

UNIVERSITY TRAINING AND RESEARCH

The **University Training and Research¹ (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 while strengthening U.S. energy and critical minerals security.

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.

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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, 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.
- To increase research and development (R&D) opportunities and tap into the innovative thinking of student researchers at HBCU–MSI institutions of higher learning.
- To ensure that students are equipped with cutting-edge, translatable skillsets that will allow them to contribute to the U.S. workforce and greater economy over the course of a long and enduring career.

¹ The University Training and Research program consists of two sub-programs – (1) Historically Black Colleges and Universities and Minority Serving Institutions, and (2) University Carbon Research.



The UTR program conducts a nationwide competitive solicitation each year. R&D projects are awarded as grants (\$200,000–1,500,000) with a typical duration of two to three years. This educational outreach initiative enhances DOE's ability to develop and sustain a national program of university research that seeks technology innovation to train the energy workforce of the future.

Between fiscal years 2010 and 2023, the UTR program made 168 R&D awards valued at more than \$71.03 million² and helped to support more than 579 students at various stages in their academic careers, including undergraduate, master's, and doctorate levels.

HISTORICALLY BLACK COLLEGES AND UNIVERSITIES AND MINORITY INSTITUTIONS

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 in science, technology, energy and mathematics (STEM) fields and maintain and upgrade the educational, training and research capabilities at HBCUs and MSIs.

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

UNIVERSITY CARBON RESEARCH

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 (3) developing research-based solutions to support administration R&D 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:

- 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.
- CO₂ Conversion: accelerate capabilities for large-scale conversion of CO₂ into products facilitated by markets for CO₂ 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: 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 benefitting from opportunities provided through the UTR program by fostering new partnerships between institutions with differing research capacity.
- Humanities-Driven STEM: 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 (DOE) national laboratory dedicated to advancing the nation's energy future by creating innovative solutions that strengthen the security, affordability and reliability of energy systems and natural resources. With laboratories and computational capabilities at research facilities in Albany, Oregon; Morgantown, West Virginia; and Pittsburgh, Pennsylvania, NETL addresses energy challenges through implementing DOE programs across the nation and advancing energy technologies related to fossil fuels. By fostering collaborations and conducting world-class research, NETL strives to strengthen national energy security through energy technology development.

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