RWFI E-NOTE MONTHLY

REGIONAL WORKFORCE INITIATIVE • DECEMBER 2021

Welcome Message

Greetings NETL RWFI stakeholders,

This month's funding in focus is a funding opportunity from the National Energy Technology Laboratory and is an extension of the original deadline to a new deadline of Feb. 4, 2022, for the *University Based Cybersecurity Centers Program*. The Funding Opportunity Announcement "seeks to establish a network of university-based, regional electric power cybersecurity centers."

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

University-Based Cybersecurity Centers

Department of Energy, National Energy Technology Laboratory, Deadline, Feb. 4, 2022

This Funding Opportunity Announcement (FOA) seeks to establish a network of university-based, regional electric power cybersecurity centers. These centers should address interrelated research and development challenges of cybersecurity and critical energy infrastructure, while considering the distinctive characteristics of each region's electricity system, network of infrastructure, and workforce expertise. We envision that this initiative will result in multiple new tools and training for the energy sector.

Improving Undergraduate STEM Education: Education and Human Resources (IUSE:EHR)

National Science Foundation, Deadline, Jan. 19, 2022

The STEM fields hold much promise as sectors of the economy where we can expect to see continuous growth in the coming decades. STEM job creation is expected to significantly outpace non-STEM job creation, according to the Commerce Department, reflecting the importance of STEM knowledge to the U.S. economy. The National Science Foundation (NSF) plays a leadership role in developing and implementing efforts to enhance and improve STEM education in the United States. Through the NSF IUSE initiative, the agency continues to make a substantial commitment to the highest caliber undergraduate STEM education through a foundation-wide framework of investments. The IUSE: EHR is a core NSF STEM education program that seeks to promote novel, creative, and transformative approaches to generating and using new knowledge about STEM teaching and learning to improve STEM education for undergraduate students.

Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES)

National Science Foundation, Deadline, Jan. 25, 2022

In 2016, the NSF unveiled a set of "Big Ideas," 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering (see *here*). The Big Ideas represent unique opportunities to position our nation at the cutting edge of global science and engineering leadership by bringing together diverse disciplinary perspectives to support convergence research. As such, when responding to this solicitation, even though proposals must be submitted to the EHR Directorate/Division of Human Resource Development (HRD), once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors. The NSF INCLUDES Big Idea is a comprehensive national initiative to enhance U.S. leadership in STEM discoveries and innovations focused on NSF's commitment to inclusion and broadening participation in these fields. The vision of NSF INCLUDES is to catalyze the STEM enterprise to work collaboratively for inclusive change, resulting in a STEM workforce that reflects the diverse population of the nation.

Hispanic-Serving Institutions Education Grants Program

United States Department of Agriculture National Institute of Food and Agriculture, Deadline, Jan. 28, 2022

This competitive grant program is intended to promote and strengthen the ability of Hispanic-Serving Institutions to carry out higher education programs in the food and agricultural sciences. Programs aim to attract outstanding students and produce graduates capable of enhancing the nation's food and agricultural scientific and professional work force.

Broadening Participation in Engineering (BPE)

National Science Foundation, Deadline, Jan. 28, 2022

Through the BPE Program, the NSF seeks to strengthen the future U.S. engineering workforce by enabling and encouraging the participation of all citizens in the engineering enterprise. The BPE Program seeks to support not only research in the science of broadening participation and equity in engineering, but also collaborative endeavors which foster the professional development of a diverse and well-prepared engineering workforce. These synergetic efforts also facilitate innovative, if not revolutionary, approaches to building capacity through inclusivity and equity within the engineering academic experience."

Environmental Convergence Opportunities in Chemical, Bioengineering, Environmental, and Transport Systems

National Science Foundation, Deadline, Jan. 31, 2022

Creating effective solutions to our most pressing environmental and sustainability challenges requires imaginative thinking - the kind that evolves when researchers from disparate fields, expertise, or perspectives fully immerse themselves in work toward a common goal. The National Academies of Sciences, Engineering and Medicine (NASEM), in their report, "*Environmental Engineering for the 21st Century: Addressing Grand Challenges*," identified five critical challenges we must address as a society: sustainably supply food, water, and energy; curb climate change and adapt to its impacts; design a future without pollution and waste; create efficient, healthy, and resilient cities; and foster informed decisions and actions. The report further states, "The challenges provide focal points for evolving environmental engineering education, research, and practice toward increased contributions and a greater impact. Implementing this new model will require modifications in educational curriculum and creative approaches to foster interdisciplinary research on complex social and environmental problems." This solicitation will support projects that tackle these grand challenges using a *convergent research model* that seamlessly integrates fundamental knowledge and expertise from the fields of chemical process, transport, and biological science and engineering with that of the sustainability and environmental engineering fields.

Mathematical Sciences Infrastructure Program

National Science Foundation, Deadline, Feb. 1, 2022

The primary aim of the Mathematical Sciences Infrastructure Program is to foster the continuing health of the mathematical sciences research community as a whole. In addition, the program complements the *Workforce Program in the Mathematical Sciences* in its goal to increase the number of well-prepared U.S. based individuals who successfully pursue careers in the mathematical sciences and in other professions in which expertise in the mathematical sciences plays an increasingly important role. The Division of Mathematical Sciences Infrastructure program invites projects that support core research in the mathematical sciences, including: 1) novel projects supporting research infrastructure across the mathematical sciences community; 2) training projects complementing the Workforce Program; and 3) conference, workshop, and travel support requests that include cross-disciplinary activities or have an impact at the national scale.

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

National Science Foundation, Deadline, Feb. 25, 2022

ECRs Building Capacity for STEM Education Research (ECR: BCSER) solicitation supports projects that build individuals' capacity to carry out high-quality STEM education research that will enhance the nation's STEM education enterprise and broaden the pool of researchers that can conduct fundamental research in STEM education and learning environments. This will increase participation in STEM fields and enhance STEM workforce development. Future of Work at the Human-Technology Frontier: Core Research

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.

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.

NETL News

Research Associate, Mentor Collaborate to Advance Wastewater Cleanup

In this quarter's Research Associate Spotlight and Mentor Profile, up-and-coming environmental engineer Preom Sarkar discusses the important contributions she is making in collaboration with NETL experts to create more environmentally friendly methods of flue gas desulfurization (FGD). FGD systems are used to scrub the gas released during fossil energy combustion to mitigate the release of pollutants such as sulfur oxide gases and mercury into the atmosphere. As a result of scrubbing, a complex wastewater containing a number of contaminants is formed that must be treated before it is acceptable for surface discharge. Sarkar conducts research on water management of power systems, with a specific focus on biological treatment of FGD systems. In this spotlight feature, Sarkar shares the journey that led her to apply for a research associate position at NETL and the new skills and invaluable experiences she has gained. .

DOE Seeks Information on Deployment-Ready Carbon Reduction and Removal Technologies

The DOE released a Request for Information (RFI) on technologies ready to be demonstrated that reduce carbon emissions and remove carbon dioxide from the atmosphere. The RFI seeks feedback from industry, investors, developers, academia, research laboratories, government agencies, NGOs, and potentially affected communities (including environmental justice, Tribal, energy transition, and other communities). The RFI follows the enactment of the Bipartisan Infrastructure Law, which includes *more than $62 billion for DOE to deliver* a more equitable clean energy future for the American people by, among other things, building the technologies of tomorrow.

U.S. Department of Energy Announces Intent to Fund Decarbonization and Environmental Remediation Projects Through University Training and Research

On Dec. 1, 2021, the DOE's Office of Fossil Energy and Carbon Management (FECM) announced its intent to fund projects through its University Training and Research Program, which is composed of the University Coal Research (UCR) program and the Historically Black Colleges and Universities and Other Minority Institutions (HBCU-OMI) program. The programs serve to prepare the next generation of engineers and scientists working to advance the Biden-Harris Administration's goals of net-zero carbon emissions by 2050. Projects will be managed by FECM's NETL. Both opportunities would fund projects to conduct early-stage research and development of decarbonization approaches, such as exploring biomass feedstocks blended with waste coal and coupled with carbon capture and dedicated storage to advance net-zero energy production. They would also include projects that address the mitigation and remediation of legacy environmental impacts of coal-based generation.

NETL's Materials Engineering & Manufacturing Researchers Make Notable Successes in 2021

In 2021, NETL's Materials Engineering & Manufacturing (MEM) researchers advanced multiple discoveries, which included developing cost-effective materials to withstand extreme service environments in tomorrow's highly efficient power plants, removing contaminants from water, finding new uses for carbon wastes, and helping the nation achieve its decarbonization goals while ensuring robust supplies of affordable energy and creating new jobs for American workers. Notable MEM research achievements in the past year were:

NETL Explores Hydrogen Production Opportunities in Appalachia

NETL is exploring new avenues by which Appalachian energy communities can realize exciting new economic opportunities through the use of carbon-neutral modular gasification technologies to produce hydrogen and other valuable products. The Lab recently released a report that details the availability of waste coal and biomass within Appalachia and explores various opportunities for using these resources to provide new economic activities for mining and power production communities throughout Appalachia. NETL collaborated with the DOE's Small Business Innovation Research Office to conduct the study."

Reports and Resources

The College Payoff: More Education Doesn't Always Mean More Earnings

Georgetown University Center on Education and the Workforce

The College Payoff: More Education Doesn't Always Mean More Earnings explores how lifetime earnings vary by education level, field of study, occupation, industry, gender, race and ethnicity, and location. The lifetime earnings of a full-time, full-year worker with a high school diploma are $1.6 million, while workers with an associate degree earn $2 million. However, at least one quarter of high school graduates earn more than an associate degree holder. Bachelor degree holders earn a median of $2.8 million during their career, 75% more than if they had only a high school diploma. Master degree holders earn a median of $3.2 million over their lifetimes, while doctoral degree holders earn $4 million and professional degree holders earn $4.7 million. However, one quarter of workers with a bachelor degree earn more than half of workers with a master or a doctoral degree.

Mission Not Accomplished: Unequal Opportunities and Outcomes for Black and LatinX Engineers

Georgetown University Center on Education and the Workforce

Engineering occupations are some of the highest-paying and most prestigious in the U.S. labor market, but they are also some of the least diverse. Mission Not Accomplished: Unequal Opportunities and Outcomes for Black and Latinx Engineers finds that of the nearly 1.7 million prime-age engineering workers in the United States in 2019, 81% were either White or Asian, and 84% were men. A mere 3% of engineers working in the field in 2019 were either Black or Latinx women.

DOE STEM Rising

Meet Longtime IBM/Brookhaven Lab Scientist Jean Jordan-Sweet

Prior to her retirement in August, Jean Jordan-Sweet was a senior engineer at IBM Research and a beamline scientist at the *Beamline for Materials Measurement* at *National Synchrotron Light Source II*, a DOE User Facility located at DOE's Brookhaven National Laboratory. For almost 40 years, her work has focused on using x-ray techniques to study materials and processes for the advancement of microelectronics technologies. Argonne's Giselle Sandi wins 2021 Motivator Award.

Argonne's Giselle Sandi wins 2021 Motivator Award

The Chicago Chapter of the Association for Women in Science (AWIS) has awarded Giselle Sandi a 2021 Motivator Award. Sandi is the deputy director in the Chemical Sciences and Engineering division at the DOE's Argonne National Laboratory. The mission of Chicago AWIS is to achieve equity and full participation of women in science, technology, engineering, mathematics, and medicine (STEMM). This award recognizes Sandi for her outstanding mentorship and support for women in STEMM. In particular, it notes Sandi's creation of enduring and effective programs at both Argonne and Rush University Medical Centers.

Lab Volunteers Help STEM Conference for Girls Succeed

More than 75 girls from across Northern New Mexico gained a better insight into science, technology and engineering with help from ten women Los Alamos National Laboratory (LANL) researchers and engineers who volunteered as presenters at this year's STEM Pathways for Girls conference. The Lab volunteers ran six hands-on workshops at the event organized by nonprofit STEM Santa Fe, which took place October 29–30. Other LANL employees volunteered as workshop assistants and general help. The opening and closing keynote addresses were streamed online, but the workshops were held in person at Santa Fe Community College.

ABOUT NETL

NATIONAL ENERGY TECHNOLOGY LABORATORY

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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