.statnews.com/2023/06/06/postdoc-system-teetering-imperiling-life-sciences-diversity/.

Cited: National Center for Science and Engineering Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering.

Yalcin, E., et al. (2023). "Retaining postdocs by recognizing their worth." Nat Biotechnol 41(2): 296-298.

Data from a postdoc salary and benefits survey may assist in retaining PhD holders interested in academia but considering alternate options owing to financial considerations. CITES the following which uses GSS data: Davies, C., Arbeit, C. A. & Yamaner, M. Assessing the Impact of COVID-19 on Science, Engineering, and Health Graduate Employment: US Part-Time Enrollment Increases as Full-Time Temporary Visa Holder Enrollment Declines. NSF 22-317 (2022); https://ncses.nsf.gov/pubs/nsf22317