STEM Graduate Education: Trends and Existing Interventions to Broaden STEM Graduate Pathways

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INTRODUCTION

Science, technology, engineering, and mathematics—STEM fields—are the cornerstone of innovation, technological advancement, and economic growth in today' dynamic world. STEM education provides individuals with the skills and knowledge to secure high-demand, high-wage jobs in emerging industries, as well as the aptitude for lifelong learning and success in a rapidly changing environment (AIA et al. 2020). While the role of STEM fields in economic growth, workforce development, and society at large has been acknowledged (Özdemir 2023), STEM can also address inequality and promote diversity. Ensuring access to high-quality STEM education among underrepresented groups is critical to bridging the gap for historically marginalized communities in educational attainment and economic opportunity, as well as in cultivating a diverse and inclusive workforce that brings together varied perspectives and creates innovative solutions (Jilani 2021; Özdemir 2023).

Despite the benefits that a more inclusive STEM community can bring to innovation and socioeconomic progress, the current educational pipeline in STEM fields is not especially diverse—particularly among racial and ethnic minorities, women, and individuals from low-income backgrounds. As shown in ACE's *Race and Ethnicity in Higher Education: 2024 Status Report* by Kim, Soler, Zhao, and Swirsky (2024), racial and ethnic minorities earn disproportionally low percentages of bachelor's, master's, and doctoral degrees in STEM fields. Among 2019–20 bachelor's degree recipients, nearly 40 percent of Asian and international students majored in STEM fields, compared with fewer than 20 percent of Hispanic or Latino, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, and Black or African American students (Kim et al. 2024). Only 16 percent of Black or African American bachelor's degree recipients—the lowest percentage among all racial and ethnic groups—earned a degree in STEM. A similar pattern was observed among 2021 master's and research doctoral degree recipients, for which international students earned the largest share of STEM degrees.

Women have been attending STEM programs at an increased rate in the past decade. Yet the gender gap in STEM education remains pronounced, especially at the graduate level. For instance, science and engineering bachelor's degrees awarded to women increased by 35 percent between 2011 and 2020. Over the same period, master's and doctoral degrees in science and engineering earned by women increased by about 45 and 18 percent, respectively (NCSES 2023). Although these figures indicate some advancement in female participation in STEM fields, data from the National Center for Science and Engineering Statistics (NCSES) also reveal that in 2020 women accounted for only 27 and 25 percent of all awarded engineering master's and doctoral degrees, respectively. Also, women earned only 35 percent of master's and 26 percent of doctoral degrees in mathematical and computer sciences (NCSES 2023), further illustrating the gender gap in STEM graduate completion.

Moreover, students from low-income backgrounds may face additional obstacles in accessing STEM graduate education. This problem is especially true among dependent undergraduates: Approximately 76 percent of Black or African American and about 72 percent of Hispanic or Latino students came from families in the lowest two income quartiles (Kim et al. 2024). The high cost of graduate programs, coupled with limited financial support, often deters these students from pursuing advanced degrees. Financial aid programs such as fellowships and assistantships are crucial but not always sufficient. As a result, socioeconomic disparities persist, contributing to the lack of diversity in STEM graduate programs.

The enrollment and completion trends in STEM education highlight the amount of work needed to achieve equitable access to STEM graduate education. Institutions, governments, agencies, and other stakeholders are addressing this issue by encouraging the design and implementation of programs or interventions that target financial, social, and academic barriers. These efforts hold significant potential to improve access to STEM graduate education for underrepresented groups.

This brief provides a snapshot of enrollment and completion trends in STEM education and offers an overview of existing interventions in STEM graduate education that aim to prepare students for the labor force. Based on lessons from research and practice, this brief also offers considerations for stakeholders who are interested in designing solutions to make STEM graduate education more equitable and inclusive.

TRENDS IN STEM GRADUATE EDUCATION, BY RACE AND ETHNICITY

Research doctoral degrees increased 61 percent between 2001 and 2021—from 44,904 to 72,418—and professional and other doctoral degrees increased 53 percent in the same period—from 79,707 to 121,641. By race and ethnicity, White students completed more than half of all doctoral degrees awarded in 2021 (52.3 percent)—followed by international (12.1 percent), Asian (10.8 percent), Black or African American (8.2 percent), and Hispanic or Latino (8.2 percent) students. Less than 1 percent of all doctoral degrees were earned by Native Hawaiian or other Pacific Islander and American Indian or Alaska Native students (0.1 percent and 0.3 percent, respectively).

Comparisons by race and ethnicity among STEM doctoral and master's degree completers are even more striking. STEM fields were the second most popular area in 2021 for which graduate students completed a doctoral degree, by about 18 percent.[1] Among all STEM doctoral degree recipients, about 41 percent were international students and about 40 percent were White students. In contrast, Asian students earned 6 percent of all STEM doctoral degrees, and Black or African American (2.4 percent) and Hispanic or Latino (4.8 percent) students completed such degrees at even a lower rate. American Indian or Alaska Native and Native Hawaiian or other Pacific Islander students only accounted for 0.2 and 0.04 percent of all STEM doctoral degree recipients, respectively.

Among STEM master's degree recipients, international and White students represented 43 percent and 32 percent, respectively, and about 9 percent were Asian students. Other racial and ethnic groups each represented fewer than 5 percent of the STEM master's graduates.[2]

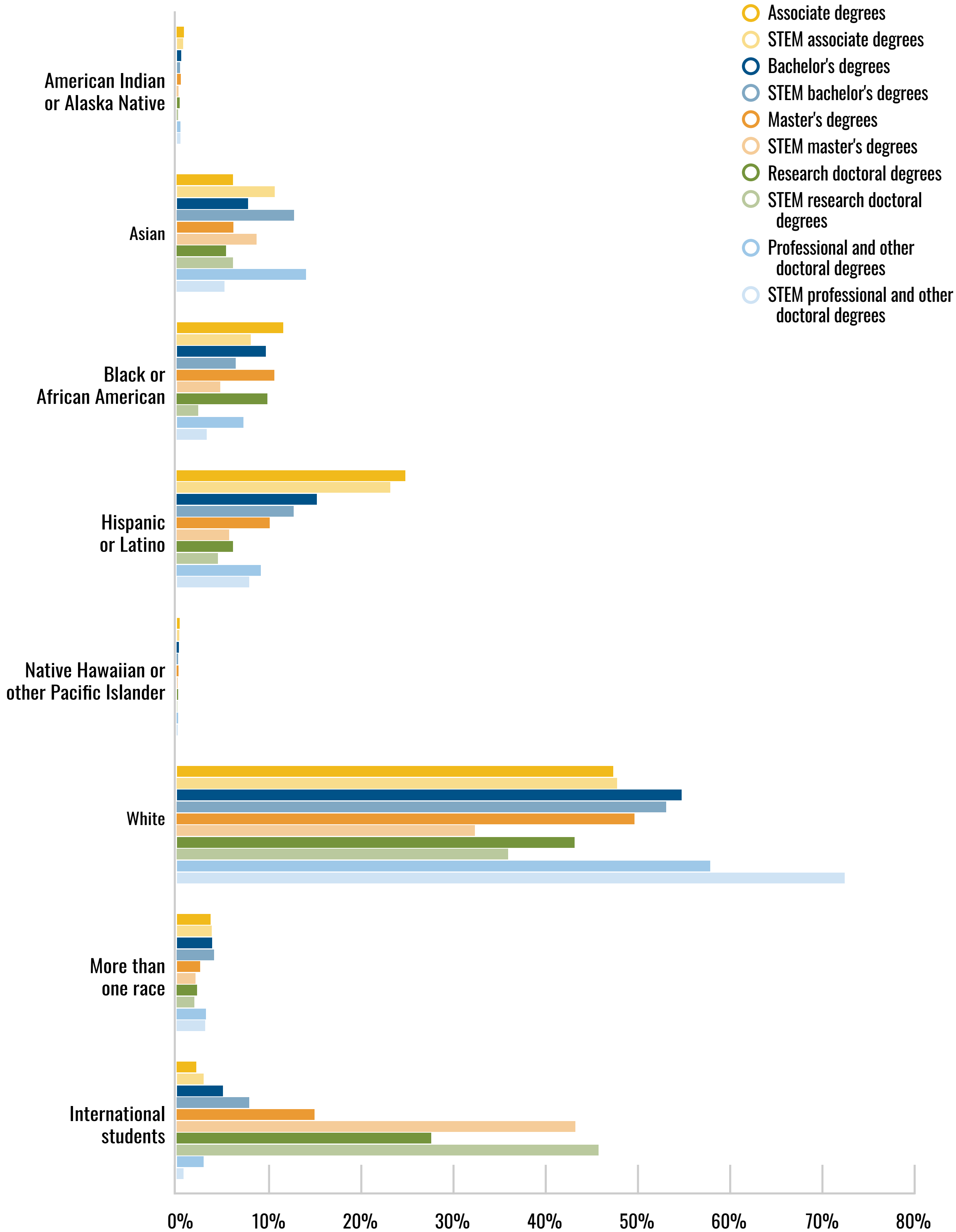
The STEM Education Pipeline

Understanding the racial and ethnic distribution among STEM graduates relative to the distribution among all graduate completions by award level offers important insights into the STEM education pipeline. At all degree award levels, each racial and ethnic group represented a lower share of graduates in STEM than in all fields combined—except for Asian and international students, whose shares among STEM graduates were higher than their shares among all graduates (see figure 1).[3]

Two additional observations emerge from figure 1. First, when examining the share of STEM degrees earned by Black or African American and Hispanic or Latino students across various award levels—excluding professional and other doctoral degrees—it is evident that the proportion of these graduates declines as the award level increases. Second, American Indian or Alaska Native and Native Hawaiian or other Pacific Islander students exhibit the lowest completion rates in STEM across all award levels. Both trends highlight the critical need to expand the already-narrowing STEM education pipeline.

1 Health fields were the top STEM doctoral degree field and were earned by about 44 percent of graduates.
2 Calculations are the author's, using data from *Race and Ethnicity in Higher Education 2024 Status Report* (Kim et al. 2024). The author would like to thank Alex Zhao for her invaluable assistance with the data tables.
3 Exceptions were Asians and international students in professional and other doctoral degrees, who earned smaller shares of STEM degrees than their shares of all fields, as well as White professional and other doctoral degree recipients, who earned more STEM degrees than those of all fields.

Figure 1. Racial and Ethnic Distribution of Degree Recipients in All Fields and STEM Fields, by Degree Award Level



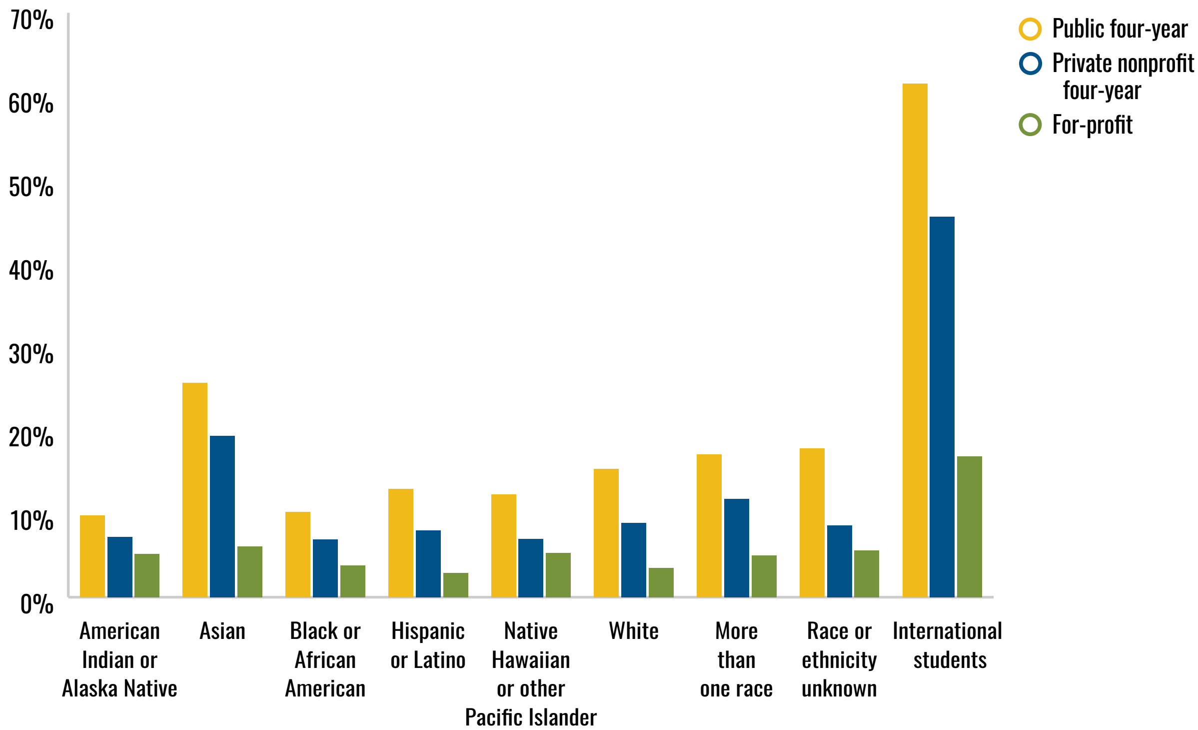
Source: U.S. Department of Education, Integrated Postsecondary Education Data System, 2021.
Notes: Data reflect degrees earned at all Title IV eligible, degree-granting institutions. For associate and bachelor's degrees, STEM fields include computer and information sciences, engineering and engineering technology, biological and physical sciences, science technology, math, and agriculture. For master's and doctoral degrees, STEM fields include life and physical sciences, math, engineering, and computer science. | The full data set can be found in the appendix.

How Do STEM Graduate Completions Vary by Institution Type?

Examining STEM graduate completion trends by institution type provides further insights into student experiences and success rates in STEM graduate programs. Data disaggregated by institution type and race and ethnicity reveal that STEM graduate completion rates are highest at public four-year institutions, followed by private nonprofit four-year institutions and for-profit institutions.

Additionally, international students compose the largest share of doctoral graduates in STEM fields, accounting for 61.5 percent at public four-year institutions, 45.6 percent at private nonprofit four-year institutions, and 16.9 percent at for-profit institutions (see figure 2).

Figure 2. Share of Graduates Who Earned STEM Degrees, by Institution Type and Race and Ethnicity: 2021

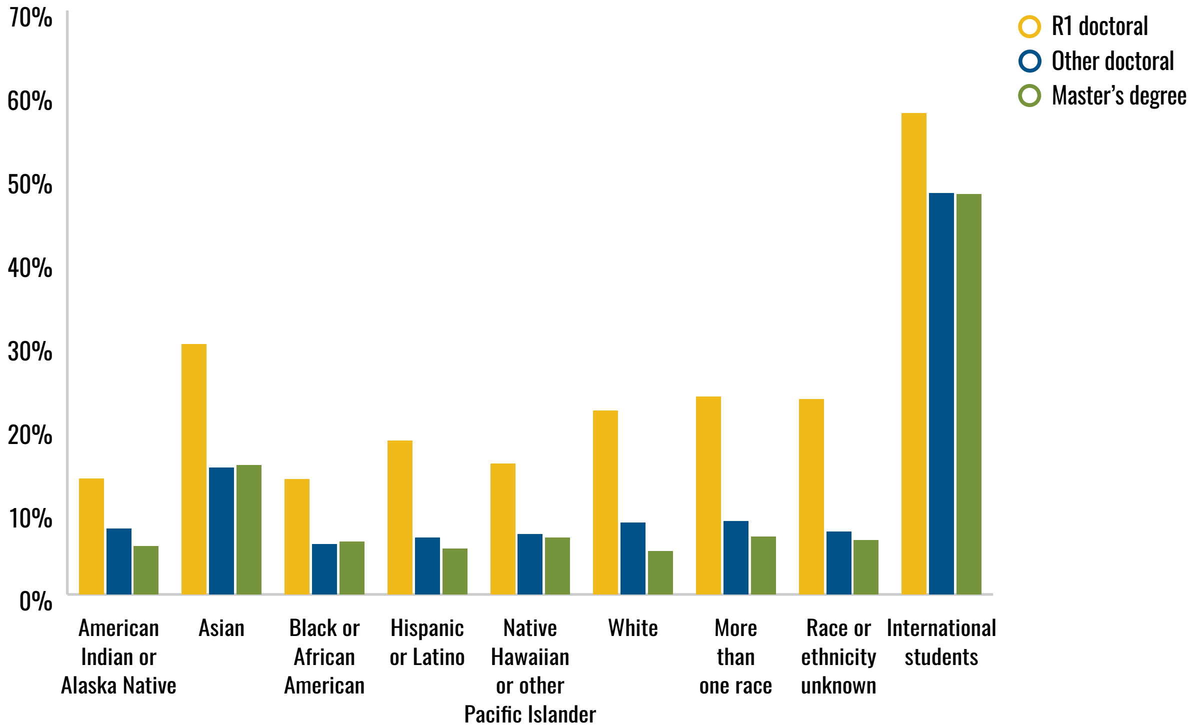


Source: U.S. Department of Education, Integrated Postsecondary Education Data System, 2021.
Notes: Data reflect graduate degrees and certificates earned at Title IV eligible, degree-granting institutions. | Institutions were categorized into sectors based upon control of the institution and the length of the predominant award granted. | STEM fields include life and physical sciences, math, engineering, and computer science. | The full data set can be found in the appendix.

Furthermore, additional data disaggregated by 2018 Carnegie Classifications indicated that the shares of STEM graduates at R1 (or very high research activity) doctoral institutions were consistently higher across all racial and ethnic groups when compared with shares from other doctoral and master's institutions.[4] When considering race and ethnicity, international students who graduated in 2021 were the most likely to earn a degree in STEM, followed by White and Asian graduates—regardless of the Carnegie Classification (see figure 3).

4 In this brief, *other doctoral institutions* includes institutions that were designated by the 2018 Carnegie Classifications as R2 doctoral universities—high research activity and doctoral/professional universities.

Figure 3. Share of Graduates Who Earned STEM Degrees, by Carnegie Classification and Race and Ethnicity: 2021



Source: U.S. Department of Education, Integrated Postsecondary Education Data System, 2021
Notes: Data reflect graduate degrees and certificates earned at Title IV, degree-granting institutions. Please see the methodology of ***Race and Ethnicity in Higher Education: 2024 Status Report*** (Kim et al. 2024) for additional information about how institutions were classified as R1 doctoral, other doctoral, and master's institutions. | STEM fields include life and physical sciences, math, engineering, and computer science. | The full data set can be found in the appendix.

The high production of STEM graduate degrees at R1 doctoral and four-year institutions demonstrates the important role of these institutions in broadening the STEM pathway. Additional data from ACE's *Race and Ethnicity in Higher Education 2024 Status Report* (Kim et al. 2024), as well as research by Velez and Heuer (2023), indicated that Black or African American STEM doctoral graduates were more likely than their counterparts to complete their doctorate at a private for-profit institution or a moderate research activity institution instead of at a high research activity institution.

While some institutional factors might promote STEM graduate education completion (e.g., supportive institutional climate, STEM culture), intentional institutional efforts such as programmatic efforts or targeted interventions can also improve outcomes in STEM programs.

WHAT ARE SOME OF THE EXISTING INTERVENTIONS TO SUPPORT STUDENTS IN STEM GRADUATE EDUCATION?

Given the importance of enhancing access and success in STEM graduate education, higher education institutions, government agencies, philanthropic organizations, and other stakeholders are actively seeking interventions to address academic, social, and financial barriers among underrepresented students.

This section provides an overview of existing interventions in STEM graduate education and highlights several exemplary programs. The six categories of included interventions are mentorship and peer support networks, outreach initiatives and bridge programs, financial support interventions, curricular interventions, partnerships and collaborations, and public and private sector initiatives. While some interventions focus on facilitating the transition to STEM fields and encouraging participation in STEM graduate programs, others aim to increase persistence and success among students who are already pursuing master's or doctoral degrees in STEM.

It is important to note that the interventions included herein are categorized for clarity. Many interventions in this brief encompass multiple programmatic components, however, as they use holistic approaches and could be classified under more than one category. Also, the examples provided represent only a sample of the numerous interventions in STEM graduate education.

Mentorship and Peer Support Networks

Mentoring and peer support networks offer social-emotional support, guidance, and connections to mentors that students may not readily access due to social barriers. These initiatives typically engage peers, faculty, or professionals as mentors or peer advisers. According to *Formal and Informal Mentoring to Broaden the Pathway into Graduate Education* (Kim 2023)—an ACE brief on mentoring practices—mentoring can occur in both formal and informal settings. Formal mentoring takes place within organized and structured programs designed by institutions or program managers. In contrast, informal mentoring is less structured and often occurs outside these organized programs. Peer support networks also provide a platform for sharing experiences, resources, and strategies for success.

In mentoring programs, support for the mentors themselves is also crucial to sustaining strong mentoring interventions. According to the National Academies of Sciences, Engineering, and Medicine's report on science, technology, engineering, mathematics, and medicine (STEMM) mentoring practices, very few campuses offer adequate training and support for mentors (NASEM 2019). Interventions that focus on developing mentors' skills and building supportive relationships can significantly impact STEM graduate students and the broader education community.

Research involving underrepresented STEM students in a mentoring program at a Hispanic-Serving Institution showed that students benefited from mentors who share a similar background. They were able to create a culturally affirming approach that was key for the mentor-mentee relationship (Morales-Chicas et al. 2022). Griffin, Pérez, Holmes, and Mayo (2010) also discussed the importance of mentors among students of color in STEM and emphasized the importance of fostering positive mentoring relationships, addressing climate issues, and supporting faculty of color in STEM fields.

Notable examples:

- Graduate Society of Women Engineers
- Program for Research Initiatives in Science and Math
- Duke University Center of Exemplary Mentoring

Outreach Initiatives and Bridge Programs

Outreach initiatives and bridge programs provide current and prospective STEM graduate students with the chance to learn more about STEM graduate education and to develop and prepare for the transition to a program. Institutions that offer these programs often foster a more inclusive and diverse STEM graduate education environment with a strong orientation toward diversifying the STEM labor force.

Bridge programs also play a crucial role in facilitating the transition from undergraduate to graduate education for underrepresented students. These programs, often established between multiple institutions, offer additional coursework and preparation—such as summer bridge programs that prepare incoming STEM students—before their studies begin. Such initiatives are designed to reduce attrition and increase the diversity of students pursuing STEM majors and career paths (Bradford et al. 2021).

In terms of impact, a meta-analysis of 16 STEM summer bridge programs revealed that program participation had a medium-sized effect on first-year overall point grade average and first-year university retention (Bradford et al. 2021).

Notable examples:

- National Society of Black Engineers
- Stanford Vice Provost of Undergraduate Education STEM Fellows Program
- Cal-Bridge Summer program
- Louis Stokes Alliances for Minority Participation

Financial Support Interventions

Financial support interventions aim to eliminate financial barriers that deter underrepresented students from pursuing a STEM graduate education program. Most of the financial support takes the form of scholarships, fellowships, and assistantships. Financial support aims to supplement the financial package that STEM graduate students already receive from their programs, but others offer larger financial support that is inclusive of annual stipends for several years in the program.

Evidence from a randomized experiment that involved low- and moderate-income students at 10 four-year colleges and universities in Wisconsin demonstrated that financial support of $1,000 per year increased the likelihood of students who either persisted in or switched to a STEM major by their third year. However, this financial support did not affect the overall odds that students would remain enrolled (Goldrick-Rab et al. 2021). Related research by Strayhorn (2010) examined the impact of financial factors on graduate student persistence. His findings indicated that up to $25,000 borrowed for graduate education positively influenced persistence. Additionally, deferring educational loan repayments increased the probability of persistence; graduate students who had research assistantships were twice as likely to persist as those without, and students who received tuition reductions were 1.6 times more likely to persist than those without such aid. Interestingly, Strayhorn found no evidence that having a teaching assistantship impacted graduate student persistence.

Notable examples:

- Sloan Indigenous Graduate Partnership
- National Science Foundation Graduate Research Fellowship Program

Curricular Interventions

STEM graduate education curriculum reform encompasses a variety of strategies:

- Interdisciplinary programs that bridge traditional STEM disciplines

- Inclusive pedagogy approaches that address the needs of students from diverse backgrounds and diverse learning styles
- Courses on ethics and social responsibility that discuss the implications of STEM research
- Programmatic efforts to help students develop professional skills (e.g., communication, leadership, and teamwork)
- Collaborative research projects
- Flexible and modular curriculum offerings that allow students to tailor their interests and career goals
- Technology and online learning (e.g., virtual labs, online simulations)
- Exchange programs and international research collaborations that will expose students to global scientific challenges

Using these approaches to develop an inclusive curriculum that reflects diverse perspectives and contributions from underrepresented groups can make STEM fields more welcoming. Relatedly, Posselt (2020) advised vigilance regarding hidden elements in the curriculum that may hinder STEM graduate education and necessitate interventions at multiple levels. For instance, she highlighted how educators may in some contexts ignore women's questions or dismiss their concerns.

Addressing such issues could involve implementing professional development and bystander intervention training, establishing grievance policies and the role of an ombudsperson, and encouraging those in positions of power to become more aware of and vocal about the ways gender influences learning environments.

Notable example:

- The Program for Excellence in Education and Research in the Sciences at the University of California, Los Angeles

Partnerships and Collaborations

Forming partnerships between research-intensive universities, minority serving institutions, and industry partners can create pathways for students to pursue advanced degrees. These collaborations often include joint research projects, shared resources, faculty exchanges, and internships, all of which provide students with practical experience and enhance their career prospects. These types of partnerships and collaborations are beneficial for career advancement—especially as they expose underrepresented students to a variety of STEM experiences that can create a pathway for advanced degrees while also helping students to connect with mentors and peers, learn more about the STEM industry, and increase their employability.

Notable examples:

- Louis Stokes Alliances for Minority Participation
- NSF's partnership with Intel Corporation focused on semiconductors
- American University's initiatives to strengthen its university-industry collaborations in the greater Washington, DC metropolitan area

Public and Private Sector Initiatives

Government programs and nonprofit organizations can also play a key role in enhancing access to STEM education by either financing specific initiatives or redirecting funds to then enable higher education institutions to do so.

Notable examples:

- STEM Education Coalition
- American Association for the Advancement of Science
- Chan Zuckerberg Initiative's Accelerate Precision Health program
- Reaching a New Energy Sciences Workforce
- Funding for Accelerated, Inclusive Research

Figure 4. Examples of Existing Interventions in STEM Graduate Education

Mentorship and Peer Support Networks	• Graduate Society of Women Engineers • Program for Research Initiatives in Science and Math • Duke University Center of Exemplary Mentoring
Outreach Initiatives and Bridge Programs	• National Society of Black Engineers • Stanford Vice Provost of Undergraduate Education STEM Fellows Program • Cal-Bridge Summer program • Louis Stokes Alliances for Minority Participation
Financial Support	• Sloan Indigenous Graduate Partnership • National Science Foundation Graduate Research Fellowship Program
Curricular Interventions	• Inclusive pedagogy approaches • Courses on ethics and social responsibility • Programmatic efforts to help students develop professional skills • Collaborative research projects • Use of technology and online learning
Partnerships and Collaborations	• Louis Stokes Alliances for Minority Participation
Public and Private Sector Initiatives	• STEM Education Coalition • American Association for the Advancement of Science • Chan Zuckerberg Initiative's Accelerate Precision Health program • Reaching a New Energy Sciences Workforce • Funding for Accelerated, Inclusive Research

SHIFTING THE PARADIGM: FROM INTERVENTIONS TO INTENTIONAL SYSTEM DISRUPTIONS IN STEM GRADUATE EDUCATION

The types of interventions summarized in this brief (see figure 4) aim to dismantle barriers that prevent underrepresented students from pursuing STEM graduate education at higher rates. This final section offers a critical perspective on what interventions are the most effective, as well as a list of questions for those who are looking to design a disruption to support underrepresented students in STEM graduate education. (For more information on STEM graduate employment, see *Labor Market Trends and Considerations for STEM Graduate Education*—the companion piece to this brief.)

Institutions have long sought to foster supportive and inclusive campus environments. In a systematic review of 82 articles that reported on STEM intervention programs with disaggregated outcomes, Palid, Cashdollar, Deangelo, Chu, and Bates (2023) concluded that multicomponent interventions fostering a welcoming environment and emphasizing the achievements of minoritized students are able to both address existing institutional shortcomings and represent a promising advancement toward greater diversity, equity, and inclusion in STEM.

However, scholars such as López et al. (2022), McGee (2020), Miriti (2020), Robinson (2022), and Whittaker and Montgomery (2012) have contended that student-focused interventions—without broader systemic transformation—fail to address higher education's entrenched biases. They argued that dominant cultural biases are deeply embedded in the research, teaching, and service aspects of higher education. These biases influence perceptions of legitimate research agendas, prioritize publications and grants over mentoring and diversity efforts, and shape which faculty members' perspectives are considered in institutional policymaking (Whittaker and Montgomery 2012, 239–240). According to this viewpoint, systemic change requires actively confronting and dismantling these biases to achieve genuine progress toward diversity, equity, and inclusion in STEM.

Additionally, Posselt (2020) argued that achieving equity in graduate education requires a systematic examination of established professional practices, as well as the interrelationships among these practices and their contextual settings. She emphasized that the most successful outcomes arise when leaders not only coordinate practice improvements but also consider the specific contexts and needs of their students. In her seminal work *Equity in Science*, Posselt acknowledged that systemic change requires collaborative efforts and redefining success beyond participation metrics. She noted, however, that this is not straightforward, and she identified four key challenges: *Perspectives* that are shaped by background knowledge and personal experiences; varying *focus areas*, such as individual experiences, organizational practices, institutional norms, and group outcomes; differing *priorities* regarding equity, diversity, and inclusion, along with varying indicators and activities toward these goals; and *normatives* that encompass implicit and explicit theories of change, power, inequality, and climate (Posselt 2020). These challenges highlight the complexity of achieving meaningful and sustainable change in STEM education.

Disruptions in higher education fall into two groups: contextual catalytic moments and adjustable disruptions. Contextual catalytic issues—such as the GI Bill, COVID-19, the Supreme Court of the United States' decision around affirmative action—are outside of the control of those guiding higher education. In contrast, adjustable disruptions are the events or changes that are within the locus of control of higher education and can change to adjust to particular outcomes.

The following questions can help shape an adjustable disruption on your campus.

CONTEXT AND TIMING

- What gaps or shortcomings exist in current interventions that necessitate a new approach?

BARRIERS IN STEM GRADUATE EDUCATION

- Which barrier(s) in STEM graduate education does the disruption aim to tackle?

OBJECTIVES OF THE DISRUPTION

Given the shrinking pipeline in STEM graduate education for underrepresented students, does the disruption:

- Serve as an intentional and adjustable disruption, or is it simply a reaction to a disruption outside of our control?
- Redefine an equity-minded, holistic review in admissions?
- Increase the share of students accessing STEM graduate education?
- Enhance retention and success rates for students already pursuing STEM graduate education?
- Shift the current structure and culture in STEM graduate education?
- Other?

STAKEHOLDER ENGAGEMENT

- How can stakeholder buy-in for introducing a disruption be achieved?
- What roles does each stakeholder play in the process?

DATA-DRIVEN DESIGN

- What data will inform the design and implementation of the proposed disruption?
- What framework will guide the design behind the disruption?

DEVELOPMENT APPROACH

- How will the disruption avoid falling into the trap(s) of current interventions?

FUNDING STRUCTURE

- What funding will support the disruption?

SERVING UNDERREPRESENTED STUDENTS IN STEM

- In what ways will the proposed disruption best serve underrepresented students?

GOALS AND ASSESSMENT

- What does the proposed disruption aim to achieve?
- How will its success be measured?
- How will the impact be assessed?

INVOLVEMENT AND ROLES

- Who needs to be involved?
- What specific roles will each stakeholder play in the process?

UNINTENDED CONSEQUENCES

- What are some of the unintended consequences of disrupting the current landscape in STEM graduate education?

These interventions are especially important in light of the Supreme Court of the United States' 2023 ruling in both *Students for Fair Admissions (SFFA) v. Harvard University* and *SFFA v. University of North Carolina*. These decisions have introduced new complexities and considerations for colleges and universities as they strive to maintain a diverse student body amid evolving legal and social landscapes. Efforts to increase diversity, equity, and inclusion must be more effective and wide-reaching than ever if we are to truly increase and diversify the STEM pipeline.

APPENDIX

Table 1. Racial and Ethnic Distribution of Degree Recipients in All Fields and STEM Fields, by Degree Award Level

		All Fields	STEM Fields
American Indian or Alaska Native	Associate degrees	0.76%	0.66%
	Bachelor's degrees	0.45%	0.33%
	Master's degrees	0.41%	0.18%
	Research doctoral degrees	0.28%	0.14%
	Professional and Other doctoral degrees	0.37%	0.37%
Asian	Associate degrees	6.08%	10.59%
	Bachelor's degrees	7.70%	12.72%
	Master's degrees	6.11%	8.62%
	Research doctoral degrees	5.33%	6.09%
	Professional and Other doctoral degrees	14.02%	5.16%
Black or African American	Associate degrees	11.52%	8.01%
	Bachelor's degrees	9.63%	6.39%
	Master's degrees	10.57%	4.69%
	Research doctoral degrees	9.83%	2.33%
	Professional and Other doctoral degrees	7.20%	3.24%
Hispanic or Latino	Associate degrees	24.79%	23.14%
	Bachelor's degrees	15.18%	12.68%
	Master's degrees	10.07%	5.67%
	Research doctoral degrees	6.08%	4.45%
	Professional and Other doctoral degrees	9.11%	7.83%
Native Hawaiian or other Pacific Islander	Associate degrees	0.28%	0.25%
	Bachelor's degrees	0.21%	0.15%
	Master's degrees	0.18%	0.08%
	Research doctoral degrees	0.12%	0.04%
	Professional and Other doctoral degrees	0.14%	0.11%
White	Associate degrees	47.30%	47.75%
	Bachelor's degrees	54.71%	53.05%
	Master's degrees	49.63%	32.32%
	Research doctoral degrees	43.11%	35.91%
	Professional and Other doctoral degrees	57.82%	72.40%
More Than One Race	Associate degrees	3.64%	3.77%
	Bachelor's degrees	3.80%	4.03%
	Master's degrees	2.50%	2.00%
	Research doctoral degrees	2.18%	1.90%
	Professional and Other doctoral degrees	3.16%	3.07%
International Students	Associate degrees	2.12%	2.88%
	Bachelor's degrees	4.98%	7.85%
	Master's degrees	14.94%	43.22%
	Research doctoral degrees	27.59%	45.73%
	Professional and Other doctoral degrees	2.88%	0.72%

Source: U.S. Department of Education, Integrated Postsecondary Education Data System, 2021.
Notes: Data reflect degrees earned at all Title IV eligible, degree-granting institutions. For associate and bachelor's degrees, STEM fields include computer and information sciences, engineering and engineering technology, biological and physical sciences, science technology, math, and agriculture. For master's and doctoral degrees, STEM fields include life and physical sciences, math, engineering, and computer science.

Table 2. Share of Graduates Who Earned STEM Degrees, by Institution Type and Race and Ethnicity: 2021

	Public Four-Year Institutions	Private Nonprofit Four-Year Institutions	For-Profit Institutions
American Indian or Alaska Native	9.80%	7.20%	5.20%
Asian	25.70%	19.30%	6.10%
Black or African American	10.20%	6.90%	3.80%
Hispanic or Latino	13.00%	8.00%	2.90%
Native Hawaiian or other Pacific Islander	12.30%	7.00%	5.30%
White	15.40%	8.90%	3.50%
More than one race	17.10%	11.80%	5.00%
Race or ethnicity unknown	17.80%	8.60%	5.60%
International students	61.50%	45.60%	16.90%

Source: U.S. Department of Education, Integrated Postsecondary Education Data System, 2021.
Notes: Data reflect graduate degrees and certificates earned at Title IV eligible, degree-granting institutions. | Institutions were categorized into sectors based upon control of the institution and the length of the predominant award granted. | STEM fields include life and physical sciences, math, engineering, and computer science.

Table 3. Share of Graduates Who Earned STEM Degrees, by Carnegie Classification and Race and Ethnicity: 2021

	R1 Doctoral Institutions	Other Doctoral Institutions	Master's Degree Institutions
American Indian or Alaska Native	13.90%	7.90%	5.80%
Asian	30.00%	15.20%	15.50%
Black or African American	13.80%	6.00%	6.30%
Hispanic or Latino	18.40%	6.80%	5.50%
Native Hawaiian or other Pacific Islander	15.70%	7.20%	6.80%
White	22.00%	8.60%	5.20%
More than one race	23.70%	8.80%	6.90%
Race or ethnicity unknown	23.40%	7.50%	6.50%
International students	57.70%	48.10%	48.00%

Source: U.S. Department of Education, Integrated Postsecondary Education Data System, 2021
Notes: Data reflect graduate degrees and certificates earned at Title IV, degree-granting institutions. Please see the methodology of ***Race and Ethnicity in Higher Education: 2024 Status Report*** (Kim et al. 2024) for additional information about how institutions were classified as R1 doctoral, other doctoral, and master's institutions. | STEM fields include life and physical sciences, math, engineering, and computer science.

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