

RWFI E-NOTE MONTHLY

REGIONAL WORKFORCE INITIATIVE • FEBRUARY 2022

Welcome Message

Greetings NETL RWFI stakeholders,

This month's funding in focus is a funding opportunity from the National Science Foundation, targeted at two-year institutions of higher education entitled, *Advancing Innovation and Impact in Undergraduate STEM Education at Two-year Institutions of Higher Education*, with a deadline of May 2, 2022. Also, in this month's E-Note is the release of the *NETL Pilot Workforce Readiness Workplan Technical Report*. Advances in technology occur at a rapid pace; consequently, skills and training must evolve to successfully deploy emerging and cutting-edge technologies. Using a questionnaire designed to elucidate skills necessary in technologies ready for commercial deployment in 3–5 years, the workforce readiness plan was conceived to help define emerging skills or occupations associated with these emerging technologies. This report discussed the initial findings from this pilot effort.

As always, feel free to reach out to us at NETL.RWFI@netl.doe.gov if you have any suggestions for information to present in future E-notes.

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– Sincerely, The NETL Regional Workforce Initiative Team

Workforce Funding Announcements

FUNDING SPOTLIGHT



Advancing Innovation and Impact in Undergraduate STEM Education at Two-year Institutions of Higher Education

National Science Foundation, Deadline, May 2, 2022

The National Science Foundation (NSF) Education and Human Resources Directorate (EHR) seeks to significantly enhance its support for research, development, implementation, and assessment to improve STEM education at the nation's two-year colleges. NSF encourages bold, potentially

transformative projects that address immediate challenges facing STEM education at two-year colleges and/or anticipate new structures and functions of the STEM learning and teaching enterprise. This program description is a targeted approach for advancing innovative and evidence-based practices in undergraduate STEM education at two-year colleges. It also seeks to support systemic approaches to advance inclusive and equitable STEM education practices. Projects must build on prior fundamental and/or applied research in STEM education and provide theoretical and empirical justification for proposed projects as needed. Projects are also expected to be research-informed and to result in field-tested outcomes and products that enhance STEM teaching and learning at two-year colleges. Potential outcomes of interest: NSF is interested in projects with potential outcomes that include but are not limited to 1) making systemic improvements in STEM education; 2) promoting diversity, equity, and inclusion; 3) mitigating the disproportionate impact of the COVID-19 pandemic on two-year colleges.

Future of Work at the Human-Technology Frontier: Core Research

National Science Foundation, Deadline, March 1, 2022

The specific objectives of the Future of Work at the Human-Technology Frontier program are to 1) facilitate multi-disciplinary or convergent research that employs the joint perspectives, methods, and knowledge of behavioral science, computer science, economics, engineering, learning sciences, research on adult learning and workforce training, and the social sciences; 2) develop a deeper understanding of how human needs can be met and values respected in regard to how new technologies, conditions, and work experiences are changing; 3) support a deeper understanding of the societal infrastructure that accompanies and leads to new work technologies and new approaches to work and jobs, and that prepares people for the future professional world; 4) encourage the development of a research community dedicated to designing intelligent technologies and work organization and modes inspired by their positive impact on individual workers, the work at hand, the way people learn and adapt to technological change, creative and inclusive workplaces (including remote locations, homes, classrooms, or virtual spaces), and benefits for social, economic, educational, and environmental systems at different scales; 5) promote a better understanding of the interdependent human-technology partnerships to advance societal needs by advancing design of intelligent technologies that operate in harmony with human workers, including consideration of how adults learn the new skills needed to interact with these technologies in the workplace, and by enabling broad and diverse workforce participation, including improving accessibility for those challenged by physical or

cognitive impairment; and 6) understand, anticipate, and explore ways of mitigating potential risks, including inequity arising from future work at the human-technology frontier.

Partnering with NETL

In the spirit of National Entrepreneurship Week, NETL continues to foster innovation and job growth by participating in Energy I-Corps. It's just part of how NETL works to realize the full commercial potential of new technologies under development by its researchers. The event is a congressionally chartered week dedicated to empowering entrepreneurship across the United States. The annual initiative was relaunched in 2017 to bring together a network of partners from Maui to Miami to educate, engage, and build equitable access to America's entrepreneurship ecosystem.

Environmental Literacy Program: Increasing community resilience to extreme weather & climate change

National Oceanic and Atmospheric Administration, Deadline, March 17, 2022

The goal of this funding opportunity is for communities to have sufficient collective environmental literacy to take actions that build resilience to extreme weather and climate change in ways that contribute to community health, social cohesion, and socio-economic equity. These communities will be composed of children, youth, and adults who participate in formal and/or informal education experiences that develop their knowledge, skills, and confidence to 1) better understand the ways that human and natural systems interact globally and locally, including the acknowledgement of disproportionately distributed vulnerabilities; 2) participate in civic processes; and 3) incorporate scientific information, cultural knowledge, and diverse community values. Efforts to build environmental literacy should ultimately aim to reduce risks from current and future environmental hazards through climate-smart and inclusive decision-making and long-term stewardship of healthy ecosystems, all the while promoting a low-carbon economy.

Innovations in Graduate Education (IGE) Program

National Science Foundation, Deadline, March 25, 2022

The IGE program is designed to encourage the development and implementation of bold, new, and potentially transformative approaches to STEM graduate education training. The program seeks proposals that explore ways for graduate students in research-based master's and doctoral degree programs to develop the skills, knowledge, and competencies needed to pursue a range of STEM careers.

Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI)

National Science Foundation, Deadline, March 28, 2022

The goals of the HSI program are to enhance the quality of undergraduate STEM education and to increase the recruitment, retention, and graduation rates of students pursuing associate's or baccalaureate degrees in STEM. Achieving these, given the diverse nature and context of the HSIs, requires additional strategies that support building capacity at HSIs through the following innovative approaches: 1) to incentivize institutional and community transformation and 2) to promote fundamental research on engaged

student learning, concerning what it takes to diversify and increase participation in STEM effectively, and that improves our understanding of how to build institutional capacity at HSIs. Intended outcomes of the HSI Program include broadening participation of students that are historically underrepresented in STEM and expanding students' pathways to continued STEM education and integration into the STEM workforce.

Alliances for Graduate Education and the Professoriate (AGEP)

National Science Foundation, Deadline, March 29, 2022

Improving equity and inclusion is critical to advancing STEM faculty, educating America's future STEM workforce, fostering individual opportunity and contributing to a thriving U.S. economy. The NSF AGEP program, therefore, seeks to fund grants that advance and enhance the systemic factors that support equity and inclusion and, consequently, mitigate the systemic inequities in the academic profession and workplace. The AGEP program goal to increase the number of historically underrepresented minority faculty is bolstered by the National Science Board's [Vision 2030: Vision for the Future](#).

EHR Core Research: Building Capacity in STEM Education Research (ECR: BCSEER)

National Science Foundation, Deadline, March 29, 2022

ECR: BCSEER supports projects that build investigators' capacity to carry out high-quality STEM education research that will enhance the nation's STEM education enterprise. In addition, ECR: BCSEER seeks to broaden the pool of researchers who can advance knowledge regarding STEM learning and learning environments, broadening participation in STEM fields and STEM workforce development. Researchers of races and ethnicities, genders, sexual orientations and abilities who are currently underrepresented in their participation in STEM education research and the STEM workforce, as well as faculty at minority-serving and two-year institutions, are particularly encouraged to submit proposals.

FY21 Office of Naval Research (ONR) STEM Program

Office of Naval Research, Deadline, March 30, 2022

ONR seeks a broad range of applications for augmenting existing and/or developing innovative solutions that directly maintain and/or cultivate a diverse, world-class STEM workforce to maintain the U.S. Navy and Marine Corps' technological superiority. The goal of proposed efforts must provide solutions that establish, build, and/or maintain STEM educational pathways and workforce opportunities for diverse U.S. citizens directly relevant to ONR science and technology areas.

Women and Minorities in STEM (WAMS) Fields Program

National Institute of Food and Agriculture, Deadline, March 31, 2022

The purpose of this program is to support research, education/teaching and extension projects that increase participation by women and underrepresented minorities from rural areas in STEM. The National Institute of Food and Agriculture intends this program to address educational needs within broadly defined areas of food and agricultural sciences. Applications recommended for funding must

highlight and emphasize the development of a competent and qualified workforce in food and agricultural sciences. WAMS-funded projects improve the economic health and viability of rural communities by developing research and extension initiatives that focus on new and emerging employment opportunities in STEM occupations. Projects that contribute to the economic viability of rural communities are also encouraged.

Tribal Colleges and Universities Program

National Science Foundation, Deadline, April 1, 2022

The Tribal Colleges and Universities Program (TCUP) provides awards to federally recognized Tribal Colleges and Universities, Alaska Native-serving institutions, and Native Hawaiian-serving institutions to promote high-quality science. This includes, but is not limited to, the following STEM-related fields: sociology, psychology, anthropology, linguistics, economics and bioeconomics, statistics, natural sciences, general computer science, artificial intelligence, quantum information science, and cybersecurity.

Established Program to Stimulate Competitive Research (EPSCoR) Research Infrastructure Improvement Program: Bridging EPSCoR Communities

National Science Foundation, Deadline, April 4, 2022

EPSCoR is designed to fulfill the mandate of the NSF to promote scientific progress nationwide. Jurisdictions are eligible to participate in the NSF EPSCoR Research Infrastructure Improvement Program based on their level of total NSF support over their most recent five years. Through this program, NSF facilitates the establishment of partnerships among academic institutions and organizations in governmental, non-profit, and commercial or industrial sectors that are designed to effect sustainable improvements in a jurisdiction's research infrastructure, Research and Development (R&D) capacity, and hence, its R&D competitiveness.

Accelerating Innovations in Biomanufacturing Approaches through Collaboration Between NSF and the DOE BETO funded Agile BioFoundry

National Science Foundation, Deadline, April 4, 2022

The NSF and the U.S. DOE's Bioenergy Technologies Office (DOE BETO) recognize the critical roles that synthetic and engineering biology play in advancing the U.S. bioeconomy. To translate advances in synthetic and engineering biology into products and processes that will impact the U.S. bioeconomy, it is imperative to accelerate innovation and adopt new biomanufacturing approaches. The integrated Design-Build-Test-Learn (DBTL) capabilities of the DOE BETO funded Agile BioFoundry (ABF) offer a unique resource to the academic community to develop and implement innovative biodesign and biomanufacturing technologies and practices. To help advance the U.S. bioeconomy, these agencies invite proposals from researchers at institutions of higher education and non-profit organizations (eligible PIs). The proposals must leverage the unique DBTL capabilities available at the ABF to translate the latest advances in synthetic biology and engineering biology basic research into testable prototype processes and products that are potentially scalable and manufacturable and can be appropriately validated.

Biosystems Design to Enable Safe Production of Next-Generation Biofuels, Bioproducts, and Biomaterials

U.S. Department of Energy, Deadline, April 6, 2022

The DOE Office of Science's Biological and Environmental Research (BER) supports fundamental, interdisciplinary research to achieve a predictive systems-level understanding of Earth, environmental, and biological systems. The overarching goals of the BER Program are to support transformative science to solve critical challenges in energy security and environmental stewardship. As part of its mission, BER invests in crosscutting technologies and programs to enable multiscale, systems-level research to achieve a predictive understanding of systems biology, biological community function, and environmental behavior. The Biological Systems Science Division (BSSD) within BER aims to provide the necessary fundamental science to understand, predict, manipulate, and design biological processes that underpin innovations for bioenergy and bioproduct research and to enhance our understanding of natural environmental processes relevant to DOE. BSSD supports fundamental research to understand the systems biology of plants and microbes through the Genomic Science Program (GSP). The GSP's portfolio includes systems biology research that builds on a foundation of multi-omics data and integrates multidisciplinary experimental and computational approaches. Within this framework, one of the objectives of the GSP is to develop the next generation of genome engineering technologies to unlock the potential of plants and microorganisms for the safe and efficient conversion of renewable biomass, captured CO₂ from the atmosphere, and/or petroleum-derived polymers into fuels, valuable chemicals, and materials with novel properties, thus making advances towards a sustainable and secure bioeconomy.

Resident Instruction Grants for Institutions of Higher Education in Insular Areas (RIIA) & Agriculture and Food Sciences Facilities and Equipment (AGFEI)

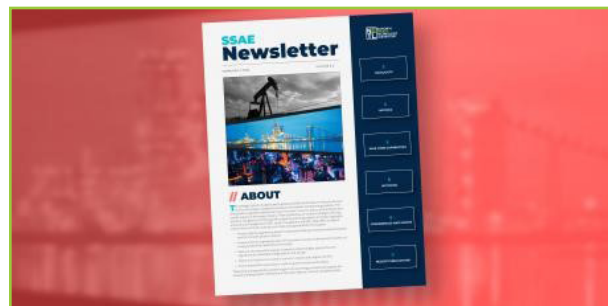
National Institute of Food and Agriculture, Deadline, April 11, 2022

The purpose of these programs is to promote and strengthen the ability of eligible institutions in the Insular Areas to carry out education within the food, agricultural and natural resource sciences. RIIA projects strengthen institutional educational capacities, including libraries, curriculum, faculty, scientific instrumentation, instruction delivery systems, and student recruitment and retention, in order to respond to education needs in the food and agricultural sciences. AGFEI projects support activities to acquire or renovate facilities and relevant equipment necessary for conducting agricultural research to support tropical and subtropical agricultural research, including pest and disease research. These programs are intended to broaden the undergraduate student experience by integrating opportunities to participate in research, education, and extension and to enhance collaborations with community colleges, Hispanic Serving Institutions, Alaska Native-Serving and Native Hawaiian-Serving Institutions, 1890 and 1994 land-grant institutions, and non-land grant colleges and universities of agriculture.

Rural Innovation Stronger Economy (RISE) Grants

U.S. Department of Agriculture Rural Development, Rural Development Service, Deadline, April 19, 2022

The primary objective of the RISE program is to support jobs accelerator partnerships to improve the ability of distressed rural and energy communities to create high wage jobs, accelerate the formation of new businesses, and help rural communities identify and maximize local assets. Grants are awarded on a competitive basis. The minimum award per grant is \$500,000 and the maximum award amount per grant is \$2,000,000. Grant funds may be used to pay for up to 80% of eligible project costs. Grant funds may be used to pay for costs directly related to the purchase or construction of an innovation center located in a rural area; costs directly related to operations of an innovation center including purchase of equipment, office supplies, and administrative costs including salaries directly related to the project; costs directly associated with support programs to be carried out at or in direct partnership with job accelerators; reasonable and customary travel expenses directly related to job accelerators and at rates in compliance with *2 CFR 200.474*; utilities, operating expenses of the innovation center and job accelerator programs and associated programs; and administrative costs of the grantee not exceeding 10% of the grant amount for the duration of the project.



February Edition of the NETL Strategic Systems Analysis and Engineering (SSAE) Newsletter Released

The February 2022 edition of the SSAE Newsletter provides updates about recent research initiatives undertaken within NETL's SSAE directorate. Click here to access this latest edition and learn about activities that SSAE is leading to gain insights into new energy concepts, support the analysis of energy system interactions and advance its capabilities.



NETL Releases Winter Edition of Water-Energy Nexus News

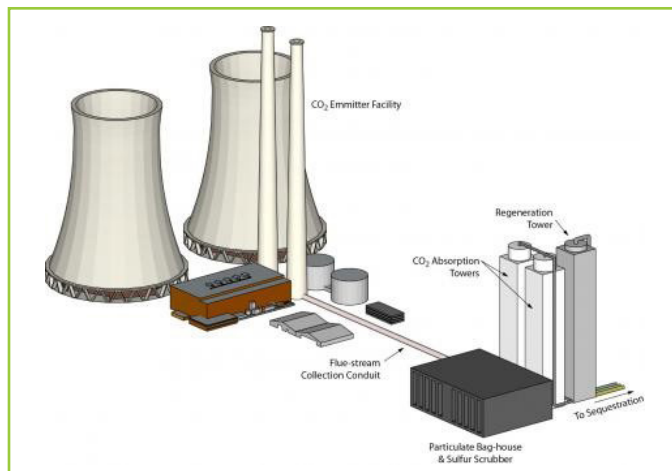
The latest edition of Water-Energy Nexus News is packed with research efforts undertaken by NETL and its partners to deliver world-class technology solutions that enhance the nation's energy foundation while helping to protect water resources for future generations. This quarter's newsletter explores the development of ProteusLib, an open-source library of water treatment models built on NETL's Institute for the Design of Advanced Energy Systems platform.

NETL News



U.S. Department of Energy Announces \$28 Million to Develop Clean Hydrogen

Today, the U.S. DOE's Office of Fossil Energy and Carbon Management announced \$28 million in federal funding for R&D and front-end engineering design projects that will advance clean hydrogen as a carbon-free fuel for transportation, industrial use and electricity production. Most hydrogen in the United States is traditionally produced using natural gas without carbon capture, which is not clean. This funding opportunity announcement will leverage innovative approaches to produce clean hydrogen at lower costs from materials that include municipal solid waste, legacy coal waste, waste plastics, and biomass with carbon capture and storage. These next-generation hydrogen technologies will play a significant role in decarbonizing the U.S. economy and advancing the Biden-Harris Administration's goal of net-zero greenhouse gas emissions by 2050.



NETL Project Partner Develops Transformational Carbon Capture Technology Based on Mixed Salts

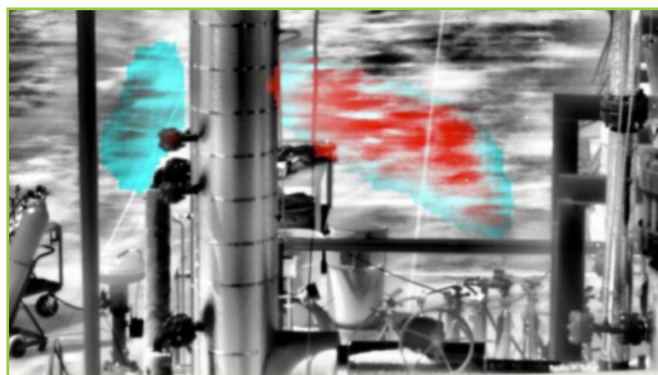
In the photo above: SRI International's mixed salt process is seen here at engineering scale. SRI International, with oversight from NETL, is developing a transformational carbon capture technology that leverages an advanced mixed-salt process to reduce capture

costs and provide a pathway toward the nation's decarbonization goals. "The technology SRI International and their partners are developing has the potential to significantly reduce the energy needed to regenerate the carbon capture solvent and compress the CO₂ product, thereby reducing costs" said Krista Hill, NETL federal project manager for the project. Hill, a West Virginia native, earned her master's in chemistry at the University of Oregon and then returned to her home state to join NETL's carbon capture team in Morgantown. With a diverse background in materials R&D, project management, business development and STEM education, Hill is well-positioned to bring expertise and a unique perspective to the DOE-NETL mission.



January 2022 Edition of Carbon Capture Newsletter Released

Check out the latest edition of the Carbon Capture Newsletter to learn about recent developments in the U.S. DOE/NETL Carbon Capture Program. The DOE/NETL Carbon Capture Program is developing the next generation of advanced CO₂ capture technologies that can provide step-change reductions in both cost and energy requirements as compared to currently available technologies. The Carbon Capture Program focuses on the broad portfolio of projects, including post- and pre-combustion capture to reduce carbon emissions from fossil fuel-based power generation and industrial sources. The program is also developing a wide array of approaches to remove CO₂ that has accumulated in the atmosphere, such as direct air capture with durable storage, biomass carbon removal and storage, and enhanced mineralization.



Smart Methane Detection Technology Developed to Significantly Reduce Greenhouse Gas Emissions

In the image above, Smart Leak Detection Methane (SLED/M) provides a visualization of a methane leak at a compressor station Southwest Research Institute (SwRI), with support from NETL, has concluded a five-year project resulting in the development of a novel methane leak detection technology that has the potential to significantly reduce greenhouse gas emissions in the energy sector. Compressor stations are essential for moving natural gas in midstream applications, but these stations have been shown to significantly contribute to fugitive methane emissions, a greenhouse gas contributing to climate change.

SwRI's Smart Methane Emission Detection System is a system that can reliably, accurately, and autonomously detect and estimate methane leaks in natural gas infrastructure in real time using midrange infrared optical gas imaging cameras. The technology represents a significant improvement over existing methane detection systems, which have significantly lower estimation capabilities.



NETL Connecting Researchers with Data Through the Power of Artificial Intelligence

NETL researchers, working closely with experts at the U.S. DOE's Office of the Chief Information Officer (OCIO), have designed a multi-cloud-based computational solution to complement on-site resources that will accelerate clean energy research across the agency. The team then tested the cloud environment using the powerful NETL-developed deep-learning tool SmartSearch©, which helps to mitigate one of the biggest draws on a researcher's time — searching for, acquiring, and transforming relevant data.



NETL Supporting the Development of Future Hydrogen Infrastructure on Multiple Fronts

NETL's SSAE researchers and analysts are pursuing an all-hands-on-deck effort to realize a clean energy future by harnessing the nation's fossil energy resources to produce hydrogen sustainably through the use of commercial and advanced hydrogen production and carbon dioxide capture technologies. Fossil fuel-derived hydrogen (H₂) presents new opportunities to decarbonize challenging sectors of the economy, such as transportation and decentralized, distributed industrial applications. In June, the U.S. DOE announced an aggressive crosscutting initiative for hydrogen production called the Hydrogen Energy EarthShot with the goal of reducing the cost of clean hydrogen production to \$1/kg H₂ by the year 2030. This initiative supports the Biden-Harris Administration's goal of a net-zero carbon emissions economy by 2050 while creating good-paying union jobs and growing the economy.

Reports and Resources



NETL Pilot Workforce Workplan Technical Report

National Energy Technology Laboratory

Advances in technology occur at a rapid pace; consequently, skills and training must evolve to successfully deploy emerging and cutting-edge technologies. Using a questionnaire designed to elucidate skills necessary in technologies ready for commercial deployment in 3–5 years, the workforce readiness plan was conceived to help define emerging skills or occupations associated with these emerging technologies. This initiative intends to inform training providers and industry representatives of emerging skill sets. Ideally, the data collected here shall inform both about future curriculum or upskilling requirements that may be necessary in the energy and manufacturing industries. This paper highlights lessons learned, and information gleaned from the pilot “workforce readiness plan” effort.

DOE STEM Rising



How the Advanced Quantum Testbed Prepares the New Quantum Workforce

A team from a middle school in Spartanburg, South Carolina took first place in the 19th annual Future City Regional Competition on Jan. 22, 2022, accomplishing the mission to design and build a model city with a waste-free future. McCracken Middle School advances to the Future City Competition National Finals in Washington, D.C. in February 2022. The top team at that event receives \$7,500 for its school’s STEM program, plus a trip to Space Camp in Huntsville, Alabama. Environmental Management *Savannah River Site* contractor Savannah River Nuclear Solutions (SRNS) and the University of South Carolina Aiken held the regional competition for sixth, seventh and eighth grade students virtually. “I am hopeful the students recognize competitions like Future City can lead to a highly beneficial experience that can last a lifetime,” said Buford Beavers, an SRNS engineering department manager. “Our country’s success will be determined by students like these who have been participating in this amazing, multi-month project.”

ABOUT NETL



NETL, owned and operated by DOE, is one of the Department’s 17 National Laboratories. NETL supports DOE’s mission to advance the national, economic, and energy security of the United States.

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