

STEM Workforce Training to Address Tomorrow's National Challenges



How PNNL engages students from underserved communities in STEM pathways

For over 50 years, PNNL has served as a hub for innovation and research, while connecting students, teachers, and educational partners in the K-20 system to real-world science experiences. For far too long, the science and engineering workforce has suffered from underrepresentation of women, Black, Latino, Indigenous, and Native American persons. PNNL provides leadership in delivering equitable, engaging science, technology, engineering, and mathematics (STEM) learning and workforce development opportunities for diverse students and educators. PNNL's pledge to inspire and develop the future workforce is rooted in the belief that teams of diverse individuals—especially comprising those who have been historically underserved in STEM—will address our nation's most challenging scientific issues and ensure America's competitiveness.

TRAINING AND INSPIRING DIVERSE STEM PROFESSIONALS

PNNL's **corps of STEM Ambassadors**—engineers, scientists, technicians, and skilled tradespeople—serve as diverse role models and trusted science communicators. STEM Ambassadors are a foundational part of PNNL's workforce development strategy. Trained to share science in inspiring ways, STEM Ambassadors support STEM outreach, educator professional development, and internship initiatives. Nearly 65% of STEM Ambassadors are women, nonbinary, Latino, Black, and/or Native American persons. In 2020, STEM Ambassadors engaged nearly 5,000 students, families, and community members. These experiential learning opportunities provide an inclusive, multicultural view of the DOE workforce and STEM careers and help generate understanding that STEM is for everyone. Investing in the professional development of diverse STEM professionals ensures STEM Ambassadors are deployed throughout STEM equity and workforce development programs.

CREATING CULTURALLY RELEVANT K-12 STEM EDUCATION PATHS

Using a culturally relevant, equity-focused framework to engage cohorts of middle and high school students from historically underserved communities, PNNL leads the national, award-winning **Mathematics Engineering Science Achievement (MESA) program** for the southeast region of Washington State. Students participate in exploration activities as they seek to pursue post-secondary education credentials and STEM careers. MESA students engage in collaborative, STEM-focused competitions, and academically rigorous projects. The program offers opportunities to develop technical skills, receive educational support, complete college preparation activities, and connect with diverse role models, including PNNL STEM Ambassadors. These strategies help students develop a STEM identity. In 2019-2020, 63% of students were from historically underserved communities

MESA teachers receive professional development in culturally responsive pedagogy and practices, affecting more than 1,800 students to date. Of MESA's graduating 2020 seniors, 71%

planned to pursue post-secondary education for a STEM career. By contrast, just 31% of Washington State 2017 SAT-takers indicated their intention to pursue a STEM degree.

ADVANCING EQUITY THROUGH INCLUSIVE INTERNSHIPS

Providing students from historically underserved communities with paid, flexible internships is a critical education and career retention strategy, offering workforce training for ready-to-be-filled jobs. PNNL annually hosts more than 1,200 interns and research associates in its **Gold Experience internship program**. Gold Experience interns, from high school to graduate students, participate in immersive experiences; delve into scientific research in chosen disciplines; expand technical, communication, and cultural knowledge and skills; and grow networks. In 2020 amid the COVID pandemic, PNNL quickly pivoted to deploy a remote internship model. Regardless of socioeconomic status or geographic location, students continued on their pathways to educational credential attainment and STEM careers.

In 2020, 51% of interns were women and/or from historically underserved groups. Nearly 30% of PNNL's diverse STEM Ambassadors served as mentors for interns and all mentors received training in how best to support intern career development. Interns embraced this remote model: 90% indicated they would return to PNNL for a remote internship and 73% plan to seek full-time employment at PNNL or other national laboratories.

SUPPORTING CAREER PATHWAYS FOR DIVERSE COLLEGE STUDENTS

As the region's largest STEM employer, PNNL plays an important role in driving the regional economy and providing jobs that support a more inclusive middle class. By aligning educational training programs to serve diverse community college students, PNNL accelerates career opportunities and pathways to the middle class, while advancing leadership in scientific innovation. **Community partnerships** with the local minority-majority school district (71% Latino) and designated Hispanic-Serving Institution community college, provide the mechanism for PNNL to support the development of educational training programs in engineering technology, nuclear technology, and cybersecurity.

PNNL informed the curriculum and pathway for a dual-credit, **high school to community college applied bachelor's degree in cybersecurity** at Columbia Basin College. Program students participate in PNNL Gold Experience internships and are often hired as full-time cybersecurity specialists. In 2021, 64% of the Cybersecurity program participants are students of color and/or women.

ABOUT PNNL

Pacific Northwest National Laboratory advances the frontiers of knowledge, taking on some of the world's greatest science and technology challenges. Distinctive strengths in chemistry, Earth sciences, biology, and data science are central to our scientific discovery mission. PNNL's research lays a foundation for innovations that advance sustainable energy through decarbonization and energy storage and enhance national security through nuclear materials and threat analyses.

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