UNIVERSITY TRAINING AND RESEARCH

NETL

NATIONAL ENERGY TECHNOLOGY LABORATORY

The **University Training and Research[1] (UTR) program within the Crosscutting Research portfolio** 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 to minimize the environmental impacts of fossil fuels while working towards net-zero emissions and negative emission power generation facilities.

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 is dedicated to providing opportunities for traditionally underrepresented communities in STEM fields.

[1] The University Training and Research program consists of two budget lines under Crosscutting Research–(1) Historically Black Colleges and Universities and Other Minority Institutions (HBCU–OMI), and (2) University Coal Research (UCR).

UNIVERSITY TRAINING AND RESEARCH

The University Training and Research program supports the Historically Black Colleges and Universities and Other Minority Institutions (HBCU–OMI) and the University Coal 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 Office of Fossil Energy and Carbon Management's 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–OMI 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 2010 and 2020, the UTR program made 109 R&D awards valued at more than $37.1 million[2] and helped to support 151 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 ($250-500K) 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 development to reduce carbon emissions and also 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-OMI)

For more than 30 years, NETL has supported the HBCU–OMI program, making it one of the longest-running university training initiatives within FECM. The key objective for the HBCU–OMI program includes providing R&D opportunities for traditionally underrepresented populations in STEM fields. These activities align with the Biden Administration's Justice40 Initiative[3] which seeks to advance environmental justice and revitalize the economies of disadvantaged communities.

From 2010-2020, 43 awards were made through the HBCU–OMI program with a cumulative total value of $11.8 million, with 65 students benefiting from the program and 68 technical papers published.

UNIVERSITY COAL RESEARCH (UCR)

The UCR program emphasizes research and development efforts that are structured to achieve FECM strategic goals in concert with student education in relevant carbon management topics. Key research areas supported include (but are not limited to): near- zero-emission power plants, carbon capture, computational energy sciences, development of advanced high-performance materials, sensors and controls, and the development of hybrid power generation systems.

From 2010-2020, 66 awards were made with a cumulative total value of $25.3 million, with 86 students benefitting from the program and 206 technical papers published.

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. Recent topics in FY21 included the following:

- Energy-water nexus implications and opportunities of a hydrogen economy
- Electromgnetic energy-assisted approaches to convert fossil fuels to low-cost hydrogen
- Process and materials co-optimization for the production of blue hydrogen
- Addressing high-temperature materials supply chain challenges
- 5G wireless technologies for power generation

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

[3] https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/

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