

# The Biopharmaceutical Industry's Sustained Commitment to Enhancing the Nation's STEM Education and Workforce



**Prepared for:**  
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# Introduction: Setting the Context

America's innovative biopharmaceutical companies understand first-hand the importance of the nation's science, technology, engineering, and math or "STEM" workforce critical to advancing U.S. innovation and maintaining its economic growth and international competitiveness.

The research-driven industry is an outsized employer of STEM talent, skills, and expertise in its mission to advance new scientific discoveries and technological advancements for patients. Despite this concentration and importance, the U.S. continues to lag other countries in key measures of STEM education, achievement, and expertise.

Innovative biopharmaceutical companies recognize the need to maintain and improve the quality of U.S. STEM education and pique student interest in and exposure to the exciting and varied careers across the industry's value chain and innovative product life cycles. To this end, the industry proactively works and partners to support and advance STEM education programs and initiatives in the local communities in which it operates, in far-reaching efforts spanning numerous states and, in several cases, nationwide.

This commitment has been sustained by allocating significant resources and investments over time, and these initiatives have reached an impressive, national scale in their combined reach and impacts on students and teachers at all education levels.

Representing the fourth in a series of studies summarizing and profiling the combined efforts of biopharmaceutical companies in these pursuits, this report utilizes findings from a sample of ten PhRMA member companies who reported on an update to the periodic survey to highlight and catalogue the many ways in which PhRMA's member companies are partnering with schools and other entities, the focus of their programming, their level of investments, and the resulting reach of their programs and initiatives.<sup>1</sup>

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<sup>1</sup> The PhRMA member companies reporting on the update include Amgen, Bayer, Biogen, Bristol Myers Squibb, Genentech, GSK, Johnson & Johnson, Novartis, Sanofi US, and UCB Biosciences.



# The Outsized Importance of STEM Talent to the Biopharmaceutical Industry and U.S. Competitiveness

The nation's biopharmaceutical industry competes on innovation fueled by STEM talent.

The innovative science- and technology-driven industry invests heavily in research and development and its advanced manufacturing capabilities to discover and produce new treatments and potential cures for patients, and it relies on its intensive deployment of talented individuals in STEM professions and roles to lead in executing its mission.

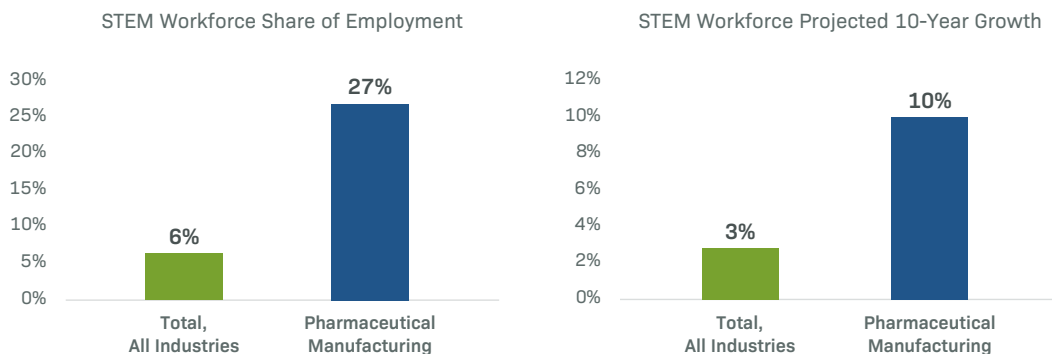
Virtually all aspects of the biopharmaceutical industry's value chain and product life cycles—from drug discovery and development through clinical trials to manufacturing and delivery of new medicines—require well-educated and trained, highly-skilled individuals in STEM fields. A broad spectrum of scientists, engineers, data scientists,



## A Leader in STEM Talent Deployment:

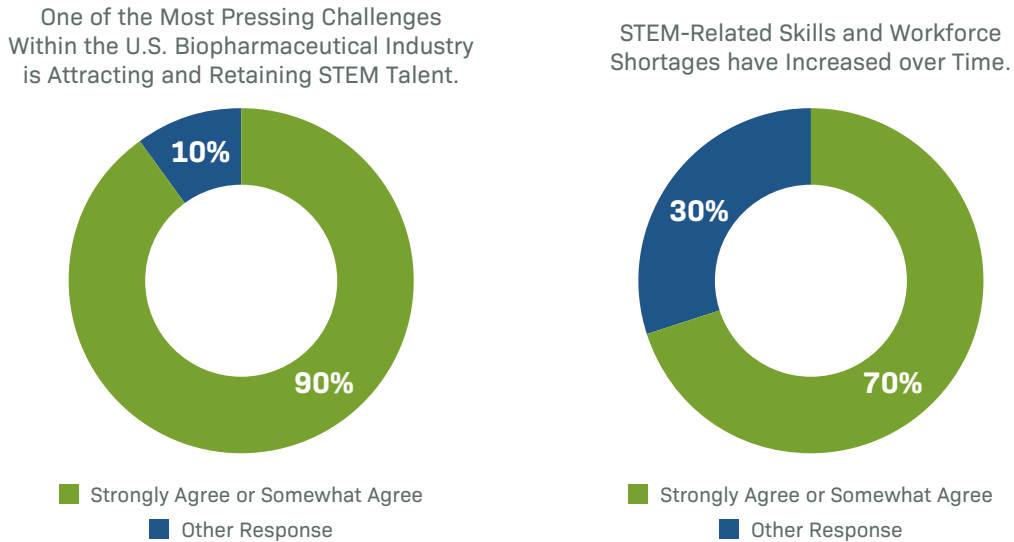
More than one in four employees in the manufacturing segment of the biopharmaceutical industry is in a STEM occupation, a concentration that is more than four times that for all U.S. industries and among the highest across all manufacturing industries.

**Figure 1: The STEM Workforce in Pharmaceutical Manufacturing vs. All U.S. Industries, 2022 and Projected Growth to 2032**



**Source:** TEconomy Partners' analysis of Lightcast Industry Staffing Patterns, 2024.1 and U.S. Bureau of Labor Statistics, Occupational Employment and Wage Statistics program projections data.

**Figure 2: Degree to Which Select PhRMA Member Companies Agree with the Statements Regarding STEM Talent Challenges**



**Source:** TEconomy Partners' analysis of PhRMA Member STEM Education Update Reporting, 2023.

and IT professionals work in concert with skilled technicians, production workers, and distribution teams to ensure new therapies, vaccines, diagnostics, and other treatments reach patient populations.

The innovation-intensive biopharmaceutical manufacturing industry employs an outsized and leading share of STEM talent as evidenced by the following:

- More than one in four employees in the manufacturing segment of the biopharmaceutical industry is in a STEM occupation (27%), a concentration more than four times that for all U.S. industries (6%) and among the highest across all manufacturing industries (Figure 1).
- The biopharmaceutical manufacturing industry's STEM talent is projected to

grow by 10% over the decade to 2032, a rapid pace that is expected to grow more than three times faster than that for overall U.S. employment (3%).

Despite the obvious strategic needs for a robust pipeline of high-performing STEM talent to fuel U.S. innovation and economic growth, there are troubling signals of continued erosion of the nation's ability to meet the rising demand for this critical segment of the workforce (see the text box below). This dynamic limits U.S. competitiveness both now and into the future and is being felt by employers. When asked about STEM talent challenges and gaps, many PhRMA member companies either somewhat or strongly agreed that STEM talent is both one of the most significant challenges for the industry, and that related skills and workforce shortages have increased over time (Figure 2).

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## U.S. STEM Competitiveness Challenges Persist

U.S. STEM performance measures and rankings versus other countries have been eroding for decades, threatening the nation's ability to compete globally. These gaps are represented and amplified by the following:

- Amid ongoing concerns about STEM proficiency in U.S. schools, recent assessments of 4th and 8th grade students are showing significant declines in math achievement, with 2022 National Assessment of Educational Progress (NAEP) results showing the largest declines in average scores since the NAEP's inception in 1990. Additionally, more 4th and 8th graders are performing below the "Basic" level in math than in 2019.<sup>2</sup>
- Internationally, U.S. 4th and 8th graders are lagging their peers, ranking 15th and 11th in the latest Trends in International Math and Science Study (TIMSS), respectively. In science, they rank 8th and 11th, respectively.<sup>3</sup>
- U.S. 9th graders are also slipping in their math assessments relative to international peers. In the 2022 Program for International Student Assessment (PISA) U.S. students had results among the lowest ever measured in math, scoring close to the OECD average. In science, U.S. students scored just above the average for OECD countries.<sup>4</sup>
- U.S. STEM teaching shortages impact the quality of education. Results from the recent National Teacher and Principal Survey found that more than 30% of those surveyed said they found it "very difficult" or were not at all able to fill teaching vacancies for STEM subjects.<sup>5</sup>
- At the postsecondary level, the U.S. lags China in its Science & Engineering (S&E) share of bachelor's degrees as a share of the total—41% for the U.S. versus 47% of all degrees for China. At the Doctoral level, the U.S. has long led the world in the number of S&E degrees awarded; however, China is quickly closing the gap. China has now surpassed the U.S. in the number of doctorate degrees in engineering and natural sciences.<sup>6</sup>
- STEM talent directly affects innovation outcomes and competitiveness. In the latest Bloomberg Innovation Index, the U.S. fell out of the Top 10 most innovative nations, dropping to 11th. When the index premiered in 2013, the U.S. was ranked 1st. The Index analyzes dozens of indicators spanning R&D activities, manufacturing capabilities, concentration of high-tech companies, patents, education, including performance in international assessments—where the U.S. notably lagged leading countries.<sup>7</sup>

As evidenced by the disparities between the U.S. and other countries on a range of STEM measures, there is a growing imperative to drive the creation of a more robust STEM ecosystem nationwide. A robust STEM ecosystem is needed not just to meet existing needs for STEM workers across the healthcare and other advanced manufacturing sectors, but also to meet future needs as policymakers seek to enhance supply chain resiliency and boost manufacturing in the U.S.

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2 The Nation's Report Card, results from the 2022 National Assessment of Educational Progress (NAEP), U.S. Department of Education.

3 National Center for Education Statistics, Trends in International Math and Science Study (TIMSS) 2019, available at: <https://nces.ed.gov/timss/results19/index.asp#/math/intlcompare>.

4 OECD, Program for International Student Assessment (PISA) 2022 Results available for the U.S. at <https://www.oecd.org/publication/pisa-2022-results/country-notes/united-states-a78ba65a/>.

5 U.S. Department of Education, Institute of Education Sciences, "Characteristics of 2020–21 Public and Private K–12 Schools in the United States," 2022.

6 National Science Foundation, Science & Engineering Indicators, 2022.

7 Bloomberg, "South Korea Leads World in Innovation as U.S. Exits Top Ten," February 2, 2021.

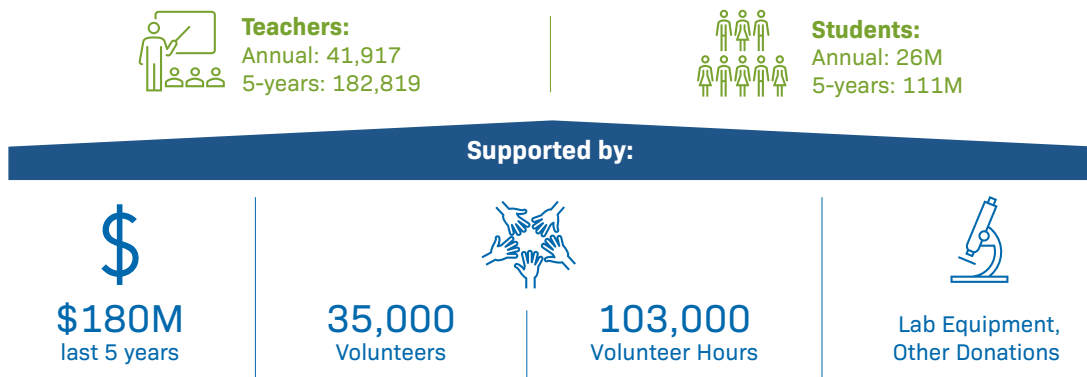


# Biopharmaceutical Industry Support for U.S. STEM Education: Key Findings

PhRMA member companies report the following reach and impacts over the last five years:

- Biopharmaceutical companies have initiated and are actively supporting 37 U.S. STEM education programs that have reached a truly impressive scale, with participation by 111 million students and nearly 183,000 teachers over a 5-year period.<sup>8</sup>
- Supported initiatives span all education levels, with a roughly even distribution of programming focused on the K-12 levels and postsecondary students and teachers.
- A significant focus of the industry-supported STEM education activities is engaging students and teachers from diverse backgrounds that have traditionally been underrepresented in STEM fields—32 of the 37 (86%) programs specifically target one or more underrepresented demographic or socioeconomic groups.

**Figure 3: The Reach of Industry-Supported U.S. STEM Education Programs: Student & Teacher Participants and Levels of Support, Annual and Last 5 years**



**Source:** TEconomy Partners' analysis of PhRMA Member STEM Education Update Reporting, 2023.

<sup>8</sup> Students and teachers would be eligible for participation in multiple STEM education programs supported by PhRMA member companies both locally and nationally and so within this figure there is likely some degree of double-counting at the national level.

- STEM programs are supported throughout the U.S. and at differing geographic levels. Sixteen programs have a primary focus at the national level, 12 are focused at local levels, and 9 have a state-level focus spanning 10 states and the District of Columbia.
- Industry support for STEM education programming takes several forms, including:
  - Financial support, totaling \$180 million over the last 5 years.
  - Half of the STEM education programs reported involve some form of in-kind support from industry, which includes employee volunteering, and/or the use or donation of company facilities, labs, or other equipment. Over the last five years, more than 35,000 biopharmaceutical industry employees volunteered nearly 103,000 hours to support U.S. STEM education programs.

## *The Varied Types of STEM Programs Supported*

Biopharmaceutical companies are supporting a wide range of STEM education programs and activities aimed at enhancing student and teacher education, development, and experiences. A majority (two-thirds) are student-focused programs in their design; however, a sizable share aims to serve both students as well as provide professional development for teachers. As shown in Figure 4, the supported programming is impressively varied, with illustrative examples provided below.

**Support for after-school and summer education and research activities.** These activities represent the largest single share of programs supported by industry and include a breadth of efforts to connect students with STEM learning and/or training opportunities beyond the classroom.

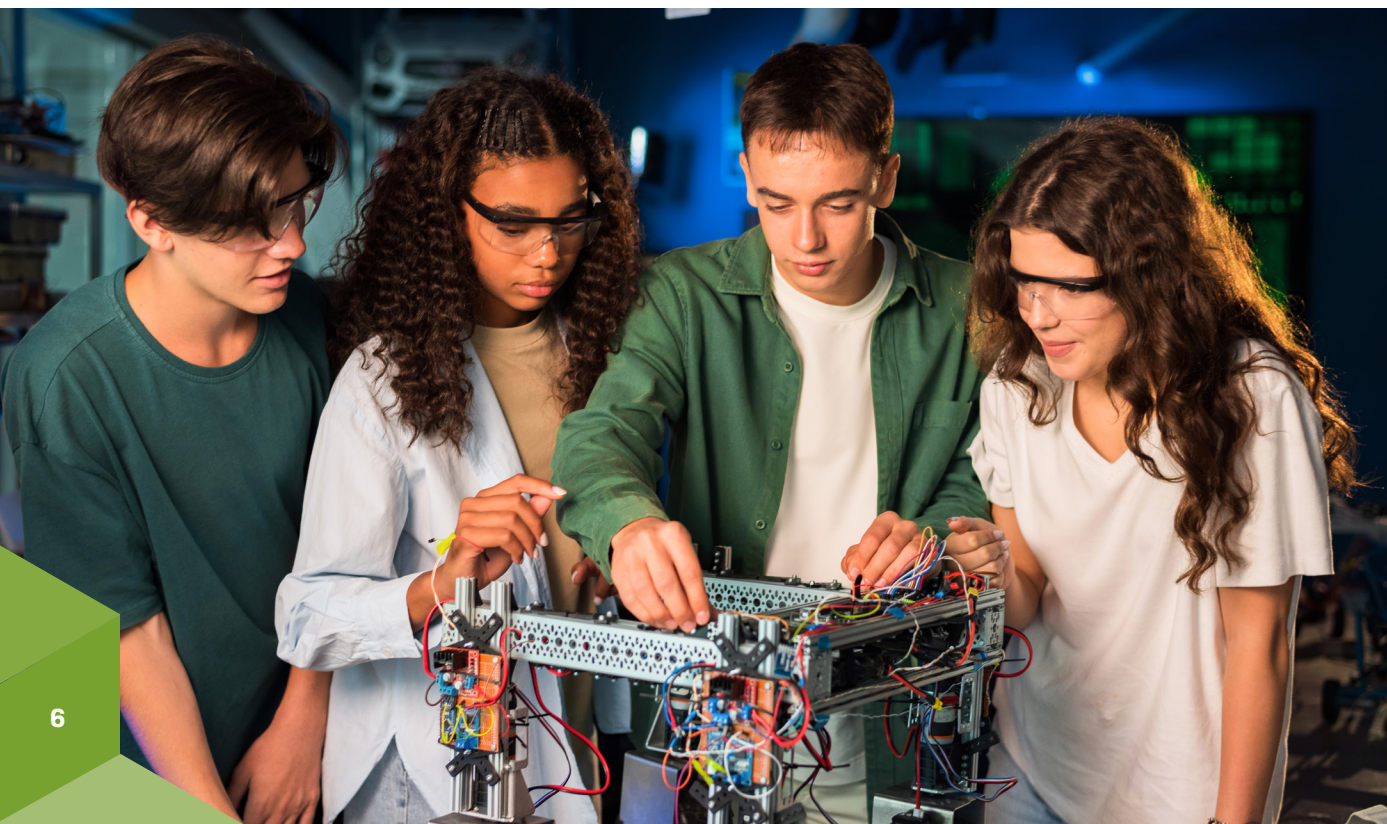
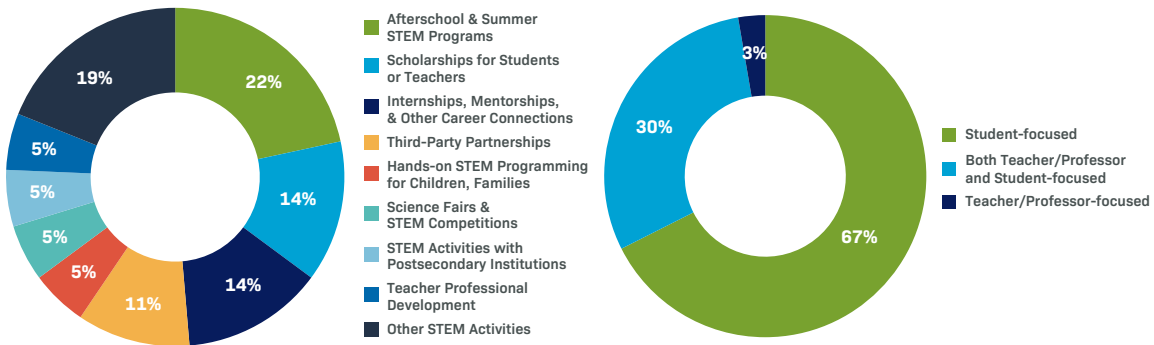


Figure 4: Types of STEM Education Programs Supported and Participant Focus



Source: TEconomy Partners' analysis of PhRMA Member STEM Education Update Reporting, 2023.

- The Amgen Foundation** is supporting undergraduate students in summer research experiences through its **Amgen Scholars Program**. Established in 2006, the program is hosted at 25 leading education and research institutions in the U.S. and globally. Student participants conduct a hands-on biotech-related research project with top university faculty, participate in seminars and networking events, and symposia. Amgen Scholars have an opportunity to present their research findings and connect with peers and leading scientists. Financial support from the Amgen Foundation ensures that students, regardless of income, can participate. Since its inception, the Amgen Foundation has supported more than 5,300 students as Amgen Scholars.<sup>9</sup>
- Biogen's Community Lab** was founded in 2002 and is the longest-running corporate STEM education program of its kind, focusing on inspiring middle and high school students in Cambridge and

Somerville, Massachusetts and Research Triangle Park, North Carolina. During the pandemic, the program shifted from in-person to virtual programming, enabling international students to participate. Today, the state-of-the-art laboratory program engages participants in hands-on and virtual experiments and experiences in biotechnology, including conversations with scientists and other biotech industry professionals. In 2024, the Community Lab expanded its model by inviting additional collaborators and local teachers to scale high-impact science education programs for students and young adults. The program includes free science activities, rigorous summer programs and teacher professional development. The refreshed Biogen "CoLab" will reach a greater range of learners with a broader breadth of programming, inspiring them to pursue higher education and careers in science and, ultimately, creating a more diverse and effective healthcare ecosystem. Since its inception, the CoLab has served more than 64,000 students.<sup>10</sup>

<sup>9</sup> Amgen Foundation, see: <https://amgenscholars.com/>.

<sup>10</sup> Biogen, see: <https://www.biogen.com/content/dam/corporate/international/global/en-US/docs/esg-report/2023-Corporate-Responsibility-Report.pdf#page=47>

- **Genentech and the Genentech Foundation** have partnered with the South San Francisco (SSF) Unified School District since 2015 to support its K-12 students through the **Futurelab** STEM education initiative. Futurelab is designed to build skills, capabilities, and excitement in science and inspire students to pursue careers in STEM fields through four programs offered at different education levels throughout the District:

- **Gene Academy:** an elementary school level mentoring and hands-on science program.
- **Helix Cup:** a middle school level science competition held annually.
- **Science Garage:** a high school level four-year biotech pathway exploring the field of biotechnology through hands-on experiments, advanced lab skills, core and elective courses, access to state-of-the-art equipment, independent studies, and more.
- **Futurelab Scholarships:** for diverse and talented graduating high school seniors, 10 scholarships are issued annually totaling up to \$425,000, including two 4-year scholarships of up to \$50,000 per year.

Futurelab supports all 8,000 students in the SSF District, 52% of whom are from population groups typically underrepresented in the sciences.

Genentech is reinforcing its commitment to this programming, launching **Futurelab+** in 2022 to scale its impacts further, aiming to reach two million additional high school students across the San Francisco Bay Area and beyond by 2026. Futurelab+ incorporates new,

industry- and standards-aligned biotech curriculum, provides teacher professional development opportunities and resources, and establishes a volunteer network of biotech professionals at Genentech to connect with classrooms and career exploration. Since its launch in Fall of 2022, Futurelab+ curriculum has reached more than 690,000 high school students, including over 60% from low-income Title I schools.

- **UCB** is actively supporting several STEM education programs and activities in local communities in which it operates through its **“Inspiring Science”** approach. The company provides funding for several after-school or out-of-school programs targeting K-12 students, including, for example, supporting STEM education activities for the Girl Scouts of Greater Atlanta; the science discovery lab at the Fernbank Museum of Natural History; and supporting BioBuilder’s high school apprenticeship program in Greater Boston. In addition to financial support for BioBuilder, Roger Palframan, Head of U.S. Research for UCB delivered BioBuilder’s annual Luminary Lecture along with other UCB scientists who engaged with participating students in the program to provide mentorship, including sharing insights into career paths, as well as with scientific poster sessions.

#### Scholarships for students or teachers.

Companies provide scholarships for students or teachers to pursue postsecondary education in a STEM-related field.

- **Bayer Fund** has partnered with the United Negro College Fund (UNCF) to establish the **Bayer Fund STEM Scholarship Program**. Launched in 2021, the Scholarship Program supports students that major in STEM fields at Historically





Black Colleges and Universities (HBCUs), a critically important source of African American graduates in STEM fields. In fact, Bayer Fund notes that HBCUs represent just 3% of all U.S. schools of higher-education and yet they produce 25% of African American STEM graduates.<sup>11</sup> In 2022, 10 Bayer Fund STEM Scholarships were awarded to HBCU STEM students.

in the Honors College who are planning to engage in research. The STEM Scholarships are part of the company's commitment to developing a strong pipeline of educated talent across diverse communities to advance industry innovation. BMS, through the STEM Scholars program, aims to increase awareness of STEM career paths within the industry and foster new research that enables the next generation of scientists to succeed.

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“The old ways of doing things won't be enough to thrive in today's rapidly evolving and technical workplace. Having graduates from diverse backgrounds bring their perspectives and new ideas to the table is what drives innovation, and Bayer Fund is pleased to play a role in helping to cultivate that diversity.”

- Al Mitchell, President of Bayer Fund

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- **Bristol Myers Squibb** supports undergraduate students at the University of Massachusetts Boston through its **Tomorrow's Innovators STEM Scholarship**. The Scholarship is open to senior level biology, biochemistry, or chemistry majors

**Internships, mentorships, and other career connections.** Companies understand the strong value of meaningful career exposure and experiences, primarily for postsecondary STEM students, and are actively connecting them to career opportunities.

- Recognizing the scarce numbers of African American and Hispanic/Latinx talent working in healthcare and biomedical regulation, **Genentech established the Howard Fellowship** to introduce graduate student fellows to careers within the biotech and pharmaceutical industry regulatory space and at the U.S. Food and Drug Administration (FDA). The Fellowship was established as a partnership between Genentech, the FDA, and the Howard University College of Pharmacy. Launched

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<sup>11</sup> Bayer Fund, see: <https://www.bayer.com/en/us/cultivatingstemleaders>.



in 2020, the program grew to include nine fellows in 2023 and is expanding to recruit other Doctor of Pharmacy

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“At Genentech, we are committed to delivering transformative treatments to patients suffering with unmet medical needs. We focus specifically on advancing inclusive research and health equity through partnerships across healthcare, education and within communities so that we can have a positive impact on society.”

- Rebecca Vermeulen, Vice President, Global Patient Network, Genentech and Sponsor of the Howard Fellowship Program

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(Pharm.D.) and graduate programs at additional HBCUs.

- **Sanofi US supports Discovery Education's STEM Careers Coalition**, serving as a Founding Partner since its inception. Discovery Education partners with schools on digital curriculum and solutions that leverage the power of technology to close achievement and equity gaps. The STEM Careers Coalition is focused on partnering with the corporate community to change the educational experience of millions of students and to advance diversity in STEM careers by bringing real-world industry examples into schools delivered in innovative and compelling new ways. Sanofi colleagues have been among the first to participate in the initiative that connects professionals across industries and companies to the nation's classrooms. Career Connect is focused on providing real-world applications to the STEM concepts being taught, learning about the latest industry advances that

have not yet reached textbooks, and preparing students for the future of work.

- **Biogen** recognizes that to address gaps in health equity and patient outcomes, the industry needs to build an inclusive pipeline of scientists and healthcare professionals. Biogen provides mentorship and financial support at Historically Black Colleges and Universities and local community colleges, with a specific focus in supporting underrepresented students pursuing neuroscience careers. In 2022, Biogen and Xavier University of Louisiana announced the **Biogen Sharp-Verret Award**, a scholarship that provides students with the support and guidance necessary to successfully pursue neurological and neuroscience careers. In 2023, Biogen's University Relations team mentored students from Morehouse School of Medicine, North Carolina Central University, Shaw University, and Xavier University of Louisiana. Biogen also supports **Project Onramp**, a Life Science Cares program, through which students get paid summer internships, and Biogen welcomes passionate and motivated four-year college students from low-income backgrounds interested in the life sciences industry.

**Hands-on STEM programming for children and families.** Access to hands-on educational experiences in STEM can be transformative for elementary-age students by instilling an inquiry-driven mindset and interest in STEM subjects.

- **The GSK Science in the Summer program** provides students in grades two through six with active, hands-on educational opportunities, preparing them with the basic STEM skills that can lead to academic and professional success. By targeting younger students, particularly



those from underserved populations across the country not widely represented in the scientific community, GSK, in partnership with The Franklin Institute and the UNC Morehead Planetarium and Science Center, is able to reach populations who would not otherwise have access to these high-quality STEM experiences—especially during summer breaks, when school is out of session. The free, inquiry-based science education program is offered nationally to more than 36 sites across the U.S. through participating out-of-school time providers, science museums, and libraries. The program helps students grow to love science and has reached hundreds of thousands of students since it began in 1986. From 2021 through 2023, more than 88,000 students participated.

**Third-party partnerships for STEM programming.** Biopharmaceutical companies are collaborating with various

public and/or private sector organizations on STEM-related initiatives.

- **The Biogen Foundation** has supported the Massachusetts General Hospital (MGH) Youth Neurology Education and Research Program since 2020, its inaugural year. The program inspires high school and undergraduate students from communities underrepresented in neurology by offering exposure to leading neurologists and neuroscientists from diverse backgrounds; paid opportunities to engage in mentored educational and research activities; and structured support to translate contributions into publications, presentations, and awards. The program also hosts a free INSPIRE Speaker Series for high school and undergraduate students that features insights from leading neurologists and neuroscientists of diverse backgrounds. Since 2020, the program has equipped 118 student interns with paid and mentored neurology research

experiences and reached more than 500 participants in dynamic learning sessions with leading neurologists and neuroscientists from diverse backgrounds.<sup>12</sup>

*“This program is so vital because it allows us to attract young people from all walks of life and support them as they become future leaders in the field of neurology. This is one way we can help accelerate scientific discoveries and ensure that clinicians are just as diverse as the communities we serve,” says Nicta Mejia, MD, MPH, FAAN, Director of Mass General Neurology Community Health, Diversity and Inclusion who created the Youth Neurology Education and Research Program.*

- **Novartis and the Novartis U.S. Foundation**, seeking to address root causes of disparities in health and education, launched **Beacon of Hope** in 2021. Designed as a 10-year, \$50 million collaborative initiative with 26 HBCUs,

other biopharmaceutical industry partners and organizations, Novartis and its partners are working collaboratively to address a number of significant issues and challenges, including to: increase diversity among clinical trial participants and investigators; improve access to high-quality education and promising jobs; examine clinical algorithms that include race as a diagnostic factor that negatively impact patients of color and recalibrate those algorithms to remove race to improve decisions and outcomes; and find actionable solutions to environmental and climate issues that disproportionately affect health among communities of color. Among the partnering organizations are Morehouse School of Medicine, Howard University College of Medicine, Meharry Medical College and Charles R. Drew University of Medicine and Science, plus Merck, Sanofi, Coursera, the Thurgood Marshall College Fund, and the National Medical Association.

<sup>12</sup> See: <https://giving.massgeneral.org/stories/youth-neurology-program-inspires-students-to-pursue-their-passions>





**Figure 5: Examples of Organizations and Institutions Partnering with Biopharmaceutical Companies in STEM Education Initiatives**



**Source:** TEconomy Partners' analysis of PhRMA Member STEM Education Update Reporting, 2023.

## Manufacturing Skills Gaps Lead to Economic Challenges and Threaten U.S. Competitiveness

Deloitte and the Manufacturing Institute have sought to highlight the persistent challenges faced by U.S. manufacturers in filling open positions in regular surveys and assessments of the industry's skills gaps nationally. **In their 2021 study, they find that, left unabated, the skills gap in U.S. manufacturing is expected to leave 2.1 million jobs unfilled by 2030 and could cost the nation's economy as much as \$1 trillion.**<sup>13</sup>

The study points to insufficient numbers of qualified workers, including those with STEM skillsets, to fill the gaps. While the latest study is based on surveys conducted amidst the COVID-19 pandemic, 77% of manufacturers surveyed say they will have ongoing difficulties attracting and retaining workers in the coming years. Digital transformation in manufacturing is impacting work across most roles in manufacturing operations, requiring enhanced skills and capabilities, and often the need for upskilling digital skills and at times redeploying the existing production and technician workforce into new areas.

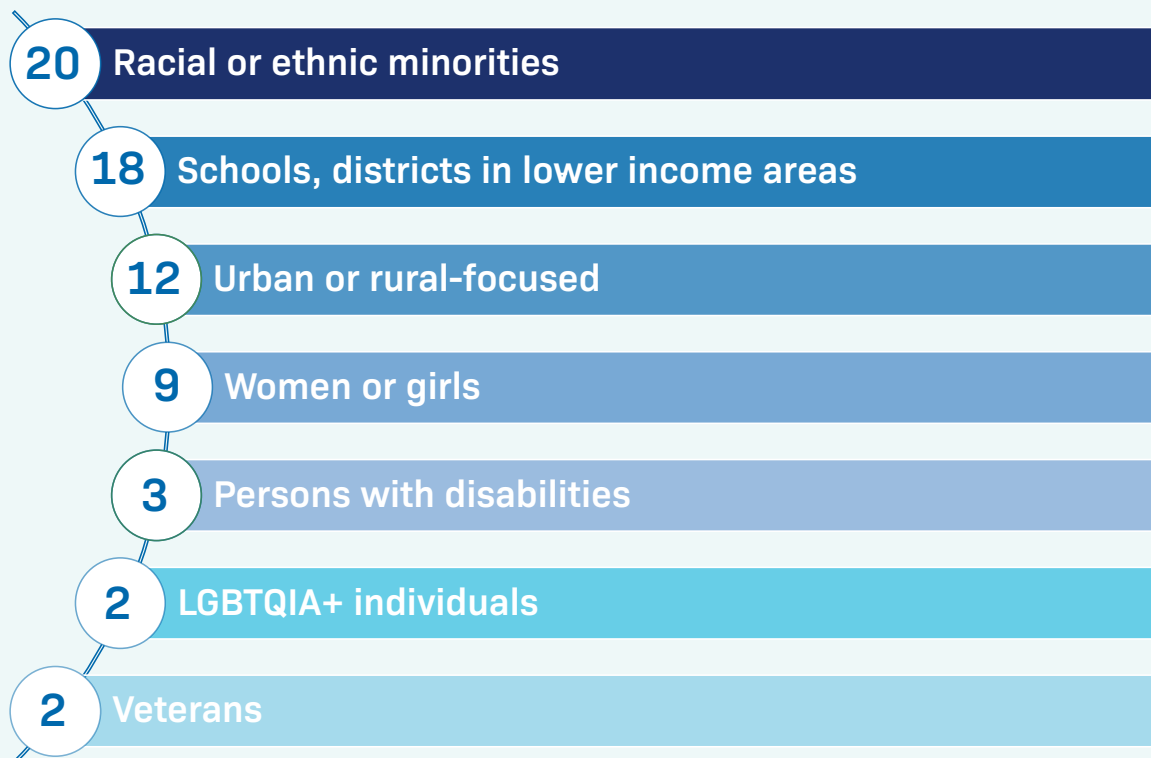
<sup>13</sup> Deloitte and The Manufacturing Institute, "Creating pathways for tomorrow's workforce today: Beyond reskilling in manufacturing," 2021.

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## An Industry Supporting Underrepresented Communities in STEM Fields

Nearly all biopharmaceutical industry-supported STEM education programs are aimed at engaging students and teachers from diverse backgrounds that have traditionally been underrepresented in STEM fields. Among the 37 programs analyzed by TEconomy, 32, or 86%, specifically target one or more underrepresented demographic or socioeconomic groups for participation (Figure 6). The program vignettes highlighted within this report illustrate the many and varied ways in which companies are supporting and proactively engaging with students and teachers at all educational levels, often as a key pillar of broader industry efforts aimed at advancing diversity, equity, and inclusion (DEI) as a strategic priority.<sup>14</sup>

**Figure 6: PhRMA Member STEM Education Programs Targeting Population Groups Typically Underrepresented in the STEM Workforce**



**Source:** TEconomy Partners' analysis of PhRMA Member STEM Education Update Reporting, 2023.

**Note:** counts shown here will not sum to program totals due to double counting across population and socioeconomic groups where education programs are focused toward more than one group.

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<sup>14</sup> For more information on the industry's efforts to advance DEI, see: TEconomy Partners and PhRMA, "The Biopharmaceutical Industry: A Sustained Commitment to Advancing Diversity, Equity, and Inclusion," 2024.



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“In a rapidly changing global landscape, investing in a more inclusive innovation community is critical for the United States’ long-term economic success, social cohesion, and national security.”

- Center for Strategic and International Studies, *Inclusive Innovation for U.S. Economic Growth and Resiliency*, 2023

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### ***A Holistic Approach to Engage Women in STEM: J&J’s WiSTEM2D Initiative***

Johnson & Johnson has committed to supporting and inspiring girls and women of all ages in their pursuit of STEM-related education and careers through its WiSTEM2D initiative, which stands for Women in Science, Technology, Engineering, Math, Manufacturing and Design. J&J works with partner organizations to advance student and youth outreach and to develop STEM resources, these include Girl Scouts of the USA, the World Association of Girl Guides & Girl Scouts, FHI 360, JA Worldwide, Smithsonian Science Education Center, and National Society of Black Engineers. These partnerships have helped J&J reach more than 14 million girls since the Initiative’s inception.

At early ages and through high school, the program seeks to cultivate girls’ STEM2D interests through creative problem-solving and play through, for example, its Student Activity Series targeting one or more STEM2D subject areas. At the college and university level, the Johnson & Johnson Scholars Award Program offers financial support for research funding and ongoing mentorship programs to help women in STEM2D fields graduate and pursue careers. Further, the WiSTEM2D program supports adults such as educators, STEM professionals, or other potential mentors to serve as role models, share personal stories, and help relate to young learners and professionals.

### ***Leveraging a Collective Impact Approach to Increase Diversity in STEM: GSK’s Support for the Philadelphia STEM Equity Collective***

GSK partners with the Philadelphia Education Fund and the Philadelphia STEM Ecosystem to support the Philadelphia STEM Equity Collective (PSEC), an ongoing 10-year collective impact strategy with a mission to increase the number of Black, Latinx, and women Philadelphians entering STEM careers. PSEC works to enhance equity, access, and inclusion in STEM career pathways for city students who are traditionally underrepresented in STEM fields.

GSK brings together Philadelphia schools, out-of-school time providers, colleges and universities, employers, local government, and philanthropy under the collective impact approach to address challenges and gaps in supporting local children from backgrounds underrepresented in STEM. Further, GSK provides backbone support for the Collective with funds for dedicated staff and through GSK volunteers providing their time and expertise. In addition, GSK commits grant funds each year to local nonprofit organizations working to address inequities in STEM education and careers.

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**Supporting teacher professional development.** Staying current regarding the latest advances in science and other STEM fields is challenging for teachers. Like their students, teachers can benefit from additional educational programming and resources. To ensure the nation's teachers are up to date on dynamic and ever-changing technology fields, companies are supporting impactful engagements with teachers.

- For more than 30 years, the **Amgen Foundation** has supported high school teachers introducing the excitement of scientific discovery and real-life biosciences to their students through the **Amgen Biotech Experience (ABE)**. The innovative program provides teachers with professional development and education materials, and loans research-grade equipment to high schools in the U.S. and 15 other countries at no cost. In a typical year, the ABE program reaches approximately 1,500 teachers and 90,000 students.<sup>15</sup> ABE has a strong and intentional focus on advancing opportunities for underserved communities in which Amgen operates, though digital resources including laboratory simulations are freely available to anyone with an internet connection on LabXchange.org. As a founding sponsor, the Amgen Foundation has committed \$42 million to LabXchange, which has provided nearly 50 million users with high-quality digital resources since its launch in 2020.
- **UCB** began partnerships with the Georgia BioEd Institute, Georgia Department of Education, and other life science industry organizations in 2020 to provide professional development for 72 rural science teachers and to supply them with materials to implement hands-on lab

experiences, impacting 11,500 students across the state. With UCB's renewed and robust support in 2021, 2022, and 2023 a total of 370 teachers and 52,682 Georgia students have been impacted to date. Approximately 70% of those students are from rural or underserved schools.

#### **Sponsoring science fairs, festivals, or STEM-related competitions.**

- **Bayer Fund** has partnered with the National Parent and Teacher Association (National PTA) as the Founding and Presenting Sponsor of the **STEM + Families Initiative** which provides grants, tools, and support to local PTAs for hosting local STEM + Families Science Festivals. Through the collaboration, grants were awarded from Bayer Fund to 30 local PTAs in late 2022, with more than half the grantees representing Title I schools—ensuring the festivals bring STEM education opportunities to diverse and low-income families. In addition, the grant included funding for a Bayer Fund STEM + Families Fellow focused on improving the effectiveness of the STEM resources through new content development and program enhancements.

#### **STEM partnerships with postsecondary institutions.**

- **Sanofi, through its PharmD Fellowship Program**, is supporting the professional development of post-doctoral students with a Doctor of Pharmacy degree with two fellowship programs designed to further their experience in the pharmaceutical industry through work experience and clinical research. Sanofi US has partnered with Rutgers University and the Massachusetts College of Pharmacy & Health Sciences

<sup>15</sup> Amgen, ABE Fact Sheet, see: <https://amgenbiotechexperience.com/sites/default/files/factsheetglobal.pdf>.

to offer one- and two-year fellowships in several areas, including: Global Medical Information, Global Health Economics and Outcomes Research, Global Regulatory Affairs, Global Medical Affairs, Strategic Marketing, US Trade & Market Access, Patient Advocacy & Public Affairs, Vaccine Epidemiology & Modeling, Global Pharmacovigilance, and US Consumer Healthcare Research & Development. In 2023, 70 fellows were a part of these

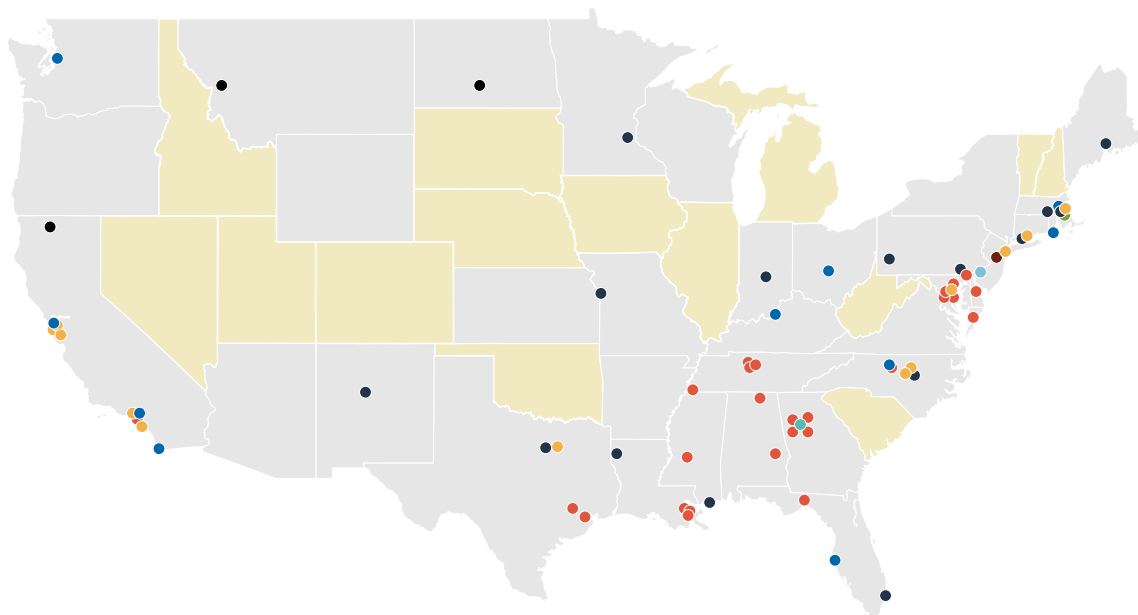
two programs at an investment of \$7 million. Over the last five years, Sanofi has invested more than \$31 million supporting more than 300 fellows.

Considered all together, the geographic reach of PhRMA member STEM education initiatives is impressive. The map in Figure 7 highlights initiatives serving both local and national constituencies of students and teachers.

**Figure 7: Map of States and Localities Served by PhRMA Member STEM Education Initiatives**

**States Served by PhRMA STEM Programs**

- State Served by Local PhRMA STEM Programs
- Other States Served by National PhRMA STEM Programs (including J&J, Bayer)



**Presence of Local STEM Programs (Dots on Map)**

- Amgen Biotech Experience
- Amgen Scholars
- Biogen STAR Initiative
- Bristol Myers Squibb Scholarships
- Genentech FutureLab
- GSK Science in the Summer (Active Sites)
- GSK STEM Equity
- Novartis HBCU Scholarships
- Sanofi Pharmacy Scholarships
- UCB (Various Programs)

**Source:** TEconomy Partners' analysis of PhRMA Member STEM Education Update Reporting, 2023.



# Conclusion

The U.S. biopharmaceutical industry competes on innovation driven by STEM talent—a critical, outsized enabler of both its operational capacity as well as a driver of future therapeutic discoveries.

Building and sustaining a robust STEM education and talent pipeline and corresponding workforce is central to ensuring supply chain resiliency and enhancing U.S. manufacturing. These efforts are hampered, however, by persistent gaps in student achievement, education and career pursuits, and resulting skills and workforce deficiencies.

In response to both its current and future demand for talent, and vast STEM skills gaps, the nation's biopharmaceutical industry and its corporate foundations are lending their resources and expertise, investing in and leveraging strategic partnerships to make substantial contributions nationally to STEM education and workforce development.

Support is targeted at all education levels and focused on meaningful career connections, with a primary focus on enhancing the diversity of STEM talent. These efforts and major investments of biopharmaceutical companies are reaching impressive scale—with 26 million U.S. students and nearly 42,000 teachers participating in industry-supported programs in the last year alone.

The nation's economic growth and competitiveness relies on the competitive advantage of a steady and predictable supply of highly skilled STEM workers. Facing increasing international competition in STEM education and talent from other nations, the U.S. cannot continue to lag.







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