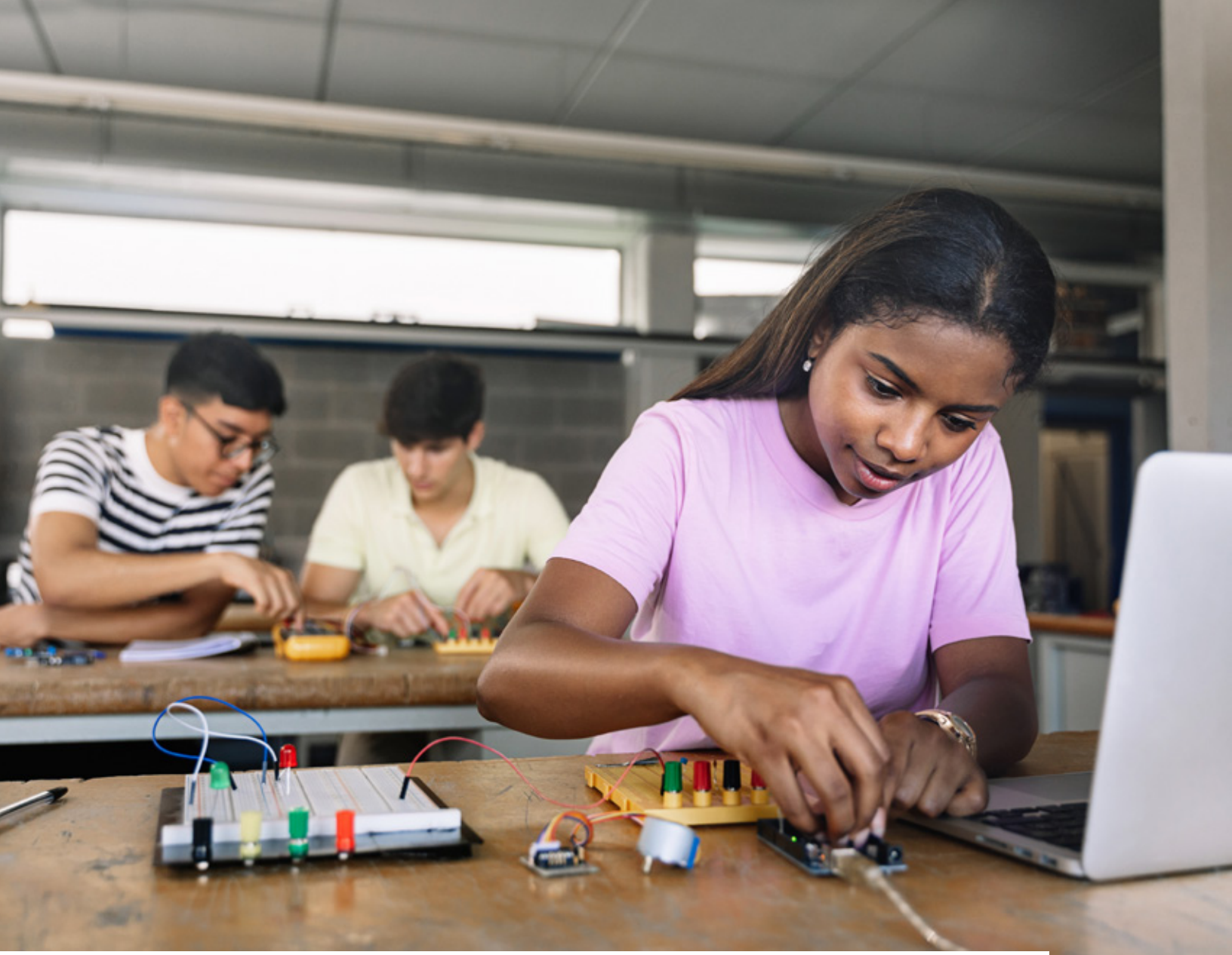


Leading for Diversity in STEM: A Renewed Commitment

Outcomes from the June 2022 Universities at Shady Grove Board of Advisors' Future Action Symposium:
Uplifting All of Our Talent to Inspire the Future STEM Workforce

The Universities AT SHADY GROVE

NOVEMBER 2022

The many fields represented in the world of science, technology, engineering and math, aka STEM, are rightly valued for their power to produce innovations that can address some of the biggest challenges of our time. But while STEM fields are transforming the future of everything from communication to medicine, energy production, agriculture and entertainment, they retain a remarkable degree of rigidity in one key area: the diversity of their workforce.

Despite a significant focus in recent years on increasing diversity in STEM, people of color and women remain chronically underrepresented. Last year, a report from the Pew Research Center found that Blacks and Hispanics in the US remain noticeably underrepresented in key STEM degree programs and jobs. It also found that "while women now earn the majority of all undergraduate and advanced degrees," they account for only a "small share" of STEM degrees in fields like engineering and computer science. Moreover, this status quo has remained stubbornly fixed despite a number of efforts to change it.

In June 2022, the Board of Advisors of the Universities at Shady Grove (USG) convened a group of influential government, industry and education experts from Montgomery County and the broader region for a Future Action Symposium. The goal was to facilitate a candid conversation about the persistent barriers to diversity in STEM and identify potential actions to overcome them—both within the University System of Maryland and the region's employer community.

Since it was established in 2000, USG has made an unwavering commitment to equity. It exists to create more opportunities for people in Maryland to attend college and enter the work world primed for success. The USG Board of Advisors is eager to move beyond merely describing the problem of diversity. It is determined to create momentum for change by stimulating new partnerships involving educational institutions, governments, businesses and community organizations.

The participants in the Future Action Symposium were keenly aware of the complexity of the problem. They responded by engaging in a spirited dialogue that produced tangible recommendations for action. The actions envisioned by Symposium participants fell generally into four categories:

1. **Increasing the number and quality of STEM mentors:** People from marginalized communities who have found success in STEM frequently point to a mentor who helped them navigate a world that is decidedly lacking in diversity.

2. **Engaging K-12 teachers and parents:** In the United States, the Bureau of Labor Statistics reports that about 67 percent of White high school graduates enroll in college compared to 51 percent of Black graduates and 63 percent of Hispanic graduates. That means increasing diversity in STEM requires actions, especially at the high school level, that engage teachers, parents and students to connect them to STEM opportunities.

3. **Creating community initiatives to increase STEM diversity:** STEM-related businesses need qualified workers to remain viable. Governments want to stimulate economic development. Educational institutions are eager to support workforce needs. And many organizations are engaged in creating opportunities for marginalized communities. All have a shared interest in fostering STEM diversity.

4. **Changing cultures in academia and the work world:** There are many systemic barriers to STEM diversity in educational institutions and the workplace. These include: a lack of flexible degree paths to a STEM-related job; the "weeding out" of students in academic courses who, with support, could be successful; and sometimes even the requirement of a degree at all for jobs that demand skills but not degrees. There also are unique challenges many women and people of color face simply because they are outside of the mainstream populations that dominate most STEM-degree programs and workplaces.

The STEM Diversity Challenge

A 2021 report from the PEW Research Center found that "Black and Hispanic adults are less likely to earn degrees in STEM than other fields" and comprise a lower share of STEM graduates relative to their numbers in the population. Meanwhile, today, the majority of people who earn undergraduate and advanced degrees are women. Yet women comprise just 22% of engineering and 19% of computer science degrees.

In the following pages, we take a deeper dive into the discussions that occurred at the symposium to highlight findings and begin exploring the wide range of actions suggested by participants.

Sharing these findings is only a first step. The Board of Advisors is actively engaged in mapping out opportunities for translating the findings into action with impact. USG is reorganizing for the future, and as it implements its first strategic plan, USG is standing up a STEM Industry Hub which will create a forum for realizing some of this work. In addition, the Board of Advisors is working to identify opportunities for a new series of regional partnerships and initiatives committed to creating a pipeline linking underserved communities and populations in the region to STEM degrees and careers. For example, there are discussions with the leaders of BioHub Maryland, an initiative designed to upskill and reskill underserved Marylanders for careers in the life science, to develop partnerships that will ensure their talent recruitment reaches into communities of color.

The Board of Advisors is committed to tapping the considerable expertise and influence of its members to facilitate cross-sector collaborations for increasing diversity in STEM. The next steps will include reconvening experts involved in the initial symposium in April 2023 to implement a concrete framework for action.

Why the USG Board of Advisors Committed to Diversity in STEM

Bringing more people of color and women into the STEM professions is important for us all. We live in a world grappling with a number of knotty challenges. They include existential threats like climate change and pandemics; rising rates of chronic diseases and many types of cancers; and recurrent food crises that are destabilizing large regions of the world. We need the broadest possible talent pool working in the STEM professions to find solutions. In other words, inclusivity in STEM is not just something that's nice to have. Pursuing equity is necessary to build a better world for us all. It's also an area where USG and the inspiring community of partners in our STEM-rich region are committed to leading by example.

SETTING THE SCENE

A Candid Discussion of STEM Diversity Challenges and Solutions

The June 2022 Leadership Symposium featured revealing discussions in which people of color and women who have reached leadership positions in STEM fields reflected on their journey. Their insights stimulated a broader cross-sector conversation among all symposium participants representing academia, industry and government. Key themes emerged from these exchanges.

In order to encourage a frank exploration of the topic, the organizers agreed that this report would offer a summary of ideas without attribution.

Lack of diversity in STEM is itself a barrier to diversity. It was often noted that "diversity creates diversity." Conversely, the lack of people of color and women in STEM fields discourages others from pursuing STEM careers because it signals that they don't belong.

- A Black woman who now leads a tech start-up talked about being too intimidated to participate in a math competition in high school because she was **"one of the few people who looked like me."**
- A Black woman scientist said she initially planned a career in medicine. But "doubts crept in" when she arrived at an Ivy League university **lacking the "social capital" to navigate a predominantly White pre-med program.** And while she has succeeded in physics, she noted that, consciously or unconsciously, **when most people think "successful physicist," the image that comes to mind "still looks like a White male."**
- A Black woman scientist at a prestigious research institution talked about the challenge of working in a profession where **"we are the unicorns, we are very different from those around us."** She said there can be **"daily reminders, like a thousand paper cuts, that we don't belong here."**

Recognizing Yourself in STEM

A program in Jackson, Mississippi called Bean Path was noted as one way to make STEM professions more relatable to people who live in underrepresented communities. The Bean Path is a large facility located in the middle of a predominantly Black city that provides a wide range of STEM-related training and experiences for both young people and adults. *[See sidebar on page 14]*

It's not about fixing individuals, it's about fixing systems. Rather than focus on perceived training or educational deficits at the individual level, we must focus on the systemic changes that can attract more people of color and women to STEM professions and ensure they succeed.

- Several participants noted that narrow pathways to STEM-related jobs erect barriers to diversity. They called for creating **multiple career pathways that provide STEM opportunities at different levels of education**—or, where appropriate, removing degree requirements altogether and focusing on skills rather than degrees.
- There was pointed criticism of **seeking diversity simply by hiring or admitting more women and people of color in STEM-related jobs and degree programs without developing systems that provide support to help them succeed**.
- There were references regarding the need to change **"toxic cultures" that fail to recognize the unique challenges facing individuals who are not part of the dominant ethnic group or gender in a particular STEM field.**

Seeking Systemic Change

One speaker noted that **Google has removed degree requirements altogether from many job descriptions** because company leaders discovered it was frequently more of a barrier to entry rather than a meaningful qualification. Apple, IBM and TESLA reportedly are doing the same. A 2022 Harvard Business School report on skills-based hiring observed that "jobs do not require four-year college degrees. Employers do."

Mentors can be life-changing, but there are far too few of them. There was considerable discussion about the importance of mentors to help guide people of color and women entering STEM fields and ensure their contributions are valued and respected. Mentors with access to power can use that power intentionally to open doors. But the entire world of mentorships has been chronically neglected.

- **Mentoring should be the rule, not the exception, in both universities and the workplace.** Inspiring mentors make for great stories in part because so few people choose to become mentors. Instead, mentoring should be commonplace. For example, hours spent as a mentor should be compensated and job performance evaluations and faculty tenure review should include mentoring as a measure of success.
- University-based mentors are **very knowledgeable about career pathways in academia but less informed about STEM-opportunities in the private sector.** They need to be equally insightful in both areas and capable of creating industry connections that can inform students' educational journies.
- We must **build a stronger cadre of STEM mentors at the high school level AND focus on mentoring teachers** because there are still so many people—including a large number of people of color—who do not pursue college degrees. High school teachers are often the last educator who can raise awareness and direct students to STEM opportunities. Connecting teachers to STEM industry can prime the pipeline.

Good data can reveal inequities and encourage a quest for solutions. The systems, policies and decisions that perpetuate STEM disparities are not always apparent. There were several discussions about how good data can reveal these "blind spots."

- Universities often lose students or "weed them out" in the STEM curriculum sequence and fail to analyze the data showing where **targeted supports could promote greater retention and successful completion by underrepresented minorities.**
- Google's **decision to remove its degree requirement for certain jobs was based on data** that revealed the requirement was not relevant for identifying qualified applicants or predicting future performance.
- **The Australian Government has developed a national STEM Equity Monitor**, a user-friendly dash board for tracking participation of girls and women in STEM from primary school to high school and universities and then into the workforce. It also regularly assesses youth, educator and parent perceptions.
- There was a cautionary note that, like all data-driven approaches to decision making, **efforts to use data to measure and promote diversity in STEM must guard against potential biases** in the way data is collected, processed and used.

Making More Mentors

The Iowa STEM Teacher Externships Program is a state government program that provides stipends and training credits to high school teachers who take six-week positions at local STEM-oriented companies to gain first-hand experience in potential career opportunities they can use to advise and mentor their students. *[See sidebar on page 11]*

Data-based Solutions

At the University of North Carolina-Chapel Hill, the My Course Analytics Dashboard (MCAD) provides anonymous data that reveals how different student populations have performed in previous semesters. It allows instructors to identify disparities and prompt consideration of strategies that can eliminate them for future classes**.** *[See sidebar on page 17]*

Actions to Deliver STEM Diversity

The discussions at the USG thought leadership symposium prompted a focus on potential actions that can:

- bring more people of color and women into STEM-related degree programs and jobs in our region; and
- provide the support essential for helping them succeed.

As noted previously, the actions generally fall into four categories.

1

Increasing the number and quality of STEM mentors

2

Engaging K-12 teachers and parents

3

Creating community initiatives to increase STEM diversity

4

Changing cultures in academia and the work world

We encourage symposium participants to consider partnerships and collaborations that can translate these actions into solutions and we will reconvene in April 2023 to coordinate implementation.

1

Increasing the number and quality of STEM mentors

Make mentorship programs ubiquitous.

- Businesses, government agencies and higher education institutions can establish STEM mentorship programs targeting people of color and women who are students or early career professionals.
- These mentorship programs can be considered a standard element for demonstrating a basic commitment to diversity.

Embed mentorship duties in job requirements and ensure they are compensated.

- Rather than considering mentorships a volunteer or optional activity, make them a standard part of job descriptions.
- Assess mentorship activities as part of routine performance evaluations and grant them equivalent standing to other key performance measures.
- Include faculty mentorship activities in tenure review processes.
- Compensate hours devoted to mentoring and count them toward regular weekly/monthly time requirements. Consider offering performance bonuses for defined achievements in mentoring.

Local governments could develop a tax incentive for companies that establish mentorship programs targeting people of color and women.

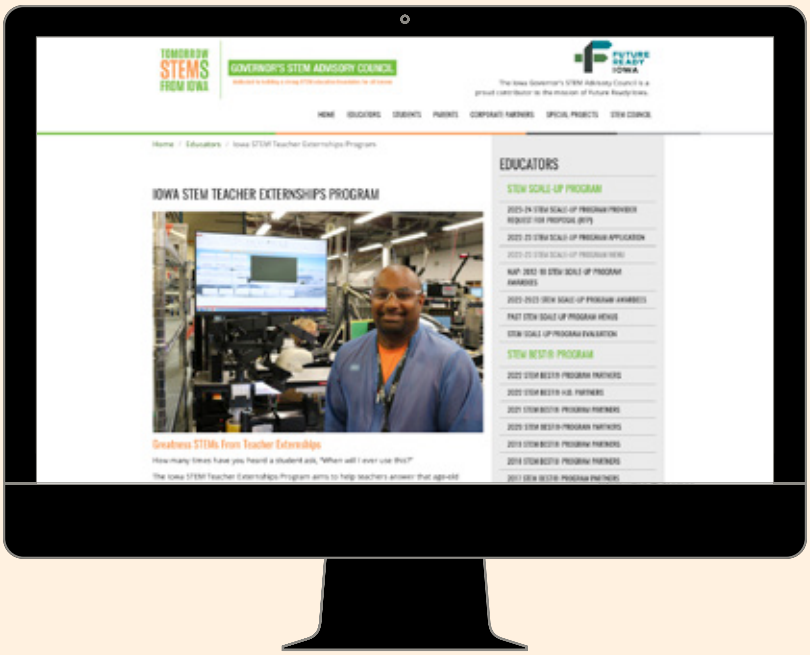
- To qualify, companies should meet certain criteria, such as those outlined above, i.e. embedding mentorships in job requirements and compensating mentorship work.
- To maintain the tax break, companies could submit regular reports on mentorship participation and impact.

Universities and local STEM-oriented businesses can establish a joint program for mentor development and education.

- The program could ensure regular dialogue regarding available career pathways and training requirements.
- The program could include a mentor hand-off process to facilitate the transition from university STEM programs to STEM-related employment.

The Maryland Tech Council Venture Mentoring Program could consider extending its work to include college and high school students and early career employees—and with a focus on people of color and women.

- This successful program is already targeting early-stage tech companies. It's a natural progression to encourage and support high school and college students who soon could be launching their own start-ups.
- One-third of the firms enrolled in the existing Venture Mentoring Program are minority-owned. This presents an opportunity to connect students of color with mentors who already have blazed a pathway in tech entrepreneurship.



STEM "Externships": Real-World Experience for High School Teachers

There are estimates that in recent years, about only about 41 percent of 18-24 year olds in the United States were enrolled in college. The numbers were lower for Blacks (37 percent) and Hispanics (36 percent). That means increasing diversity in STEM requires targeting students at least at the high school level, if not earlier, which also requires a greater focus on the STEM-related experience of high school teachers.

Iowa has embraced an approach to doing just that through what are known STEM Teacher Externships. The goal of the program is to provide funding that gives teachers an opportunity to work for six weeks in a local STEM-oriented company during their summer break. They want teachers to go back to the classroom and provide students with vivid examples of what a career in STEM involves. They also see the program as a way to create long-term partnerships between STEM employers and local schools.

As one Extern noted, "I will be able to give my students an idea of the kind of future employment they can expect to have if they only aspire to certain levels of education and training."

2

Engaging K-12 teachers, students and parents

Montgomery County Public Schools, Montgomery College and USG could consider creating a STEM outreach program targeting both parents and students in underserved communities.

- The goal of the program would be to increase awareness among both parents and students regarding STEM opportunities—and the educational pathways available to achieve them.
- The program could conduct outreach with trusted community based partners to identify parents and students who potentially could benefit and encourage them to participate.
- The program could hold regular workshops on issues such as STEM job and educational opportunities, the college admission process and scholarship options.
- These sessions could be offered both virtually and in-person and at times that accommodate parent work schedules.
- Program leaders could develop ways to regularly follow-up with parents to assess how they are using STEM-related information and to provide additional guidance to students.

3

Creating community initiatives to increase diversity in STEM

Local businesses, governments and universities could establish a joint effort to fund and staff innovation hubs in minority communities in the region.

- Leaders of the effort could consider traveling to Jackson, Mississippi to learn about the Bean Path community innovation hub—including its physical infrastructure, staffing and funding streams.

The Montgomery County Economic Development Corporation (MCEDC) and WorkSource Montgomery could facilitate fact-finding missions that connect STEM employers with community-based organizations to learn more about the local workforce and the company's impact on communities of color.

- Local STEM companies could be paired with local non-profits to learn more about the diverse populations in their communities and opportunities to reflect this diversity in their workforce.
- The engagement could include discussions of how STEM companies are affecting the local community. Considerations could include positive impacts, such as providing job opportunities for people in marginalized communities. But they should also consider negative impacts, such as displacing low-income housing.
- MCEDC could consider reaching out to representatives at Google to learn about partnerships they have developed with community groups located in areas where the company is expanding its footprint.

Bean Path: How Jackson, Mississippi is Embedding STEM in the Community

During the symposium, several participants noted the importance of recognizing yourself in the STEM professions, something many people found difficult to do in a world that remains largely white and male. That's becoming less of an issue for residents of Jackson, Mississippi. The majority-Black city is home to Bean Path, a tech incubator and technology hub for local residents.

It was founded by Dr. Nashlie Sephus, PhD, a computer scientist and Jackson native who previously worked with Amazon's artificial intelligence initiative. She wanted to establish a community tech hub in her hometown that provided everything from STEM immersion programs for local youth to basic tech help for local residents. However, Sephus prefers the terms STEAM—with the A standing for art, as she wants to encourage a broader range of people to find their place in the STEM fields.

Operating out of a large facility in downtown Jackson, Bean Path offers workshops for high school students and mentors that can help steer them to internships. There are also programs for adults. And anyone in the community can sign-up for free help-desk sessions with IT specialists.

At a recent architecture and design workshop, students designed and built model homes. They also engaged with industry experts to discuss designs for the Jackson Tech District. It's an effort by Bean Path to develop a tech hub in downtown Jackson that will include workspace, housing and restaurants.

"My goal is to turn this space into a self-sustaining village where people can live, work, play, and eat," Sephus said.

4

Changing cultures in academia and the work world

Maryland colleges and universities can work with industry partners to design degree programs that provide multiple points of entry into STEM professions.

- Students could be given opportunities to pursue two-year and four-year programs along with advanced degrees that are linked to specific job opportunities.
- The options could include “stackable” degrees, badges, certificates and credentials—a structured series of linked degrees or credentials students can choose to pursue over time, often after they have obtained their first STEM job, to steadily improve their job qualifications.
- Consider expanding experiential opportunities for students along their educational pathway that contribute to their academic work and are more clearly connected to specific job opportunities when they graduate.
- Connect with career counselors at the high school and college level to ensure students are aware of multiple STEM career pathways.

Local STEM companies can demonstrate a commitment to diversity by increasing the number of jobs they offer that don't include degree requirements.

- Companies can expand their pool of applicants and increase the diversity of their employees by embracing a skills-based versus degrees-based approach.
- Business organizations such as the Maryland Tech Council can reach out to companies that already have eliminated degree requirements to help local firms follow a similar process.
- Local governments can offer tax incentives for STEM companies to create non-degree career pathways. The entry points can include approaches such as paid apprenticeships or "uptraining" programs that help existing employees acquire new skills.

Local colleges and universities can develop "data dashboards" that track participation and retention in STEM-related classes and programs to understand where they are failing and identify potential opportunities to increase diversity.

- Data should be stripped of any personal identifiers. It should be solely intended to inform future changes to improve retention of people of color and women.
- Data categories can include gender, first-generation status, race/ethnicity, eligibility for Pell grants and student transfer status—along with grade distribution, grade trends and class attendance.
- Instructors can be trained in ways to produce custom reports and learn how their peers at other institutions are using these dashboards to improve student performance.
- Dashboards also can be developed to reveal more about students who dropout of particular STEM programs or choose not to pursue advanced STEM degrees.
- Experts in data collection and analysis can advise the process to ensure the dashboards do not inadvertently perpetuate existing biases.

Local colleges and universities can establish an exit interview process targeting graduating STEM students.

- The interviews should seek insights into students' educational experience to inform changes to curriculum and career advisory services that can improve STEM diversity.
- The interviews should occur shortly before graduation, with a follow-up interview one-year later.

Data for STEM Diversity: A Dashboard for Driving "Inclusive Learning"

At the University of North Carolina, instructors today can track the potential connection between student backgrounds and classroom performance through a new data system called My Course Analytics Dashboard (MCAD). The goal is to provide insights that can prompt instructors to consider inclusive teaching practices that can promote success for all students.

The dashboard provides anonymous data on student performance in previous classes organized by gender, first-generation status, race/ethnicity, eligibility for Pell grants and student transfer status.. Overall, it allows instructors to identify disparities in student performance and prompts consideration of strategies to eliminate them for future classes.

The creators of the dashboard have stressed that they are not talking about "handholding" or special treatment. Rather, they are encouraging instructors to use the data to make practical changes that can help all types of students succeed. They also have created a guide on How to Make Your Teaching More Inclusive. It focuses on "active learning," a teaching approach that has the potential to reduce achievement gaps in STEM courses.

Moving from Recommendations to Implementation

The USG Board of Advisors convened the Future Action Symposium to assemble a creative group of thought leaders to provide tangible recommendations for increasing diversity in STEM. We are deeply grateful for the wide range of potential actions that emerged from the deliberations.

We encourage symposium participants to share this report widely and consider potential partnerships and champions for joining our next phase of work: moving from recommendations to implementation. The Board of Advisors is committed to continuing in its role as a convener and facilitator. We are planning a symposium for the spring of 2023 dedicated to translating many of the proposed actions that emerged from this gathering into concrete initiatives.

The energy and commitment to change on display at the Future Action symposium was inspiring. The task ahead is to maintain this momentum and create the mechanisms in our region's educational institutions, universities, governments and business community that will ensure we are uplifting ALL our talent and making meaningful progress to achieve diversity in STEM training and the STEM workforce.

The Universities
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The June 2022 Future Action Symposium was proudly sponsored by the Universities at Shady Grove Board of Advisors