

Development of a Workforce to Support a Distributed, Equitable Bioeconomy

A Policy Paper by the Engineering Biology Research Consortium

*Compiled and edited by Emily R. Aurand, EBRC Director of Roadmapping and Education
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The development of [biotechnologies that will usher in a more sustainable and healthier future](#) require a talented, trained workforce that reflects the diversity of America. The bioeconomy will rely on the distribution of opportunity geographically, demographically, and across the workforce spectrum. To support the growth of talent in all 50 states and reach all Americans—including people of color, people with disabilities, and people from economically disadvantaged backgrounds—federal agencies must advance [biotechnology education](#) and workforce development policies and programs that meet potential trainees where they are. The U.S. Government can establish and incentivize programs, infrastructure, and funding for regional education and training, direct assistance to those with traditionally fewer opportunities, and to make sure that there are entry and access points into the bioeconomy workforce throughout the pipeline.

Opportunity should be geographically distributed

Challenge - The bioeconomy is growing in a distributed fashion across the country; however, the US still needs to rapidly onshore and expand capacity if we are to meet the demands of the growing bioeconomy. While biomanufacturing capacity is distributed more broadly, major research and innovation is currently centered in a few regions, creating an opportunity for greater geographic distribution of education and workforce development.

Recommendation - The federal government can:

- Incentivize and establish educational institutions, programs, and training centers that are geographically distributed to meet regional needs and opportunities in biomanufacturing and the bioeconomy and ensure that students in rural areas have access. Congress and agencies can earmark funding for educational programs (secondary, post-secondary, and graduate) and workforce training (CTE, apprenticeships, informal educational programs, portable training materials) that can reliably meet the future workforce where they are.
- Establish and invest in biotechnology and biomanufacturing infrastructure across the U.S. This can include identifying existing fermentation and manufacturing capacity that can be repurposed for bioproduction and developing a strategy for adding new biomanufacturing facilities in regions near key resources and where costs are low. The federal government can also provide financial incentives for states and companies to build and use domestic facilities and then draw their labor pool from the region in which the facilities are located.

The future workforce should be demographically diverse

Challenge - Education is the surest, shortest path to economic prosperity, but long-standing inequities limit the diversity of our nation's skilled workforce. Some institutions do not yet appreciate the inherent and practical value of diversity, equity, inclusion, and accessibility (DEIA) as important drivers not just for the scientific

research enterprise, but for sustainable and sound workforce development. While organizations like the NSF have placed an emphasis on broadening participation of traditionally underrepresented groups in STEM, institutions serving those groups (MSI, HBCU, etc.) are generally under-resourced for providing educational and training opportunities in STEM, and even more so for providing education and training in emerging areas like the bioeconomy. Similarly, to engage a broader demographic of individuals in the fast-growing bioeconomy, education and training needs to extend beyond traditional educational institutions to all points of entry, with programs and resources for non-traditional communities and those outside of the educational pipeline.

Recommendation - To attract a diverse workforce into the bioeconomy, the federal government must ensure abundant opportunities for education and technical training. Effective education and training for bioeconomy jobs requires access to expertise, instructional capacity and materials, and tools and technologies that are foundational to the sector. The federal government should:

- Provide direct support to minority-serving institutions, including the infrastructure and physical resources to introduce students to engineering biology and biomanufacturing skills, encouraging the development of interdisciplinary programs in bioeconomy-allied fields of science and engineering, and incentivizing the establishment of programs and activities that expose students to career opportunities in biotechnology.
- Catalyze the training of talent throughout the country, for individuals at all levels of educational attainment. This includes establishing skills-oriented training programs that serve teenagers in poor and/or immigrant communities and that offer a high school credential or certificate, veteran-serving community programs that provide after-hours training with wrap-around support for active service military spouses and under-employed service-men and -women, and informal education centers with coordinated public programming that can familiarize residents of non-traditional STEM hubs with the career opportunities and required technical skills to meet regional needs in biomanufacturing.
- Incentivize programs and action for research-intensive institutions and industry to engage and hire individuals with various disabilities that can thrive in the bioeconomy with certain workplace accommodations.

Opportunities should exist to consistently retrain and upskill

Challenge - There are both economic and social imperatives for investing in workforce training specific to the bioeconomy. Bioeconomy opportunities are starting to arise in areas that are seeing losses in other sectors. Today's incumbent workers who see their expertise as either insufficiently up to date or focused on a narrow and perhaps shrinking area of the economy, must not be allowed to fall behind but should, instead, be supported with federally-funded professional development opportunities.

Recommendation - The federal government should

- Expand the availability of existing retraining programs and events, to ensure that talent will persist in or transfer to jobs in biotechnology and biomanufacturing.
- Provide formal and informal opportunities tailored to those from sunseting industries to develop skills and abilities that align with regional bioeconomy jobs.
- Catalog and provide incentives for companies to enroll their employees in short, effective programs that are specific for current and potential bioeconomy workers.