

# UNIVERSITY TRAINING AND RESEARCH

The **University Training and Research<sup>1</sup> (UTR)** program supports novel, 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, UTR program provides opportunities for traditionally underrepresented communities in science, technology, engineering, and mathematics (STEM) fields.

<sup>1</sup> The University Training and Research program consists of two sub-programs – (1) Historically Black Colleges and Universities and Other Minority Serving Institutions (HBCU–MSI), and (2) University Carbon Research (UCR).

# NETL

## NATIONAL ENERGY TECHNOLOGY LABORATORY

The UTR program supports the Historically Black Colleges and Universities and Minority Serving Institutions (HBCU–MSI) and the University Carbon Research (UCR) programs. The core mission of both 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 that advances the FECM mission of delivering integrated solutions related to fossil energy and carbon management and enable transformation to a sustainable, low-carbon energy future
- To increase research and development (R&D) opportunities for traditionally 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

Between fiscal years 2010 and 2022, the UTR program made 140 R&D awards valued at more than \$47.6 million<sup>2</sup> and helped to support 455 students at various stages in their academic careers, including undergraduate, master's, and PhD levels.

The UTR program conducts a nationwide competitive solicitation each year. Research and development projects are awarded as grants (\$250K-750K) with a typical duration of 2–3 years. This educational outreach initiative enhances the Department of Energy's ability to develop and sustain a national program of university research that seeks technology innovation to reduce carbon emissions and train the workforce of the future that is prepared to address the global challenge of climate change.

### HISTORICALLY BLACK COLLEGES AND UNIVERSITIES AND OTHER 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. These activities align with the Biden Administration's [Justice40](#) Initiative, which seeks to advance environmental justice and revitalize the economies of disadvantaged communities.

From 2010-2022, 57 awards were made through the HBCU-MSI program with a cumulative total value more than \$14.2 million, with 191 students benefiting from the program.

### UNIVERSITY CARBON RESEARCH (UCR)

Consistent with FECM's goals, the UCR program is focused on technology development to mitigate and/or remediate legacy environmental impacts of fossil-based generation systems, assessments of environmental benefits and impacts of utilizing legacy mining materials, such as coal waste for the cultivation of other low-carbon products, and ensuring the safety and environmental integrity of sustainable energy systems.

From 2010-2022, 83 awards were made with a cumulative total value of more than \$31.9 million, with 264 students benefitting from the program.

In FY23, the funding level for the HBCU-MSI Program is \$8M and \$5M for the UCR 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<sub>2</sub> Conversion: accelerate capabilities for large-scale conversion of CO<sub>2</sub> into products advancing net-zero and justice goals, facilitated by markets for CO<sub>2</sub> as a feedstock
- Carbon Dioxide Removal (CDR): 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

<sup>2</sup> 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 technological 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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