UNIVERSITY TRAINING AND RESEARCH

The **University Training and Research (UTR)** program supports early-stage research at U.S. colleges and universities that advances the Office of Fossil Energy and Carbon Management (FECM) mission of delivering integrated solutions related to minimizing the environmental impacts of fossil fuels while working towards net-zero emissions.

By investing in the education and training of America's future scientists and engineers, this program highlights the key role technology plays in addressing America's energy challenges, promotes the development of innovative and disruptive technologies, and reinforces workforce development as a part of our nation's continued economic prosperity. With a special emphasis on diversity and inclusion, the UTR program provides opportunities for traditionally underrepresented communities in science, technology, engineering and mathematics (STEM) fields.

Program 135, October 2024

NATIONAL ENERGY TECHNOLOGY LABORATORY

UTR comprises two sub-programs — Historically Black Colleges and Universities and Minority Serving Institutions (HBCU–MSI) and University Carbon Research (UCR). The core mission of both sub-programs is the following:

- To educate and train the next generation of engineers and scientists to help develop and contribute to a highly skilled, inclusive and competitive U.S. workforce and economy.
- To support novel early-stage research at U.S. colleges and universities toward integrated solutions related to fossil energy and carbon management enabling transformation to a sustainable, low-carbon energy future.
- To increase research and development (R&D) opportunities for underrepresented communities within the United States and tap into the innovative and diverse thinking of student researchers at HBCU–MSI institutions of higher learning.
- To ensure that students are being equipped with cutting-edge, translatable skill sets that will allow them to contribute to the U.S. workforce and greater economy over the course of a long and enduring career.

The UTR program conducts a nationwide competitive solicitation each year. Research and development projects are awarded as grants ($200,000–$15 million) with a typical duration of two to three years. This educational outreach initiative enhances the DOE's ability to develop and sustain a national program of university research that seeks technology innovation to reduce carbon emissions and train a prepared to address the global challenge of climate change.

Between fiscal years 2010 and 2023, the UTR program made 168 R&D awards valued at more than $71.03 million[2] and helped to support more than 579 students at various stages in their academic careers, including undergraduate, master's, and Ph.D. levels.

HISTORICALLY BLACK COLLEGES AND UNIVERSITIES AND MINORITY INSTITUTIONS (HBCU-MSI)

For more than 30 years, NETL has supported the HBCU–MSI program, making it one of the longest-running university training initiatives within FECM. The key objective for the HBCU–MSI program includes providing R&D opportunities for traditionally underrepresented populations in STEM fields and maintain and upgrade the educational, training and research capabilities at HBCUs, MSIs, and Tribal Colleges and Universities. These activities seek to advance environmental justice and revitalize the economies of disadvantaged communities.

From 2010-2023, 76 awards were made through the HBCU–MSI program with a cumulative total value more than $31.77 million, with 286 students benefiting from the program.

UNIVERSITY CARBON RESEARCH (UCR)

The UCR program provides funding to colleges and universities to support early-stage research and education surrounding new technology development and deployment consistent with FECM's goals. The program provides a threefold benefit: (1) conducting directed energy research in an innovative environment; (2) expanding the research capabilities and education of students in STEM and humanities disciplines; and (3) developing research-based solutions to support Administration R&D and equity goals.

From 2010-2023, 92 awards were made with a cumulative total value of more than $39.26 million, with 293 students benefiting from the program.

TECHNOLOGY INNOVATIONS THROUGH UNIVERSITY-LED RESEARCH AND DEVELOPMENT

The UTR program is dedicated to conducting early-stage R&D for a wide variety of technology applications. Current development efforts are aligned with the FECM Strategic Vision:

- Point-Source Carbon Capture (PSC): Reduce the cost, increase the efficacy and advance deployment of commercial-scale PSC technologies in the power and industrial sectors.
- CO_2 Conversion: Accelerate capabilities for large-scale conversion of CO_2 into products advancing net-zero and justice goals, facilitated by markets for CO_2 as a feedstock.
- Carbon Dioxide Removal: Diverse approaches supporting DOE's Carbon Negative Shot, addressing emissions from hard-to-decarbonize sectors.
- Reliable Carbon Storage and Transport: Advance storage technologies and support large-scale transport and storage facilities and regional hubs.
- Hydrogen with Carbon Management: Develop hydrogen production from sustainably sourced carbon-based feedstocks coupled with carbon capture and storage, hydrogen storage, reversible solid oxide fuel cells, and hydrogen-fired generating turbines.
- Domestic Critical Minerals (CM) Production: Develop and demonstrate technologies for extraction, processing and refining CM for a strong supply chain and good jobs.
- Methane Mitigation: Minimize the environmental impacts of fossil energy extraction, transport and utilization with a focus on life cycle methane emissions.
- Visiting Scholars Program: Maximize the number of students benefiting from opportunities provided through the UTR program by fostering new partnerships between institutions with differing research capacity.
- Humanities-Driven Science, Technology, Engineering and Mathematics: Facilitate interdisciplinary student training and technology development through collaborative R&D in social sciences and humanities fields leading to sustainable technology deployment in communities.

[2] Cumulative award value including DOE share and voluntary cost share

NETL is a U.S. Department of Energy national laboratory that drives innovation and delivers solutions for an environmentally sustainable and prosperous energy future. By leveraging its world-class talent and research facilities, NETL is ensuring affordable, abundant and reliable energy that drives a robust economy and national security, while developing technologies to manage carbon across the full life cycle, enabling environmental sustainability for all Americans.

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