# Good Afternoon

## The Webinar is scheduled to start at 1:00 ET

NATIONAL ENERGY TECHNOLOGY LABORATORY

Solutions for Today | Options for Tomorrow

# Welcome to the Webinar

## NETL Webinar on FECM's Minority Serving Institutions Program

***Sarah Nathan***
*Federal Project Manager*

***April 12, 2022***
***HBCU-OMI FECM Webinar***

# Welcome and Introductions

- The objective of this Webinar is to assist officials at Minority Serving Institutions (MSIs) by
  - Increasing awareness of NETL's **Historically Black Colleges and Universities, and, Other Minority Institutions (HBCU-OMI) Program** and its available opportunities
  - Presenting the context for these opportunities: NETL's Mission and Priorities in general and of Crosscutting Research in particular
  - Reviewing NETL's engagement with MSIs and its purpose
  - Briefing participants on the intricacies of doing business with the Federal Government and how to effectively respond to NETL Funding Opportunity Announcements (FOAs)

# Welcome and Introductions

- This **Webinar is being recorded and will be posted** on NETL Website: www.netl.doe.gov. Go to the "News and Events" tab on the upper right-hand side and click "Conference Proceedings".
- If you are using computer audio, you may experience audio issues depending on your internet connection speed. To avoid this, **we recommend the phone call option**.
- Your telephones are muted and we will not be able to hear your questions, so **please use the chat/question box that came up when you logged onto WebEx for your questions**. All questions will be answered, time-permitting, after all the presentations have been made.
- Questions that are not answered during the Webinar will be posted, along with the answers, at the same location as the Webinar recording.

# Goals of NETL's HBCU-OMI Program

- To reach U.S. minority students from underrepresented and structurally marginalized communities.
- For minority students to **benefit from and contribute to world-class research activities** by participating in key areas that impact the Nation and potentially, the World.
- For minority students to have the **opportunity to be involved in FECM mission goals for a sustainable and net-zero greenhouse gas future**.
- For minority students to **develop and hone cutting-edge and translatable skillsets**.

# Agenda

1. **Welcome and Introductions**
   ***Sarah Nathan***, Federal Project Manager, Crosscutting Team

2. **Overview of NETL's University Training & Research Program**
   - ***Alan Perry***, Director, Office of Workforce Management and Administration
   - ***Sandra Penaherrera***, Program Manager, Mickey Leland Energy Fellowship Program
   - ***Sydni Credle***, Technology Manager, University Training & Research

3. **Overview of Hydrogen Program**
   Hydrogen and Fuel Cell Technologies Office (HFTO)
   - ***Eric Miller,*** Senior Advisor
   - ***James Vickers***, Technology Manager,

4. **Overview of internship opportunities**
   - **Mickey Leland Energy Fellowship Program**
     ***Sandra Penaherrera***, Program Manager, Mickey Leland Energy Fellowship Program
   - **NETL's Internship Programs**
     ***Patricia Adkins-Coliane***, Program Coordinator

5. **Doing Business with the Federal Government and Funding Opportunity Announcements (FOAs)**
   ***Sarah Nathan***, Federal Project Manager, Crosscutting Team

6. **Responding to the Areas of Interest (or Topics)**
   ***Sarah Nathan***, Federal Project Manager, Crosscutting Team

7. **Questions and Answers**

# University Training and Research

## *2022 HBCU-OMI Spring Webinar*

April 12, 2022

U.S. DEPARTMENT OF ENERGY | NATIONAL ENERGY TECHNOLOGY LABORATORY

# MISSION

Driving innovation and delivering solutions for an environmentally sustainable and prosperous energy future:

- 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, and
- Enabling environmental sustainability for all Americans

# VISION

To be the nation's premier energy technology laboratory, delivering integrated solutions to enable transformation to a sustainable energy future.

# Research Focus by Site

## Multiple Sites Operating as 1 LAB System

### OREGON

- Materials Performance
- Multi-environment Materials Characterization
- Alloy Development/Manufacture
- Geospatial Data Analysis

### WEST VIRGINIA

- Energy Conversion Devices
- Simulation-Based Engineering
- *In-Situ* Materials Characterization
- Supercomputer Infrastructure
- Diagnostics, Sensors, and Controls

### PENNSYLVANIA

- Process Systems Engineering
- Decision Science
- Functional Materials
- Environmental Sciences
- Energy Systems Optimization

### TEXAS

Oil and Gas Strategic Office

### ALASKA

Oil and Gas Strategic Office

# NETL Snapshot

NATIONAL ENERGY TECHNOLOGY LABORATORY

## By the Numbers

**3** labs across U.S.

**1000+** R&D projects in **50** states

**$5.0B** total award value

**$1.2B** FY22 budget

## Workforce

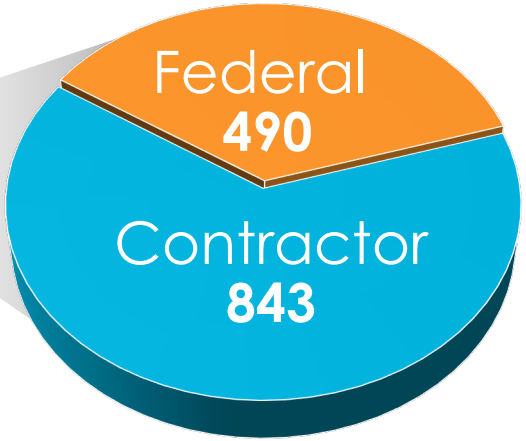
**1,344** Full Time Equivalent Employees (FTEs)

**34** Joint Faculty

**12** Postdoctoral Researchers

**18** Graduate Students

**1** Undergraduate Students




**NETL manages & implements an array of activities for multifaceted R&D programs**

- Program planning, development, and execution
- Legal, financial, procurement and Head of Contracting Activity (HCA)
- Project management expertise

# NETL Budget

## FY2022 Budget
### $1.2B

### Carbon Management

| | |
|---|---|
| Carbon Capture | $ 99M |
| Carbon Dioxide Removal | $ 49M |
| Carbon Utilization | $ 29M |
| Carbon Storage | $ 97M |
| Adv. Energy Systems | $ 94M |
| Crosscutting Research | $ 33M |
| Mineral Sustainability | $ 53M |
| STEP | $ 15M |

### Resource Sustainability

| | |
|---|---|
| Resource Tech. and Sustainability | $110M |

### FECM Program Support

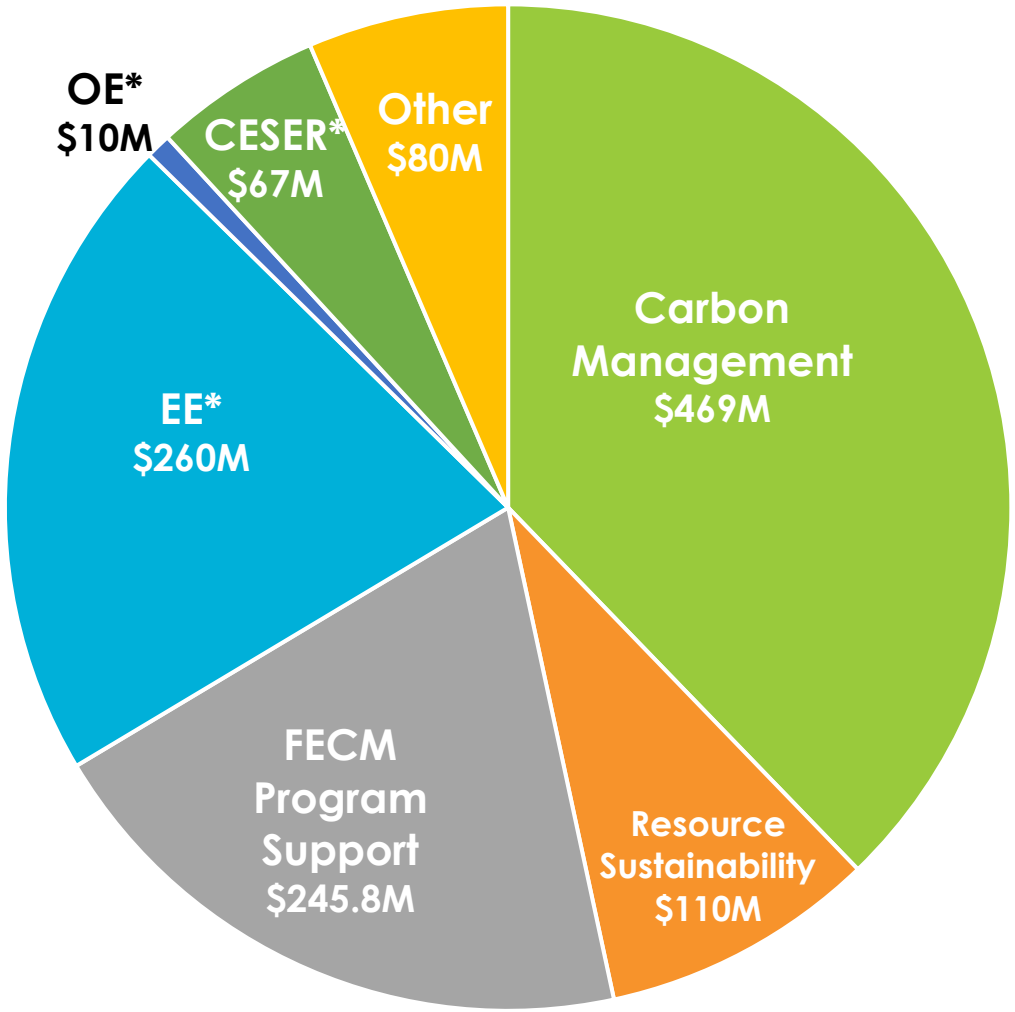
| | |
|---|---|
| Program Direction | $ 66.8M |
| Special Recruitment | $ 1M |
| NETL Research & Ops. | $ 83M |
| NETL Infrastructure | $ 75M |
| Congressionally Directed Spending | $ 20M |

### Non-Fossil Programs*

| | |
|---|---|
| EE | $260M |
| OE | $ 10M |
| CESER | $ 67M |

### Collaborative Research and Engagement

| | |
|---|---|
| Other | $ 80M |




*estimated and subject to change

# Carbon Management Technology R&D Thrusts

NATIONAL ENERGY TECHNOLOGY LABORATORY

## Carbon Capture & Removal

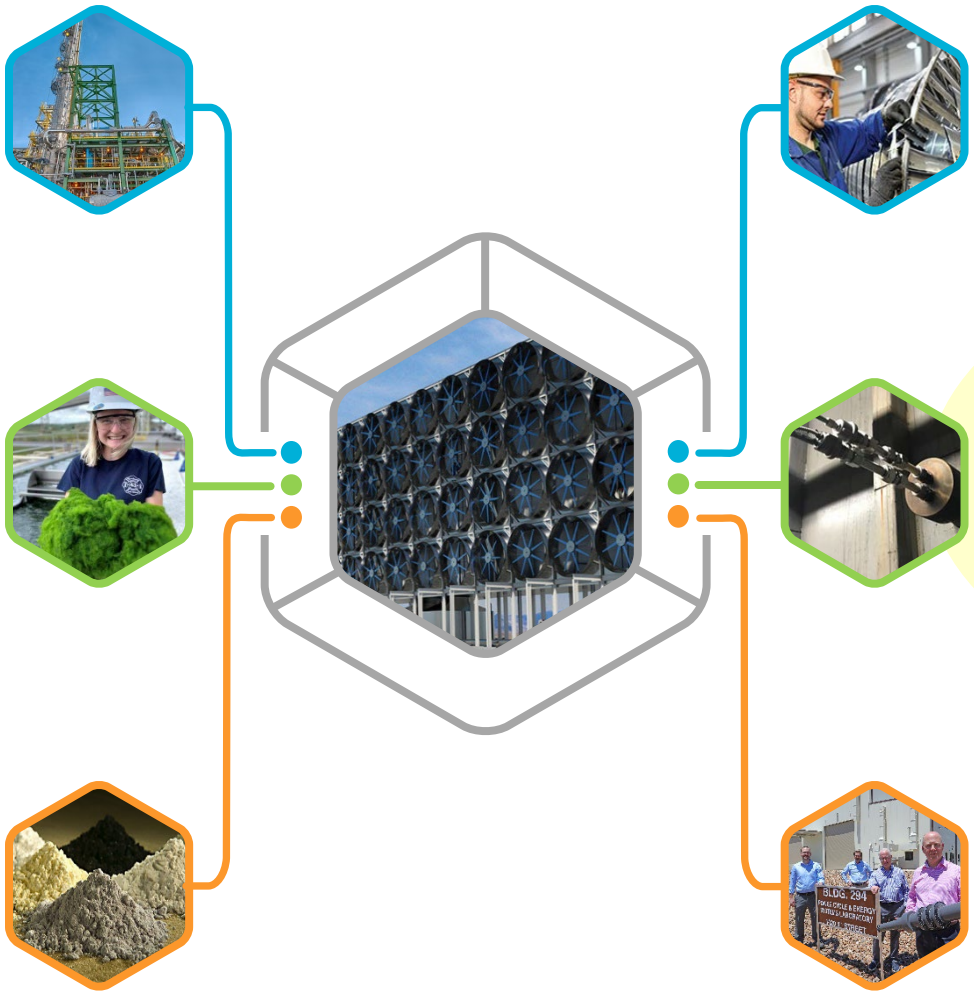
- Negative Emissions Technologies
- Direct Air Capture
- Natural Gas Sources
- Industrial Sources
- Enhanced Weathering

## Carbon Utilization & Storage

- Algae Systems
- Conversion to Fuels & Chemicals
- Mineralization into Inorganic Materials
- Monitoring, Verification, Accounting & Assessment of Long-Term Storage
- Storage Infrastructure Demonstration
- Accelerating Regional Initiatives
- CarbonSAFE

## Rare Earths & Critical Minerals

- Efficient REE and CM recovery, extraction, and separation
- Cost-competitive domestic supply



## Advanced Energy & Hydrogen

- Hydrogen Fuel
- 21st Century Power Plants
- Gasification
- Solid Oxide Fuel Cells & Gas Turbines

## Crosscutting Research

- High-Performance Materials
- Sensors & Controls
- Energy Storage
- Simulation-Based Engineering
- **University Training & Research**

## STEP (Supercritical $CO_2$)

- STEP Pilot Plant
- Turbomachinery & Recuperators
- Advanced Concepts in Direct-Fired Cycles
- Systems Integration & Operation



*Carbon Utilization Photo Courtesy of MicroBio*

# University Training and Research Program

**Historically Black Colleges & Universities (HBCU) and Other Minority Institutions (OMI)**

**University Coal Research (UCR)**

**Education and Training Program for Next Generation of Engineers and Scientists**

# UTR Program – Goals and Objectives

- 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 & Carbon Management's mission of delivering integrated solutions related to fossil energy and carbon management and enable transformation to a sustainable, net-zero greenhouse gas future
- To **increase research & development opportunities for underrepresented and structurally marginalized communities** within the U.S. and tap into the innovative and diverse thinking of student researchers at minority-serving institutions of higher learning
- Ensure that students are being 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 longstanding and enduring career

# Challenges and Opportunities for Future Energy Systems

# Decarbonization Goals

- **50% reduction in U.S. GHG pollution by 2030**
  - From a 4/22/21 White House Statement: Today, President Biden will announce a new target for the United States to **achieve a 50-52 percent reduction from 2005 levels in economy-wide net greenhouse gas pollution in 2030** – building on progress to-date and by positioning American workers and industry to tackle the climate crisis.
- **Carbon-neutral power sector by 2035**
  - From EO 14008, Sec 205: "The plan shall aim to use, as appropriate and consistent with applicable law, all available procurement authorities to achieve or facilitate: (i) **a carbon pollution-free electricity sector no later than 2035**"
- **Carbon-neutural economy by 2050**
  - From EO 14008, Sec 201: "Despite the peril that is already evident, there is promise in the solutions — opportunities to create well-paying union jobs to build a modern and sustainable infrastructure, deliver an equitable, clean energy future, and put the United States on a path to **achieve net-zero emissions, economy-wide, by no later than 2050**."

# 2022 FECM Strategic Vision

## Strategic Vision: The Role of FECM in Achieving Net-Zero Greenhouse Gas Emissions

FECM prioritizes the following three strategic directions:

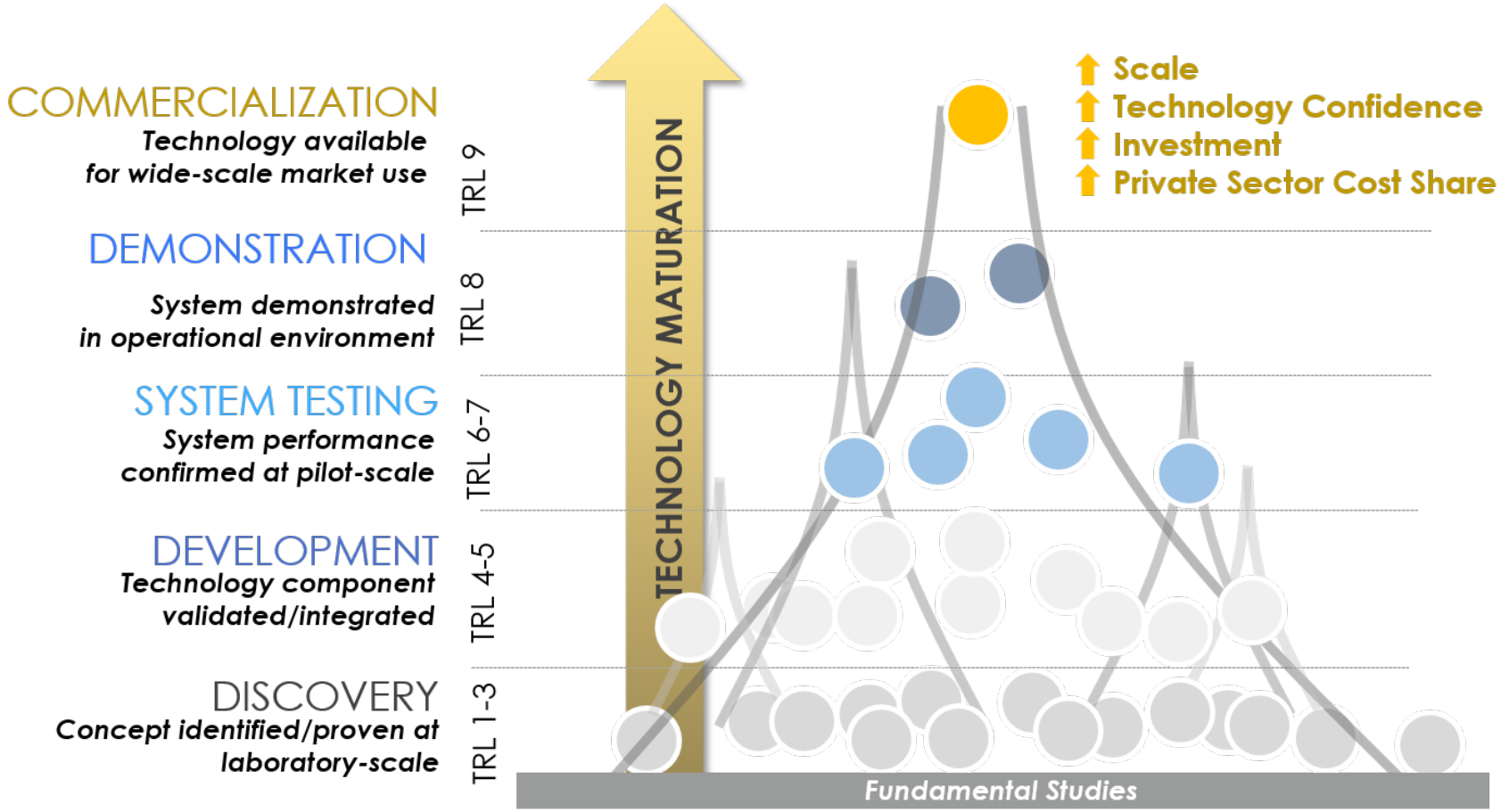
- Advancing Justice, Labor, and Engagement
- Advancing Carbon Management Approaches toward Deep Decarbonization
- Advancing Technologies that lead to Sustainable Energy



Learn more here: https://www.energy.gov/fecm/strategic-vision-role-fecm-achieving-net-zero-greenhouse-gas-emissions

# University Training and Research Program

Nurture technologies from initial idea/concept through the various stages of development, including proof of feasibility, prototyping, field testing, etc.




UTR Program is traditionally TRL 2-5

# University Training and Research Program

## Education and Training Program for Next Generation of Engineers and Scientists

- Annual HBCU-OMI Funding Opportunity Announcement (FOA)
- Nationwide, competitive solicitation each year
- Research and development (R&D) projects awarded as Grants
- Typical duration of 2-3 years
- Award size: $400-500K
- Resources: https://netl.doe.gov/business/solicitations
  https://www.fedconnect.net/
  https://www.grants.gov/

# FOA Summary (Recent HBCU-OMI Topics)

NATIONAL ENERGY TECHNOLOGY LABORATORY

## FY20

- **Quantum** for Energy Systems and Technologies
- Novel **Sensors and Controls** for Flexible Generation
- **Machine Learning** for Computational Fluid Dynamics (CFD)
- Fast, Efficient, And Reliable Fossil Power with Integrated **Energy Storage**

## FY21

- **Energy-water nexus** implications and opportunities of a hydrogen economy
- Electromagnetic 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

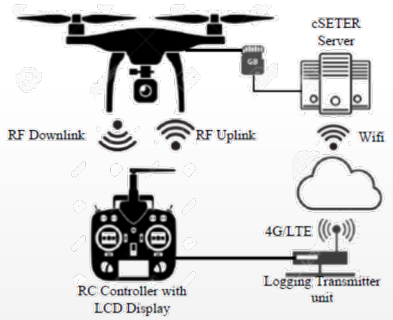
## FY22*

*2022 - present

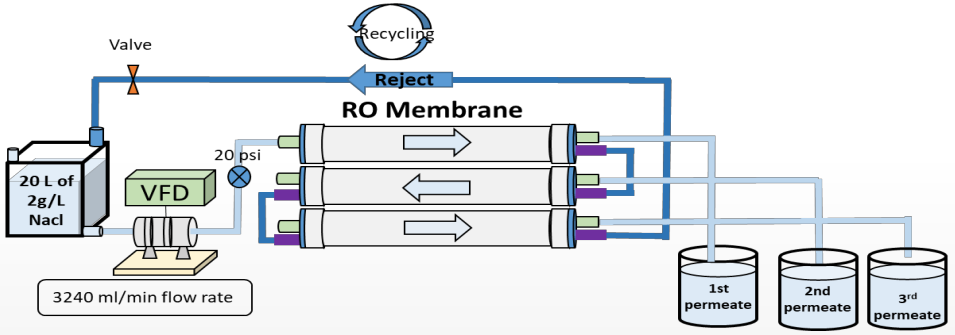
- **Techno-Economic Analysis (TEA) and Lifecycle Analysis (LCA)** Screening of CCS-Enabled, Waste Coal and Biomass Power Production
- Resource Development Site Assessments to Inform LCA/TEA
- **Phytotechnology** Development for Identification and/or Remediation of Sites Exhibiting Soil Contamination
- R&D Scoping Study and **Infrastructure Self-Assessment** of FECM Research Capabilities
- Biological **Uptake of CO2 via Algae** for Agricultural Applications

# UTR Portfolio Highlights

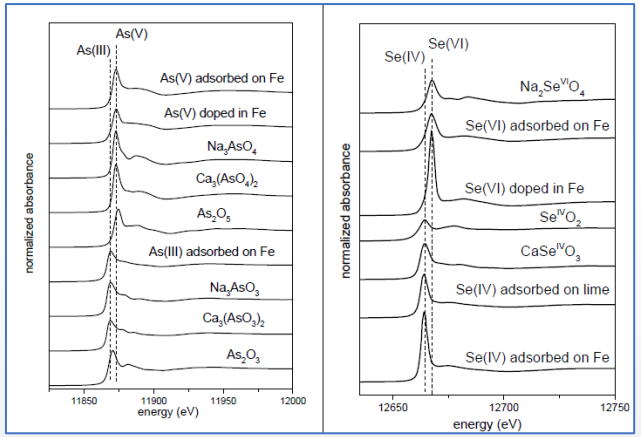
## ROBOTICS FOR NON-DESTRUCTIVE EVALUATION



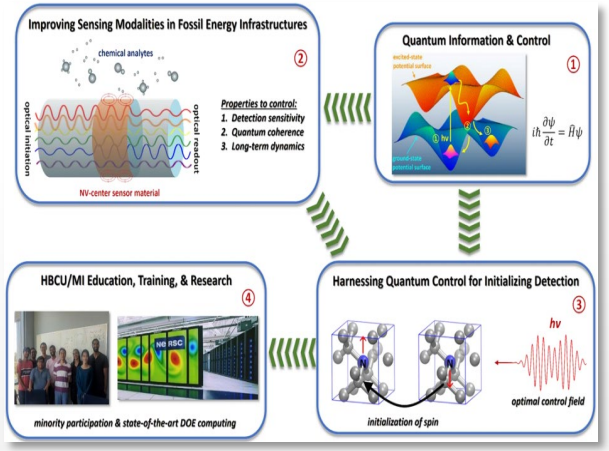
## WATER TREATMENT



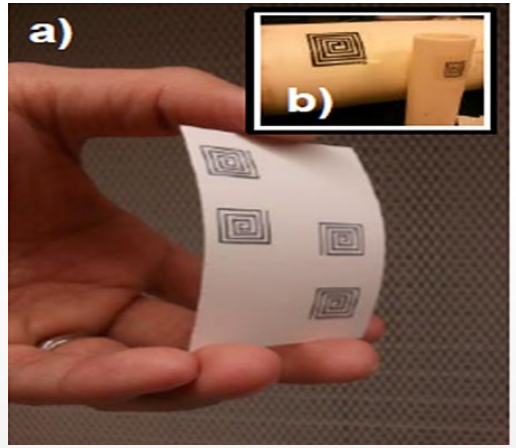

## ARSENIC & SELENIUM IN COAL FLY ASH



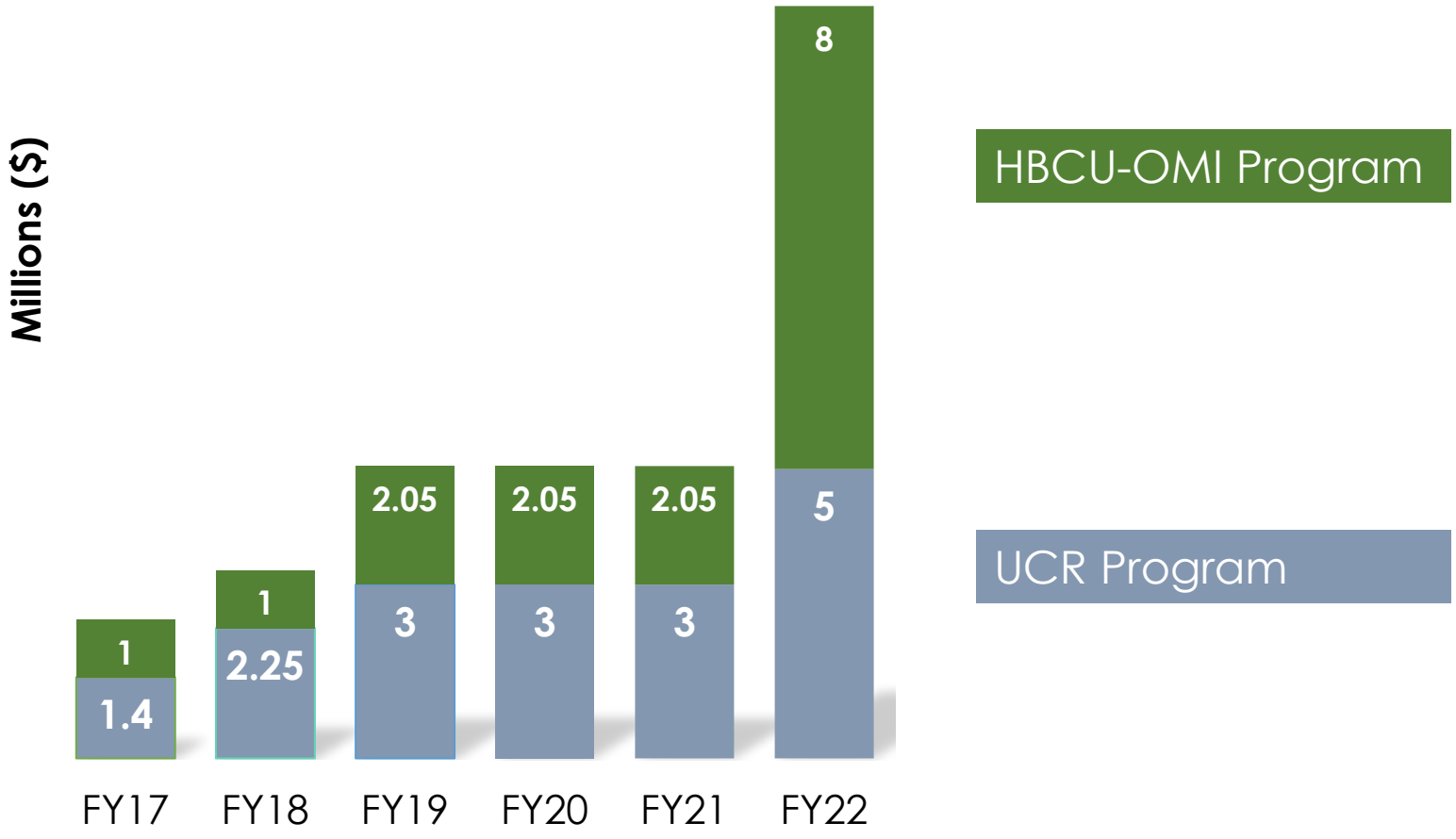

## QUANTUM INFORMATION SCIENCES




## PASSIVE WIRELESS SENSORS



# UTR Program Budget History



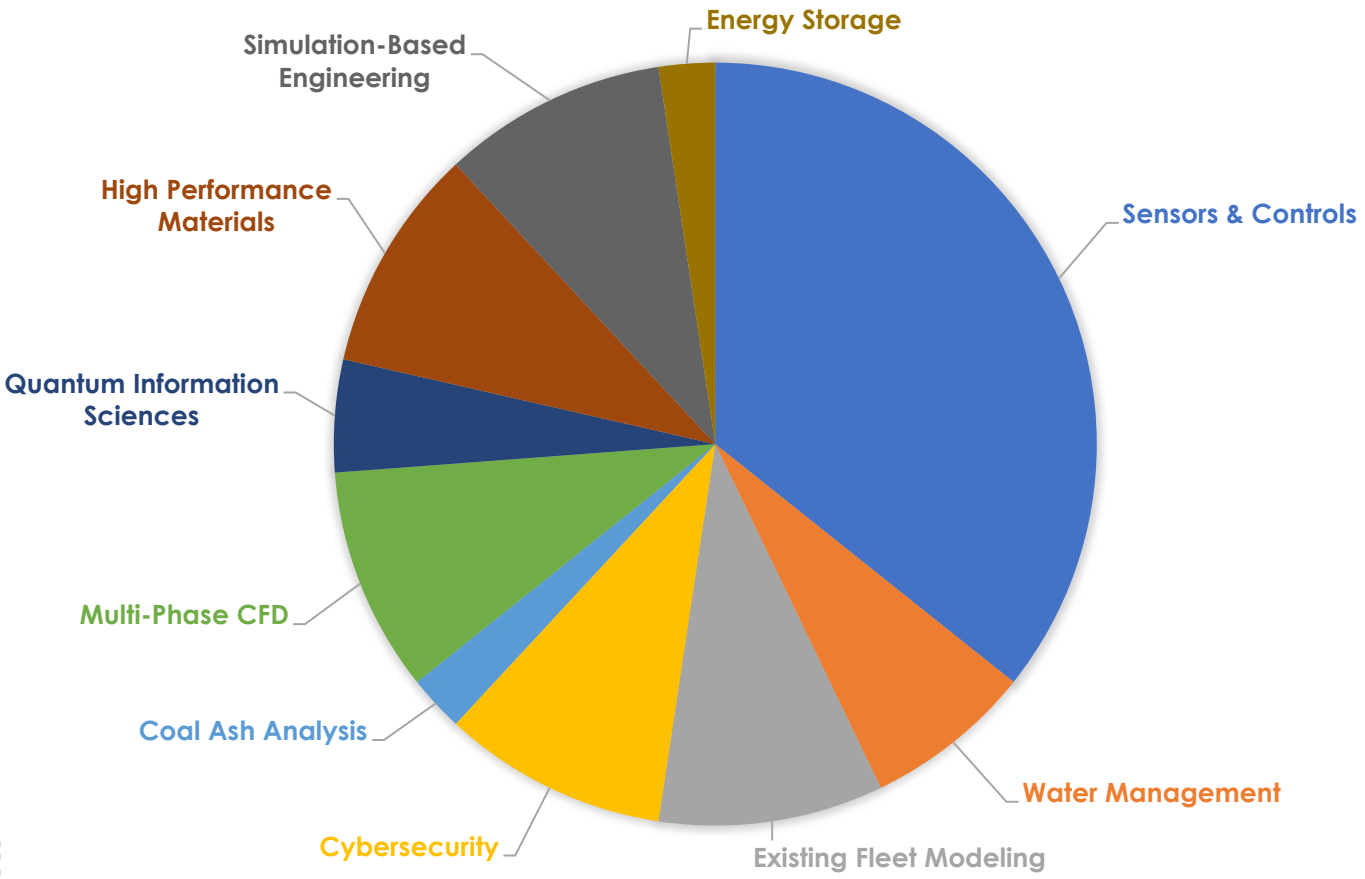
# UTR Program – Project Summary

**42** TOTAL PROJECTS (ACTIVE)

**25** UNIVERSITY COAL RESEARCH (UCR)

**17** HISTORICALLY BLACK COLLEGES AND UNIVERSITIES, AND OTHER MINORITY INSTITUTIONS (HBCU-OMI)

**$18.3M** TOTAL AWARD VALUE (ACTIVE)

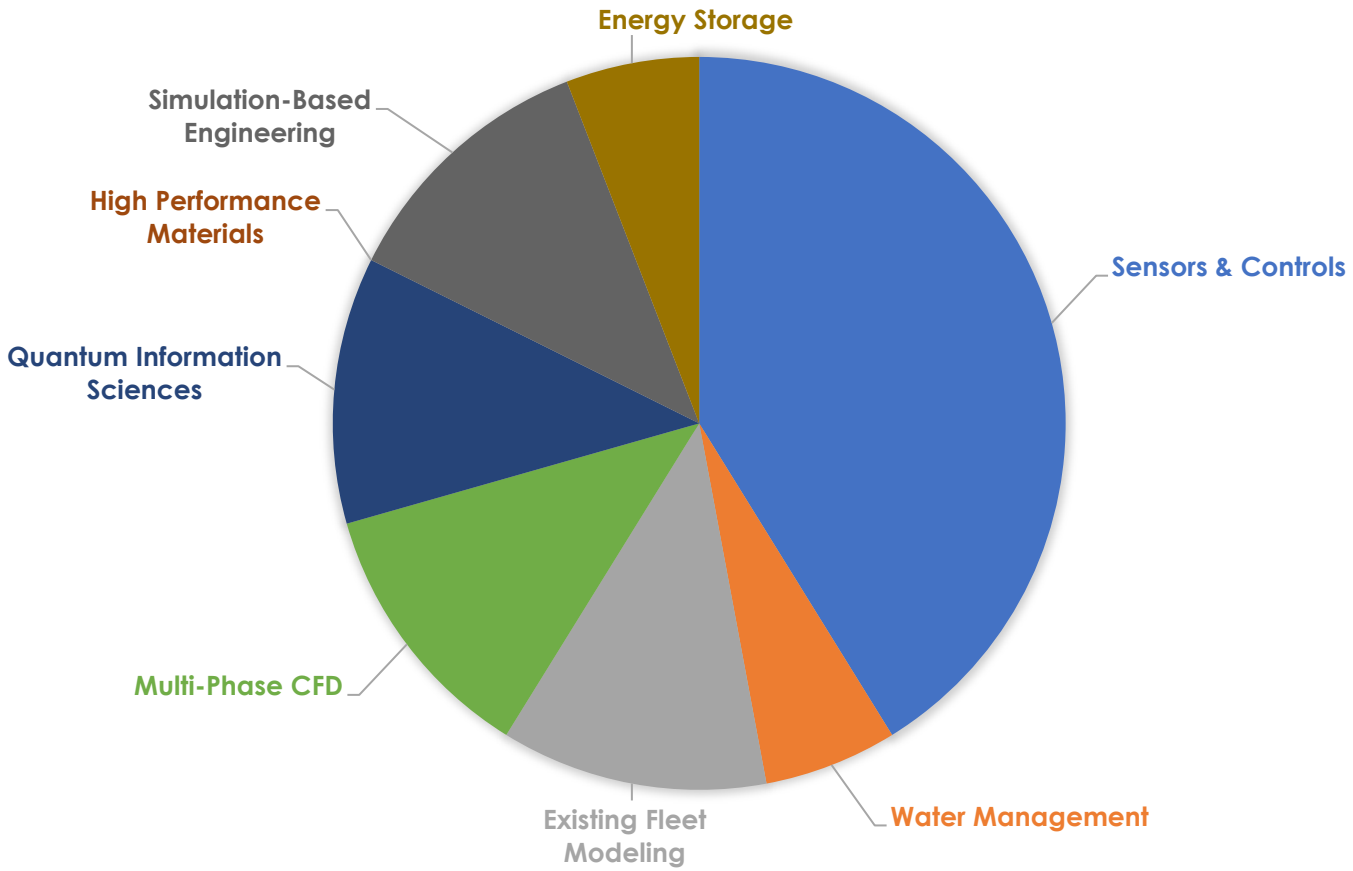


# UTR Program – Project Summary

**17** HISTORICALLY BLACK COLLEGES AND UNIVERSITIES, AND OTHER MINORITY INSTITUTIONS (HBCU-OMI) ACTIVE PROJECTS

**$7.4M** TOTAL AWARD VALUE (ACTIVE)

**44** CURRENT STUDENTS AFFILIATED W/PROGRAM (as of Nov 2021)

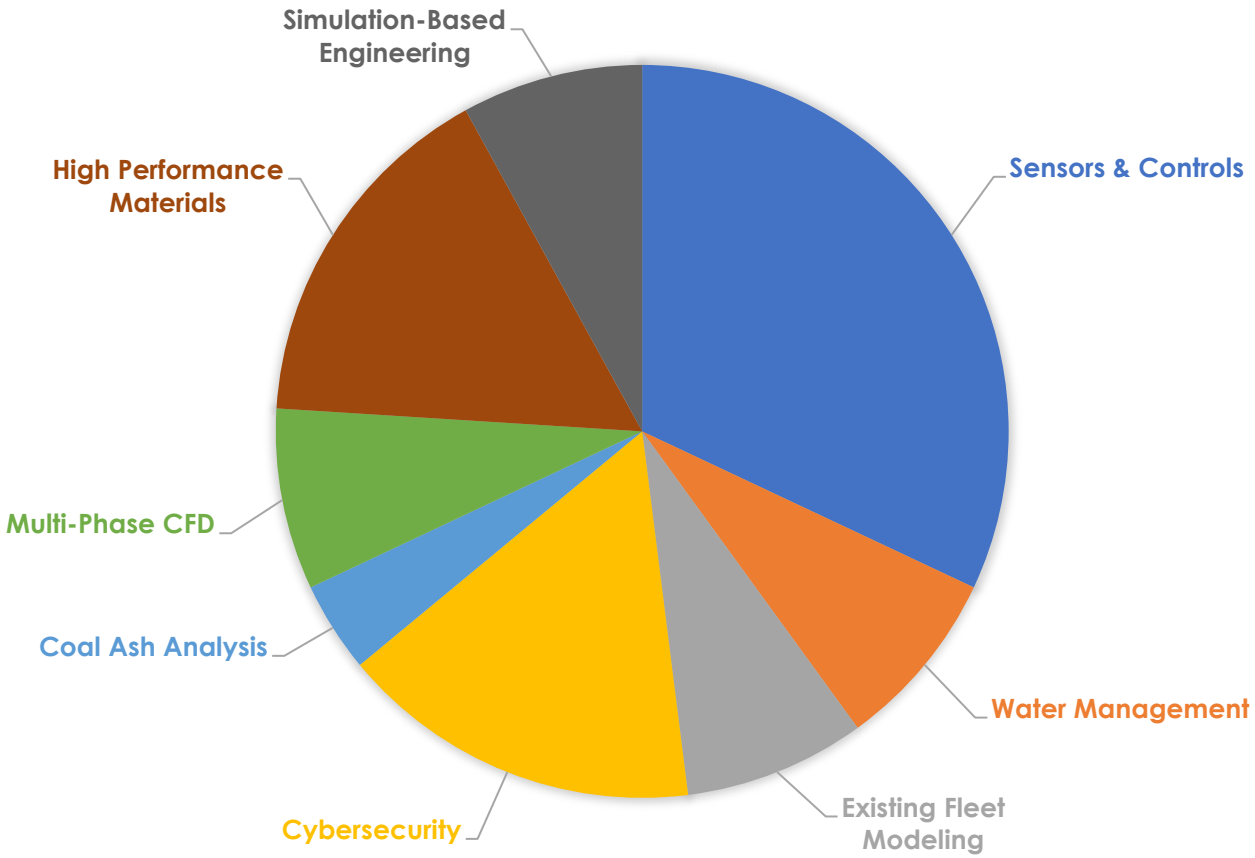


# UTR Program – Project Summary

**25** UNIVERSITY COAL RESEARCH (UCR) ACTIVE PROJECTS

**$10.9M** TOTAL AWARD VALUE (ACTIVE)

**58** CURRENT STUDENTS AFFILIATED W/PROGRAM (as of Nov 2021)



# UTR Program – University Partners

- Carnegie Mellon University**
- Colorado School of Mines
- Duke University
- Florida A&M University
- Florida International University**
- Georgia Tech Research Corporation**
- Howard University
- Johns Hopkins University
- Michigan State University
- Michigan Technological University
- Morgan State University
- New Mexico State University
- North Carolina A&T University
- Ohio State University
- Ohio University
- Old Dominion University
- Pennsylvania State University
- University of California – Riverside**
- University of Maryland
- University of Massachusetts
- University of Missouri
- University of North Carolina Charlotte
- University of North Dakota
- University of North Dakota Energy and Environmental Research Center (UNDEERC)**
- University of Texas at El Paso**
- University of Texas at San Antonio
- West Virginia University Research Corporation**

**Denotes multiple awards; Last updated: November 2021

# UTR Program – University Partners (HBCU-OMI)

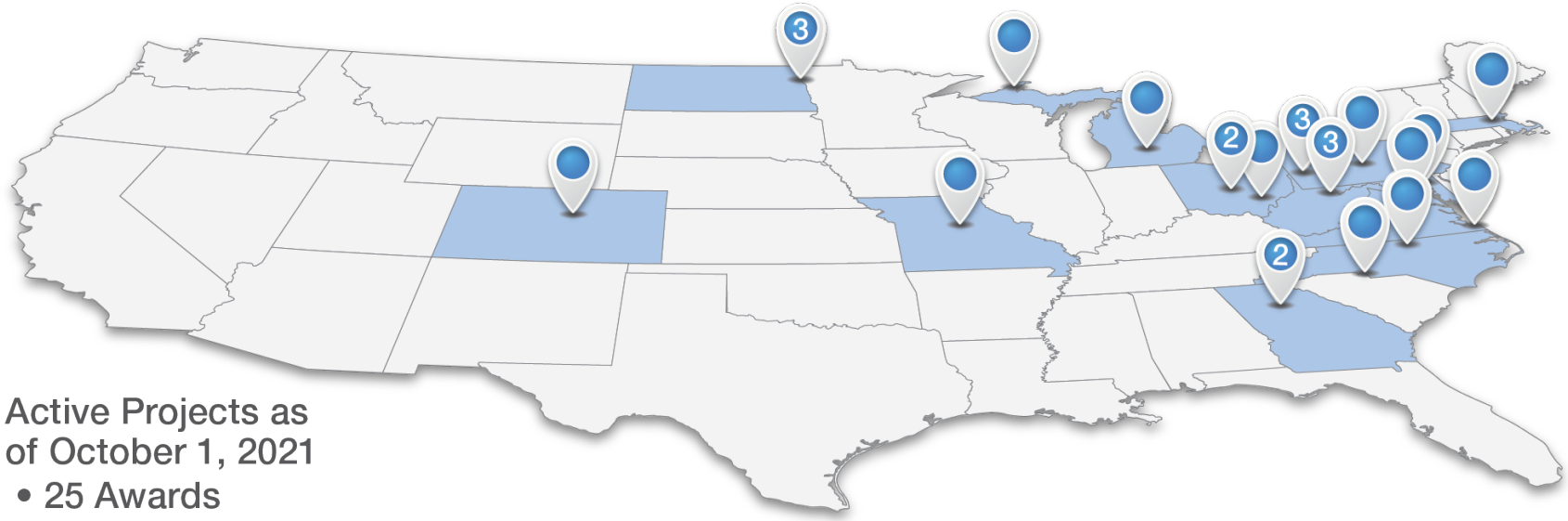
*Historically Black Colleges and Universities, and, Other Minority Institutions*

Active Projects as of October 1, 2021

- 17 Awards
- $7.36M
- 44 Students

# UTR Program – University Partners (UCR)

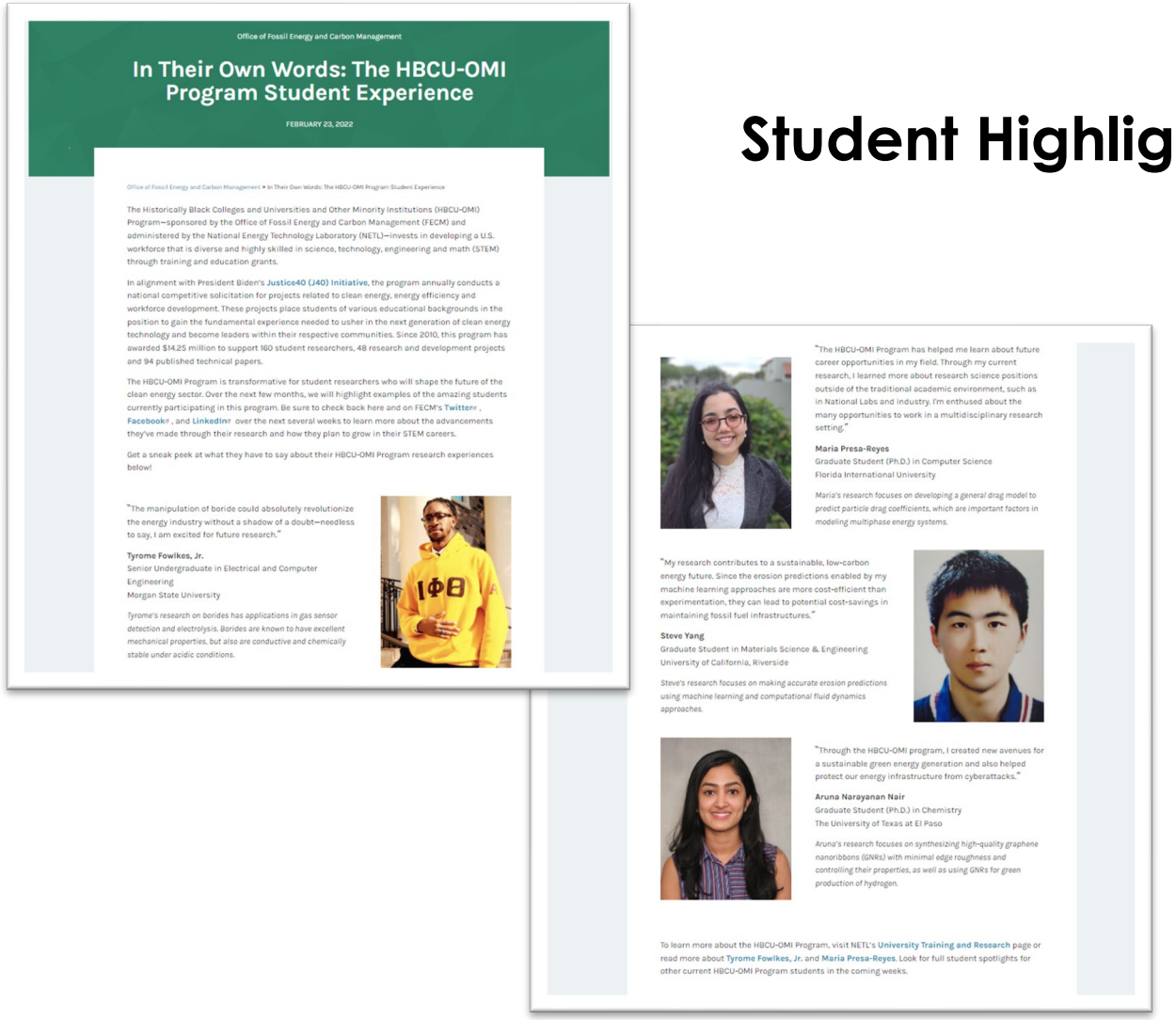
*University Coal Research Program*




Active Projects as of October 1, 2021

- 25 Awards
- $10.89M
- 58 Students

# In Their Own Words …



Office of Fossil Energy and Carbon Management

## In Their Own Words: The HBCU-OMI Program Student Experience

FEBRUARY 23, 2022

Office of Fossil Energy and Carbon Management > In Their Own Words: The HBCU-OMI Program Student Experience

The Historically Black Colleges and Universities and Other Minority Institutions (HBCU-OMI) Program—sponsored by the Office of Fossil Energy and Carbon Management (FECM) and administered by the National Energy Technology Laboratory (NETL)—invests in developing a U.S. workforce that is diverse and highly skilled in science, technology, engineering and math (STEM) through training and education grants.

In alignment with President Biden's **Justice40 (J40) Initiative**, the program annually conducts a national competitive solicitation for projects related to clean energy, energy efficiency and workforce development. These projects place students of various educational backgrounds in the position to gain the fundamental experience needed to usher in the next generation of clean energy technology and become leaders within their respective communities. Since 2010, this program has awarded $14.25 million to support 160 student researchers, 48 research and development projects and 94 published technical papers.

The HBCU-OMI Program is transformative for student researchers who will shape the future of the clean energy sector. Over the next few months, we will highlight examples of the amazing students currently participating in this program. Be sure to check back here and on FECM's **Twitter**, **Facebook**, and **LinkedIn** over the next several weeks to learn more about the advancements they've made through their research and how they plan to grow in their STEM careers.

Get a sneak peek at what they have to say about their HBCU-OMI Program research experiences below!

"The manipulation of boride could absolutely revolutionize the energy industry without a shadow of a doubt—needless to say, I am excited for future research."

**Tyrome Fowlkes, Jr.**
Senior Undergraduate in Electrical and Computer Engineering
Morgan State University

*Tyrome's research on borides has applications in gas sensor detection and electrolysis. Borides are known to have excellent mechanical properties, but also are conductive and chemically stable under acidic conditions.*

"The HBCU-OMI Program has helped me learn about future career opportunities in my field. Through my current research, I learned more about research science positions outside of the traditional academic environment, such as in National Labs and industry. I'm enthused about the many opportunities to work in a multidisciplinary research setting."

**Maria Presa-Reyes**
Graduate Student (Ph.D.) in Computer Science
Florida International University

*Maria's research focuses on developing a general drag model to predict particle drag coefficients, which are important factors in modeling multiphase energy systems.*

"My research contributes to a sustainable, low-carbon energy future. Since the erosion predictions enabled by my machine learning approaches are more cost-efficient than experimentation, they can lead to potential cost-savings in maintaining fossil fuel infrastructures."

**Steve Yang**
Graduate Student in Materials Science & Engineering
University of California, Riverside

*Steve's research focuses on making accurate erosion predictions using machine learning and computational fluid dynamics approaches.*

"Through the HBCU-OMI program, I created new avenues for a sustainable green energy generation and also helped protect our energy infrastructure from cyberattacks."

**Aruna Narayanan Nair**
Graduate Student (Ph.D.) in Chemistry
The University of Texas at El Paso

*Aruna's research focuses on synthesizing high-quality graphene nanoribbons (GNRs) with minimal edge roughness and controlling their properties, as well as using GNRs for green production of hydrogen.*

To learn more about the HBCU-OMI Program, visit NETL's **University Training and Research** page or read more about **Tyrome Fowlkes, Jr.** and **Maria Presa-Reyes**. Look for full student spotlights for other current HBCU-OMI Program students in the coming weeks.

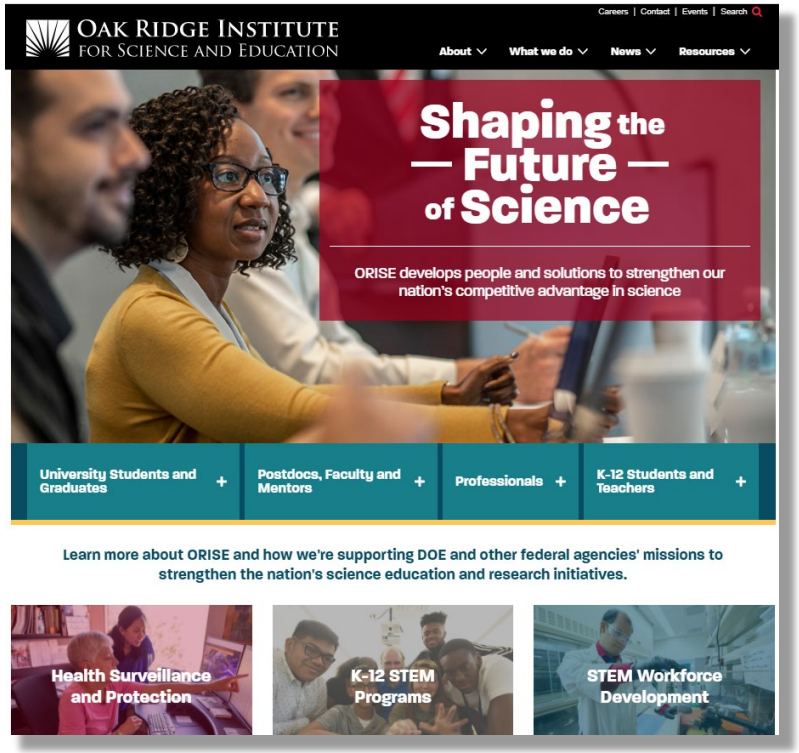
## Student Highlight Series for HBCU-OMI Program

- New initiative to amplify the work and achievements of students supported by the HBCU-OMI program
- Outstanding students were nominated by Pis and received recognition by DOE/FECM
- Students shared unique perspectives about their academic journey, including how they are contributing to a sustainable, low-carbon energy future.

Learn more here: https://www.energy.gov/fecm/articles/their-own-words-hbcu-omi-program-student-experience

# Internship & Fellowship Opportunities

## Oak Ridge Institute for Science and Education (ORISE)




https://orise.orau.gov/

## Mickey Leland Energy Fellowship (MLEF) Program

https://netl.doe.gov/education/internships/MLEF

# UTR Leveraged for Inter-Office Collaborations

U.S. DEPARTMENT OF ENERGY | OFFICE OF ELECTRICITY

U.S. DEPARTMENT OF ENERGY | Fossil Energy and Carbon Management

U.S. DEPARTMENT OF ENERGY | Office of Science

**FECM's HBCU-OMI Program may be leveraged to support other DOE Offices seeking to 1) provide additional opportunities, and 2) foster stronger relationships with minority-serving institutions**

U.S. DEPARTMENT OF ENERGY | Office of Nuclear Energy

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

U.S. DEPARTMENT ENERG

# Thank You!

VISIT US AT: **www.NETL.DOE.gov**

**@NETL_DOE**

**@NETL_DOE**

**@NationalEnergyTechnologyLaboratory**

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**University Training and Research**
https://netl.doe.gov/coal/university-training

U.S. DEPARTMENT OF ENERGY

U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

# DOE Hydrogen Program Activities


**Eric Miller, Ph.D.**
Senior Advisor

**James Vickers, Ph.D.**
Technology Manager

**Hydrogen and Fuel Cell Technologies Office (HFTO)**


April 12, 2022

ENERGY earthshots | Hydrogen
U.S. DEPARTMENT OF ENERGY

# Hydrogen Energy Earthshot

## "Hydrogen Shot"

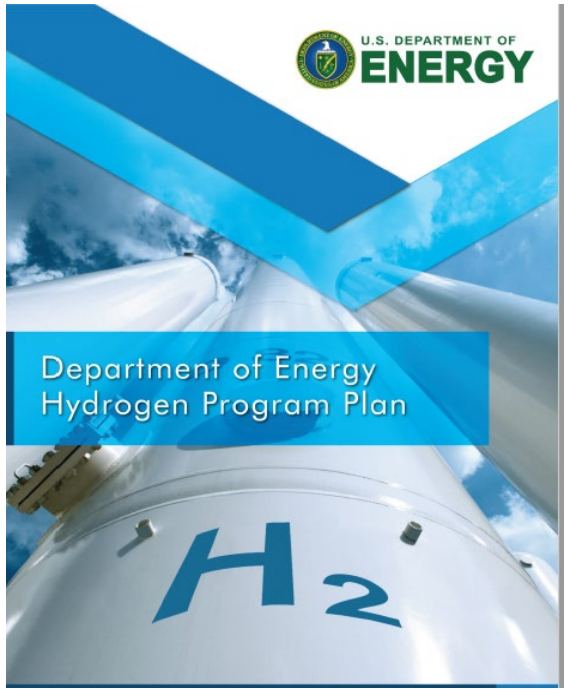
## "1 1 1"
## $1 for 1 kg clean hydrogen in 1 decade

Launched June 7, 2021
Summit Aug 31-Sept 1, 2021

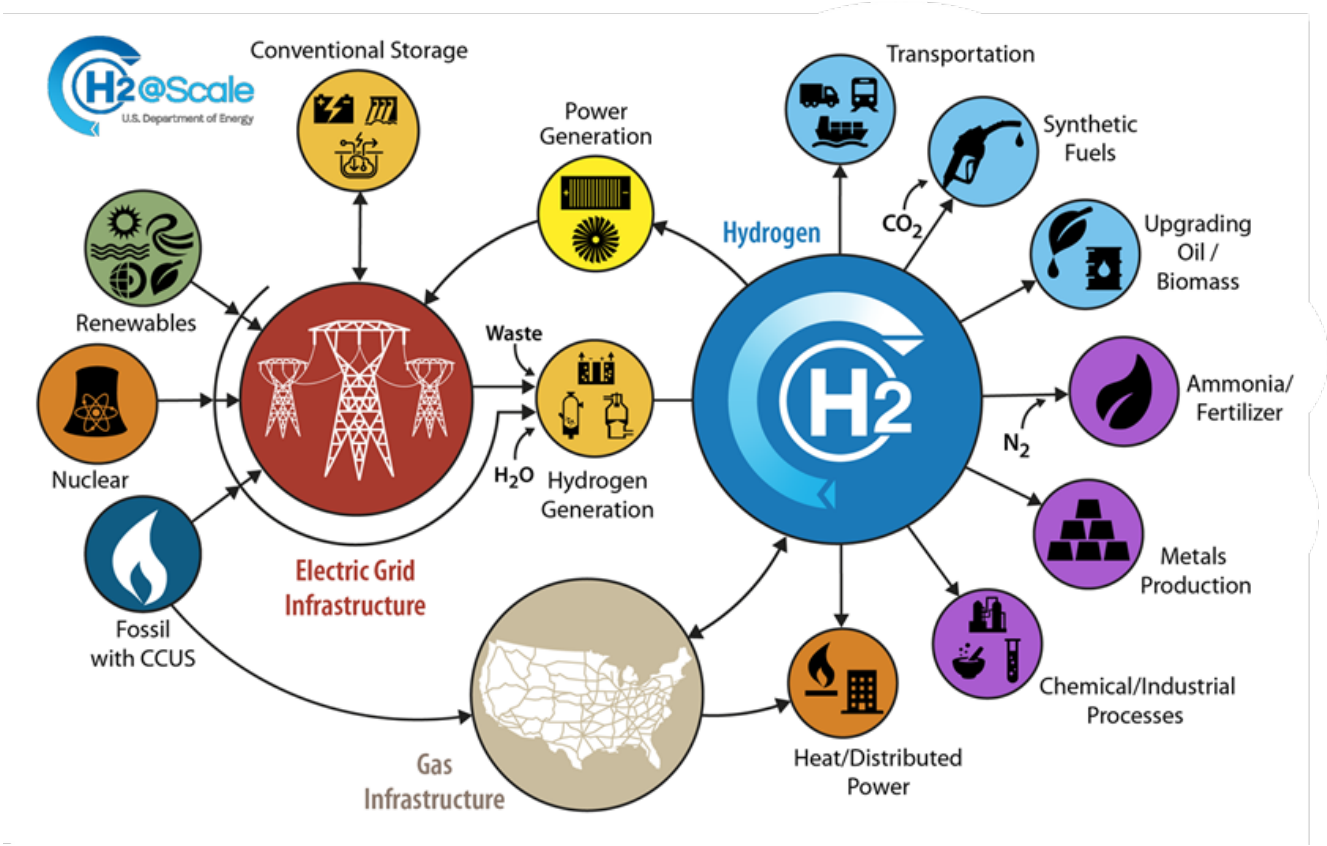
**www.energy.gov/eere/fuelcells/hydrogen-shot**

# The U.S. DOE Cross-Office Hydrogen Program

## Hydrogen is one part of a broad clean-energy portfolio




www.hydrogen.energy.gov




www.energy.gov/eere/fuelcells/h2scale

**Coordinated across relevant DOE Offices – Supporting Hydrogen Shot and H2@Scale; Interagency Working Group coordinates across Agencies**

# $H_2$ Program: Priority Areas Spanning Multiple DOE Offices

- **Low cost, clean hydrogen**
- **Low cost, efficient, safe hydrogen delivery and storage**
- **Enable end use applications at scale for impact**

***additional priorities in:***

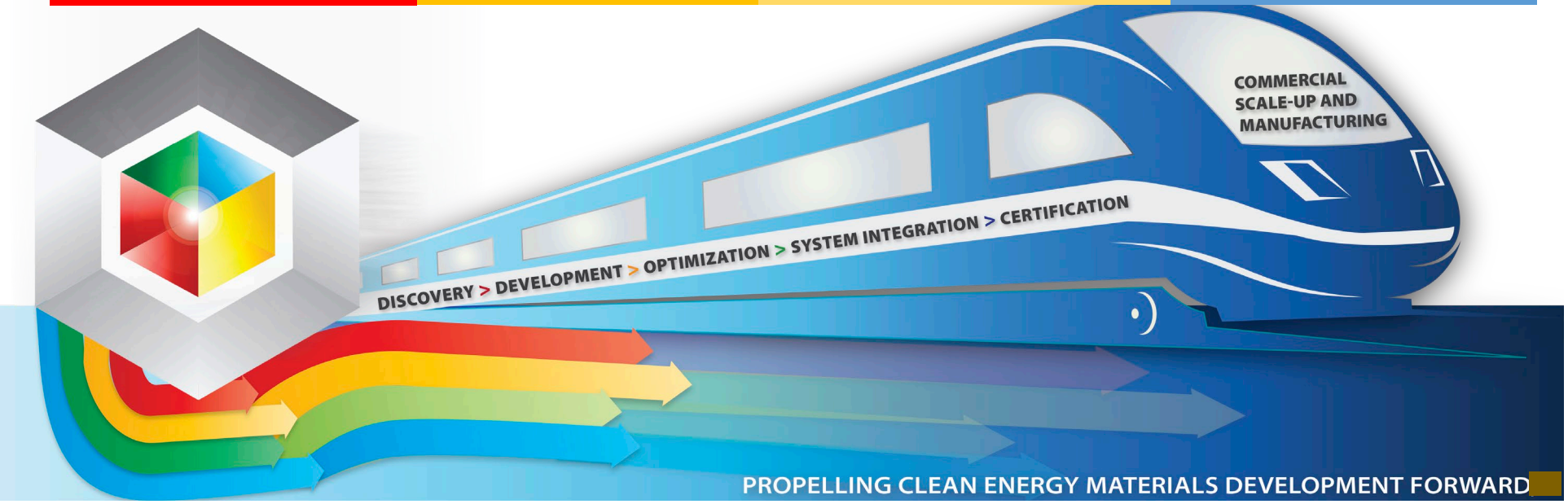
- **Workforce development**
- **Safety, codes, standards**
- **Environmental Justice priorities**

| | NEAR-TERM | LONGER-TERM |
|---|---|---|
| **Production** | Gasification of coal,* biomass, and waste with carbon capture, utilization and storage (*waste coal, other waste)<br>Advanced fossil and biomass reforming/conversion/pyrolysis<br>Electrolysis (low-temperature, high-temperature) | Advanced biological/microbial conversion<br>Advanced thermo/photoelectro-chemical $H_2O$ splitting |
| **Delivery** | Distribution from on-site production<br>Tube trailers (gaseous $H_2$)<br>Cryogenic trucks (liquid $H_2$) | Widespread pipeline transmission and distribution<br>Chemical $H_2$ carriers |
| **Storage** | Pressurized tanks (gaseous $H_2$)<br>Cryogenic vessels (liquid $H_2$) | Geologic $H_2$ storage (e.g., caverns, depleted oil/gas reservoirs)<br>Cryo-compressed<br>Chemical $H_2$ carriers<br>Materials-based $H_2$ storage |
| **Conversion** | Turbine combustion<br>Fuel cells | Advanced combustion<br>Next generation fuel cells<br>Fuel cell/combustion hybrids<br>Reversible fuel cells |
| **Applications** | Fuel refining<br>Space applications<br>Portable power | Blending in natural gas pipelines<br>Distributed stationary power<br>Transportation<br>Distributed CHP<br>Industrial and chemical processes<br>Defense, security, and logistics applications<br>Utility systems<br>Integrated energy systems |

# Energy Materials Network (EMN) – $H_2$-Related Activities

**DOE's EMN aims to accelerate foundational applied materials RD&D in tracks aligned with some of the nation's most pressing sustainable energy challenges**

| Hydrogen Compatible Materials | Breakthrough Hydrogen Storage Materials | Next-Generation Electro-catalysts for Fuel Cells | Advanced Water Splitting Materials for Hydrogen Production |
|---|---|---|---|




***Accelerating foundational materials RD&D for energy applications***

# ElectroCat: Electrocatalysis Consortium

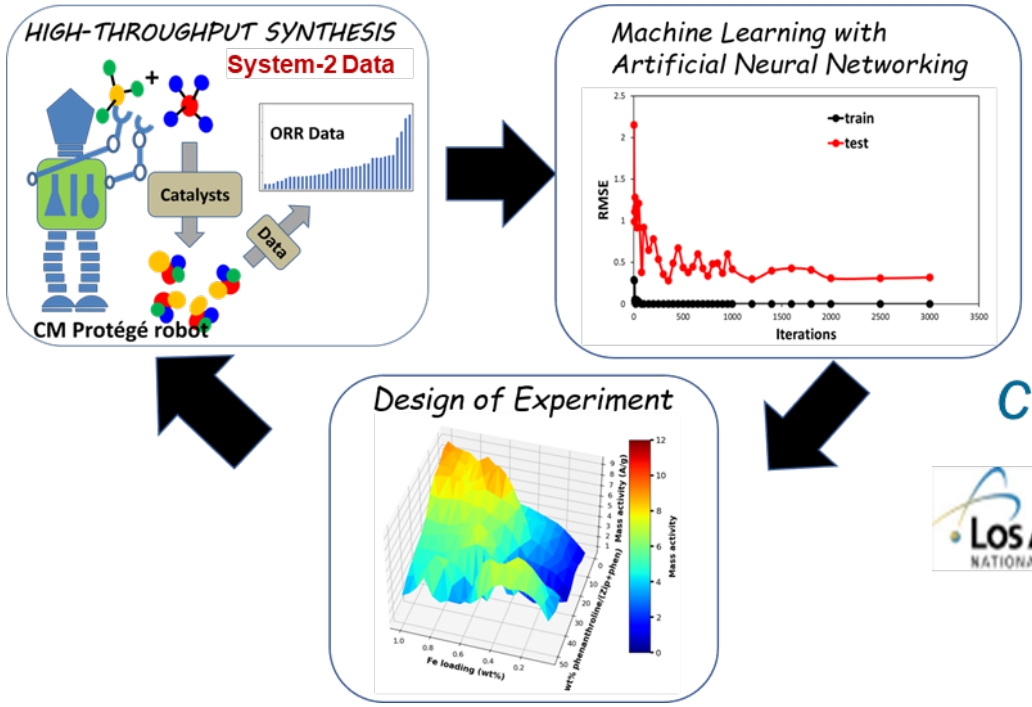
ElectroCat
Electrocatalysis Consortium
https://www.electrocatconsortium.com/

Development of durable PGM-free catalysts for PEMFCs and for low-temperature electrolyzers, as low-cost alternative to PGM catalysts, addressing critical mineral challenges

➢ ***Comprising 30 world-class capabilities and expertise in:***

- Catalyst synthesis, characterization, processing, & manufacturing
- High-throughput, combinatorial techniques
- Advanced computational tools

## Predictive Data-Driven Guidance of High-Throughput Synthesis of PGM-free Electrocatalysts




***Synthesis, Processing and Manufacturing***

***Characterization and Synthesis***

***Computation, Modeling & Data Management***

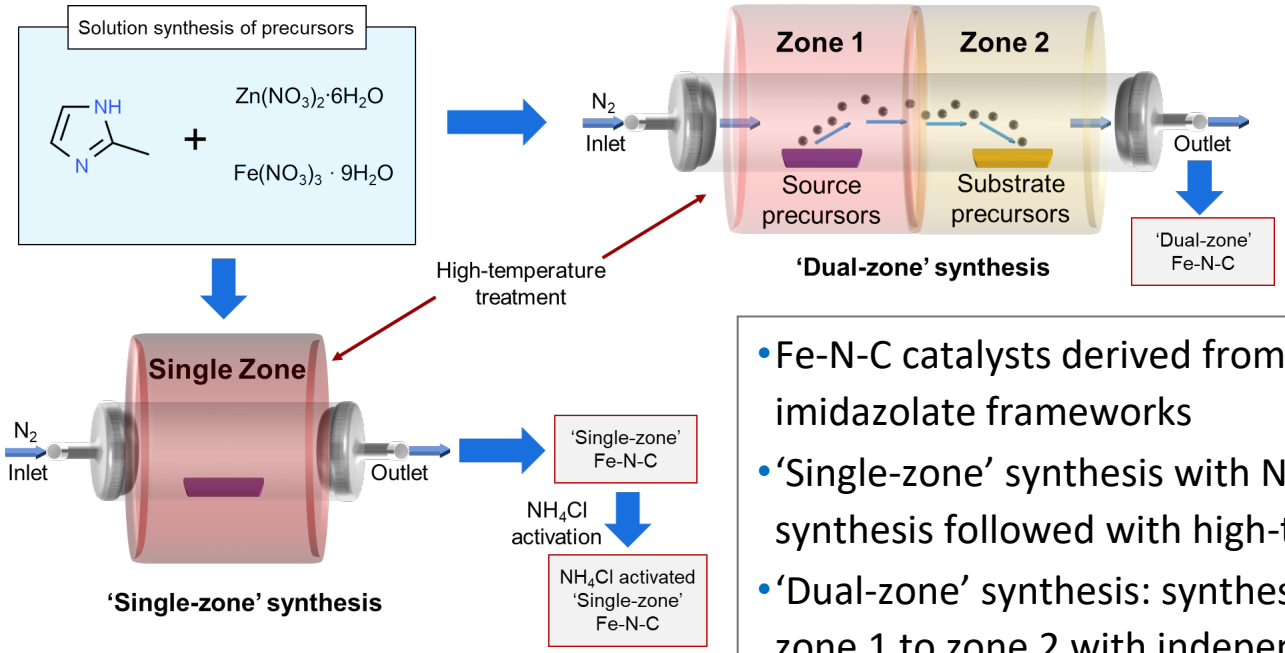
Core Labs

Los Alamos NATIONAL LABORATORY
Argonne NATIONAL LABORATORY
OAK RIDGE National Laboratory
NREL

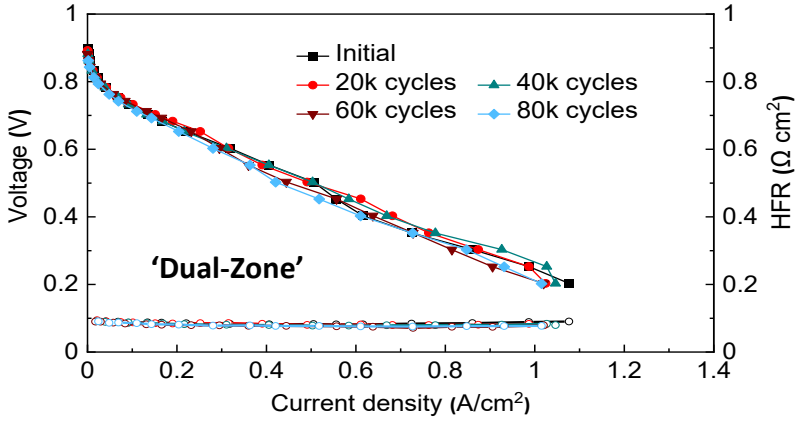
# PGM-Free Catalyst Durability Accomplishment

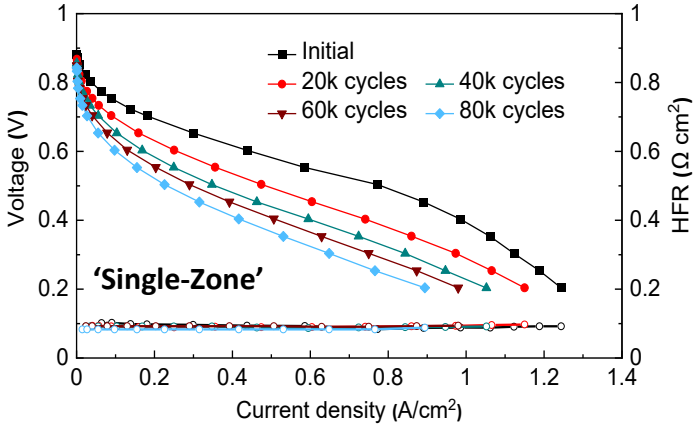
ElectroCat
Electrocatalysis Consortium

## Catalyst synthesis development leads to excellent durability after 80,000 cycles




- Fe-N-C catalysts derived from bimetallic (Fe, Zn) zeolitic imidazolate frameworks
- 'Single-zone' synthesis with $NH_4Cl$ activation: one-zone synthesis followed with high-temp activation with $NH_4Cl$
- 'Dual-zone' synthesis: synthesis involving deposition from zone 1 to zone 2 with independently-controlled temperatures



# H-Mat (Hydrogen Materials Compatibility) Consortium

https://h-mat.org/

## H-Mat Focus Areas

- **Polymers**: Improve life of seal materials in $H_2$ by 50%.
- **Metals:** Increase life of storage vessels in hydrogen by 50%.
- **Pipelines:** Characterize life of metal and polymer pipe materials in hydrogen blends.
- **Cross-cut:** Support industry & academia to develop novel low-cost materials for $H_2$ service.

## Materials Development to Enable 50% Increase in Life of Materials in Hydrogen Environments

Damage in materials used in fueling stations commonly due to pressure cycling in $H_2$.

Storage is the second most expensive component at fueling stations; commonly replaced in <5 years due to limited life in $H_2$.

## World-Class Materials R&D Capabilities

- Mechanical testing in high-pressure, temperature-controlled hydrogen environments, advanced imaging, and computational modeling tools
- National laboratory expertise developed through decades of R&D that informed hydrogen codes & standards and component design
- Two online portals for metals and polymers, to enable data sharing with global community

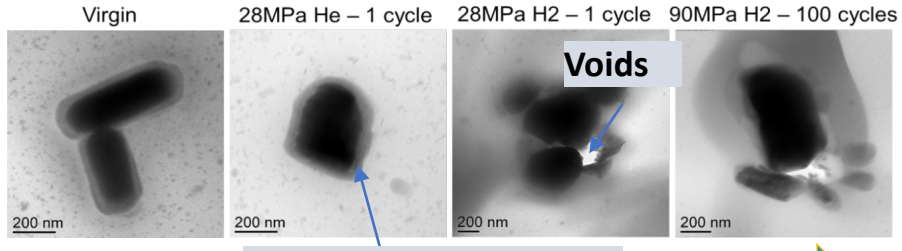
## Collaboration between 5 national labs & teams from industry and academia

- Partners engaged through FOAs, SBIRs, and CRADAs
- Online data portal to share information with R&D community worldwide

# H-Mat – Some Key Accomplishments

## Polymers

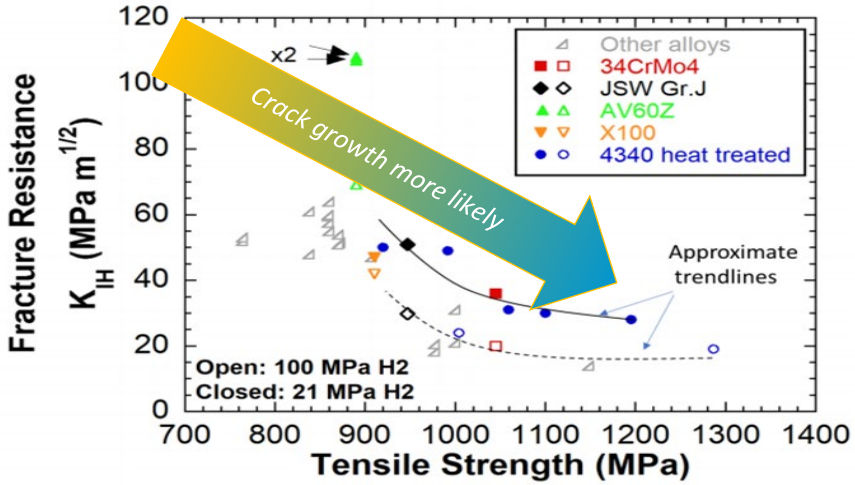
***Identified microstructural features within Ethylene Propylene Diene Monomer materials as locations for void formation***




*Increasing hydrogen pressure and cycles cause void formation*

- *Cycled polymer materials from industry partner (Takaishi Industries) in up to 90 MPa hydrogen and conducted TEM to visualize microstructure changes*
- *Validated phase field models of EPDM to predict void formation, and inform materials development*

## Metals




**Systematic *in situ* testing of 9 microstructural variants of steel confirm strong correlation between strength and reduced fracture resistance**

- *Conducted molecular dynamics simulations and imaging to identify features most likely to contribute to crack growth*
- *Simulations will inform synthesis of experimental microstructures with enhanced resistance to fatigue*

https://h-mat.org/

# HyMARC—
# Materials-based H2 Storage Consortium

https://www.hymarc.org/

**Accelerating $H_2$ storage materials development to enable 2x energy density**

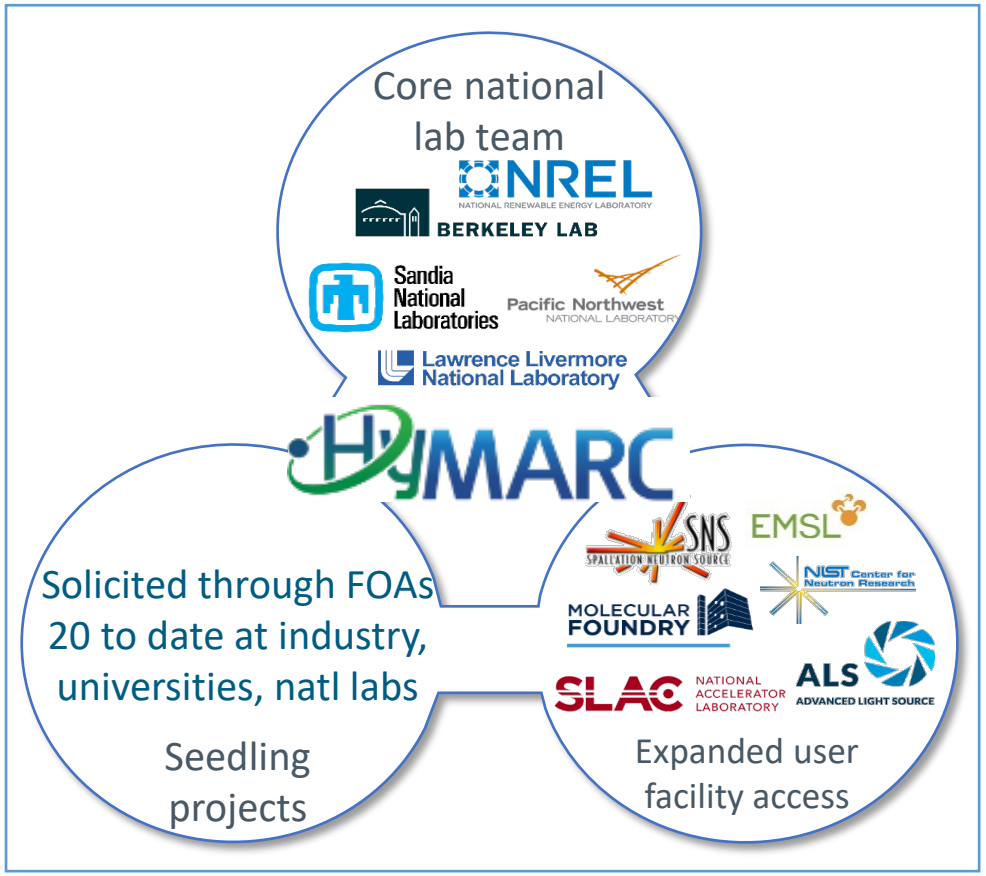
Address critical R&D gaps, leveraging advances in multiscale modeling, *in situ* characterization, and novel materials synthesis techniques

Develop foundational understanding of thermodynamics and kinetics of hydrogen release and uptake in all classes of storage materials

Join world-class national lab capabilities with innovative ideas from academia and industry

**HyMARC by the numbers**

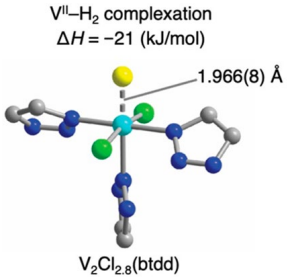
- 130+ publications
- 11 patents
- 60+ lab scientists
- 57 postdocs
- 35 grad students
- 13 undergrads

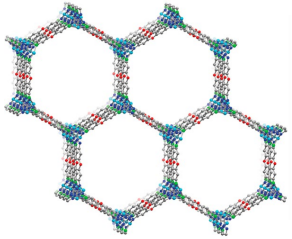


# HyMARC – Some Key Accomplishments

## First MOF with binding energy in the 15-25 kJ/mol range (LBNL/NIST) [1]

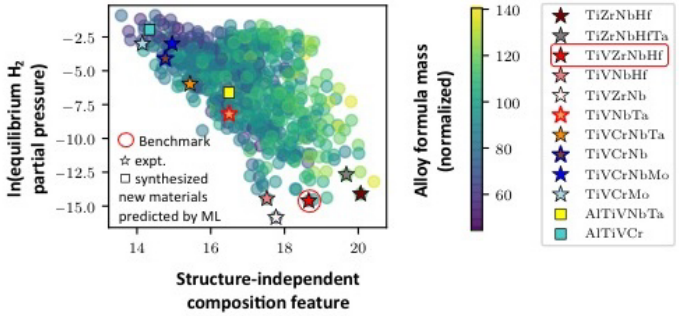
- $V_2Cl_{2.8}$(btdd), 21 kJ/mol – Ideal range predicted to enable RT operation
- 38% higher than $cH_2$, 27% improvement over SOA



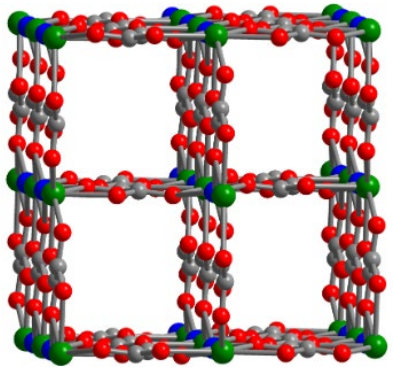
## MH discovery using machine learning (SNL)

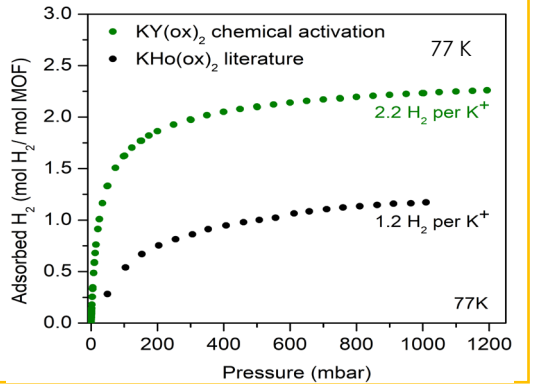
- ML model + MH database data dramatically reduces material discovery time
- New materials made; performance validated




## Oxalates may bind > 2 $H_2$/metal (LBNL)

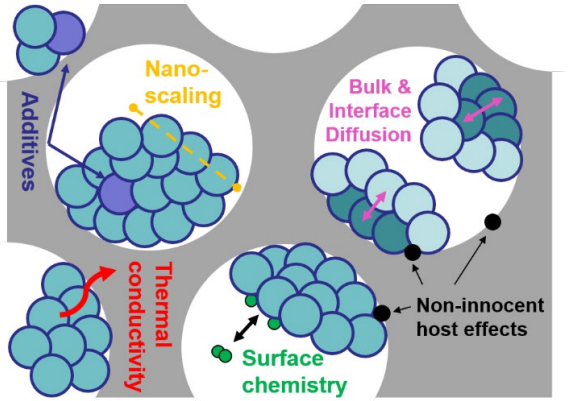
- $KY(ox)_2$ adsorbs 2.2 $H_2$ per $K^+$ at 77 K






## Encapsulated and nanostructured MHs (NREL/SNL/LLNL/LBNL)

Reduction of thermodynamic & kinetic barriers in metal hydrides shown with multiple types of synthetic techniques




[1] D. E. Jaramillo, J. R. Long, et al *J. Am. Chem. Soc.* 2021 doi 10.1021/jacs.1c01883

# Thank You!

## Relevant Information

### Hydrogen Technologies overview, targets, and projects:

https://www.hydrogen.energy.gov/pdfs/review21/plenary7_stetson_2021_o.pdf

- https://www.energy.gov/eere/fuelcells/doe-technical-targets-onboard-hydrogen-storage-light-duty-vehicles

### Fuel Cells overview, targets, and projects:

- https://www.hydrogen.energy.gov/pdfs/review21/plenary8_papageorgopoulos_2021_o.pdf

### Hydrogen Materials overview, targets, and projects:

- https://www.hydrogen.energy.gov/pdfs/review21/in001a_san_marchi_2021_o.pdf
- https://www.hydrogen.energy.gov/pdfs/review21/in001b_simmons_2021_o.pdf

## Hydrogen Program:

Hydrogen Shot | Department of Energy
U.S. Department of Energy Hydrogen Program Plan
H2@Scale | Department of Energy

## Consortia:

https://h-mat.org/
https://www.hymarc.org/
https://www.electrocat.org/

**hydrogen.energy.gov**

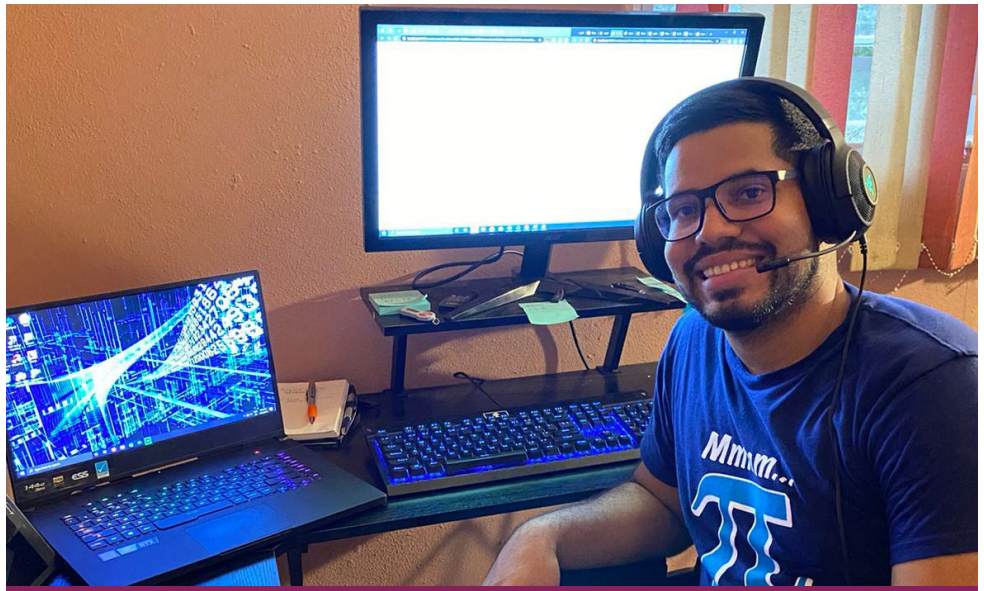
# MICKEY LELAND
## ENERGY FELLOWSHIP PROGRAM

U.S. DEPARTMENT OF ENERGY • OFFICE OF FOSSIL ENERGY AND CARBON MANAGEMENT

# MICKEY LELAND ENERGY FELLOWSHIP (MLEF)

- A **10-week** summer research program for Science, Technology, Engineering, and Math (STEM) students
- Receive **mentorship** from DOE scientists and engineers
- Provide **hands-on experience** complementing course of study and connect **theory to practice**
- Increase **confidence**, enhance **communications skills**, and promote **critical thinking** and **problem solving**

# MLEF PROGRAM



www.energy.gov/fe/mlef

## ELIGIBILITY

- Be at least age 18
- Be a U.S. Citizen
- Have a minimum 2.8 GPA
- Be enrolled full-time in a STEM degree program at the Associate, Bachelor's or Master's level at the time of application.
- Must be a college sophomore or higher

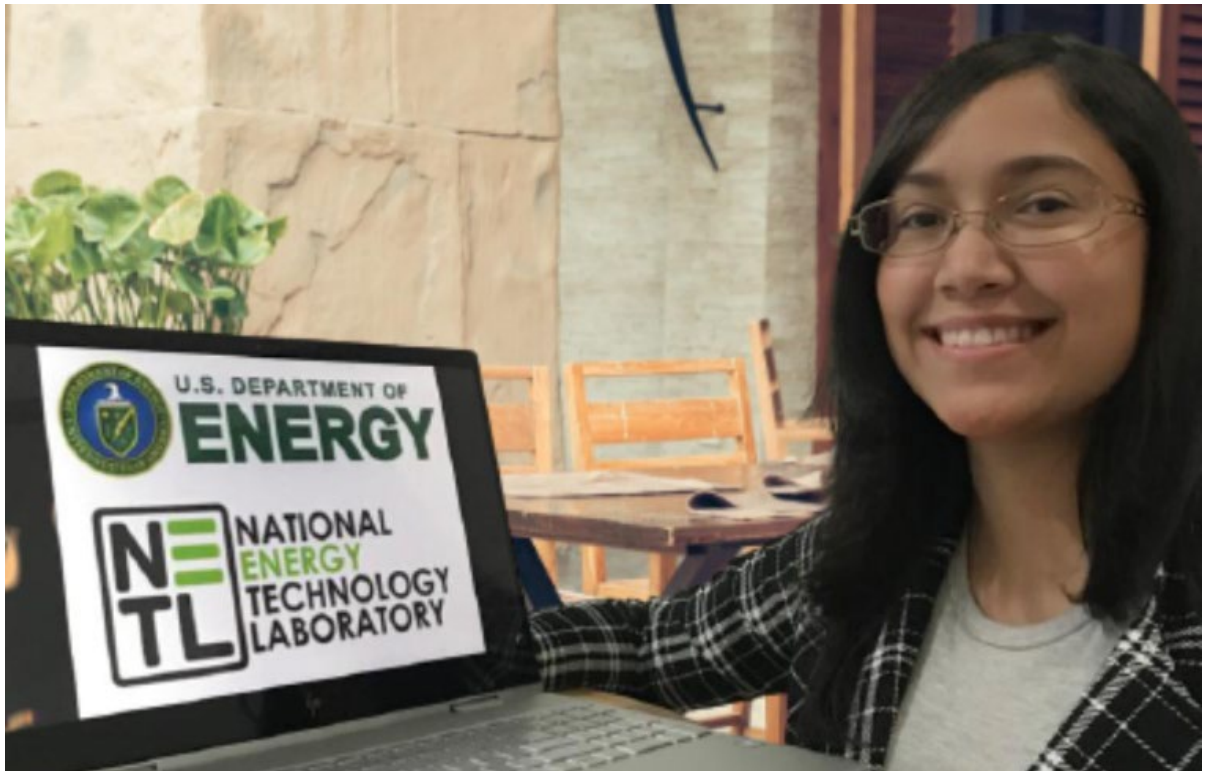
## REQUIREMENTS

- Commit for the full 10-week program
- Attend orientation and present research findings at the Technical Forum

**The 2023 program application opens September 2022**

U.S. DEPARTMENT OF ENERGY | Fossil Energy and Carbon Management

# MLEF PROGRAM




**STIPEND***

- Undergraduate students: $650 per week
- Master's students : $750 per week

*Some participants may be eligible to receive a housing and travel allowance.

# DOE SCIENCE, TECHNOLOGY AND POLICY PROGRAM

The DOE Science, Technology and Policy Program seeks motivated students, postgraduates, and faculty to participate in projects at the forefront of the clean energy transition, helping to address the climate crisis through a one-year fellowship with FECM.

The STP Program provides an opportunity for candidate to participate in technical and policy-related FECM projects.

## PARTICIPANTS MUST FALL INTO ONE OF THE FOLLOWING CATEGORIES:

- **Student:** Currently enrolled undergraduate or graduate student in an accredited U.S. college, university, technical institute, or must be in an institution approved by FECM. Part-time students may be considered with sponsor approval.
- **Postgraduate:** Candidate must have received an associate's, bachelor's, master's or doctorate degree.
- **Faculty**: Candidate must be full-time faculty member at an accredited U.S. college, university, technical institute, or must be at an institution approved by FECM.

**https://www.zintellect.com/Opportunity/Details/DOE-STP-FECM-2022-01**

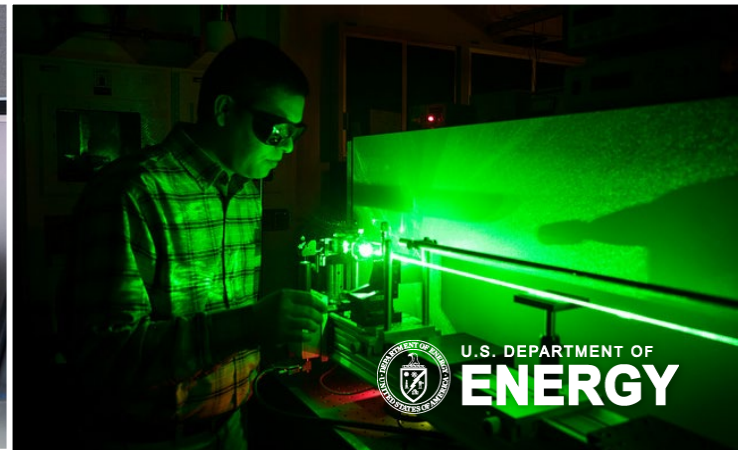
# CONTACT US

**Sandra Peñaherrera**
MLEF@hq.doe.gov
www.energy.gov/fe/mlef

NATIONAL ENERGY TECHNOLOGY LABORATORY

# NETL Internship Opportunities

www.netl.doe.gov/education/internships



# NETL Internship Opportunities

## Why choose NETL?

- Collaborate with world class researchers, scientists, and subject matter experts
- Use one-of-a-kind equipment & facilities
- Author/co-author papers, presentations & other publication materials
- Attend/present at conferences & workshop
- Connect with other professionals in your fiel

## Where?

- Albany, Oregon
- Morgantown, West Virginia
- Pittsburgh, Pennsylvania

## When?

- Applications are always accepted, and awards are made on a continuing basis
- For best results apply by February 15 for summer appointments
- One-year appointments are renewable
- Full-time and part-time opportunities are available

Internship Opportunities | netl.doe.gov

# NETL Internship Programs

Administered by Oak Ridge Institute for Science and Education (ORISE)

OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION
Managed by ORAU for DOE

## Professional Internship Program (PIP)

- Current undergraduate or graduate student in good standing at a regionally accredited college/university or a post-baccalaureate within 2 years of graduation
- Minimum GPA of 2.5/4.0
- At least 18 years of age at the time of the appointment

## Postgraduate Research Program (PGRP)

- Have earned/about to receive master's or doctoral degree
- Graduate who received master's degree within the last 3 years or doctorate within the last 5 years

## Faculty Research Program (FRP)

- Full-time/part-time regular permanent faculty member at an accredited college/university with a research interest in NETL's core R&D areas

[NETL Internship Programs Administered by ORISE | netl.doe.gov]

# Connecting With NETL

## Check Out Websites

- For NETL, Visit - www.netl.doe.gov and www.netl.doe.gov/education/internships
- Search databases like Scholar.Google.com, Web of Science, and others for recent NETL publications.
- Visit https://orise.orau.gov/netl/ for programs including PIP, PGRP, and FRP

## Apply to Opportunities in Zintellect Catalog (Important!)

- https://zintellect.com/Catalog Select "National Energy Technology Laboratory" in the *Organizations* filter to see active NETL opportunities. Select multiple opportunities if interested.
- Recent ORISE information session on how to apply in Zintellect.

## Direct Email

- Email internship.program@netl.doe.gov your resume and provide the specifics as to what research you're most interested in learning more about.
- Email authors affiliated with NETL on recent publications in your area(s) of interest to introduce yourself and express interest in their research. (Let them know that you've applied in Zintellect)

Internship Opportunities | netl.doe.gov

# Doing Business with the Federal Government - *FOA and Requirements*

NATIONAL ENERGY TECHNOLOGY LABORATORY

***Sarah Nathan***
*Federal Project Manager, Crosscutting Team*

***April 12, 2022***
***HBCU-OMI FECM Webinar***

# Steps to Apply for an NETL Grant

- Identify opportunity of interest through **Funding Opportunity Announcement (FOA)**
  - Discussed in detail later in presentation
- Meet registration requirements
- Prepare and submit application

# The Funding Opportunity Announcement (FOA)

- A publicly available document by which a Federal agency makes known its intentions to award discretionary grants or cooperative agreements, usually as a result of competition for funds
- May be known as **program announcements, requests for applications, notices of funding availability, solicitations, or other names** depending on the agency and type of program
- See recent DE-FOA-0002398
  - **FUNDING IS CLOSED; FOR EXAMPLE USE ONLY**
  - http://www.fedconnect.net/fedconnect/?doc=DE-FOA-0002398&agency=DOE

version: July 13, 2020

**FINANCIAL ASSISTANCE**
**FUNDING OPPORTUNITY ANNOUNCEMENT**

**Department of Energy (DOE)**
**Office of Fossil Energy (FE)**

**UNIVERSITY TRAINING AND RESEARCH FOR FOSSIL ENERGY APPLICATIONS**
**Funding Opportunity Announcement (FOA) Number: DE-FOA-0002398**
**FOA Type: Initial**
**CFDA Number: 81.057 University Coal Research**

| | |
|---|---|
| FOA Issue Date: | 12/11/2020 |
| Submission Deadline for Full Applications: | 02/15/2021/ 8:00 PM ET |
| | |
| Expected Date for Selection Notifications: | April 2021 |
| Expected Date for Award: | June 2021 |

# Registration/Submission Requirements

- Obtain a **Unique Entity Identifier (UEI)** (https://fedgov.dnb.com/webform/)
  - This has replaced the DUNS number previously used.
- Register with the **System for Award Management (SAM)** (sam.gov/SAM)
- Register with grants.gov
- Register with fedconnect.net

# Registration Requirements: Grants.gov

- Register with Grants.gov
  - **There are 3 steps to this process:**
    1. The **Authorized Organizational Representative (AOR)** must register
    2. An email is sent to the **E-Business (E-Biz) POC listed in SAM**. The E-Biz POC must approve the AOR registration using their MPIN from their SAM registration
    3. **AOR verifies that registration was completed** at Grants.gov
- **Grants.gov is where you will submit your application package**

# Registration Requirements: Fedconnect.net

- Applicants must register with FedConnect (fedconnect.net) to submit questions
- View and download announcement documents or amendments
- Communicate with Federal representatives managing the announcement
- **Allow at least 44 days to complete entire registration process**

# Questions

- Questions related to the registration process, system requirements or how an application form works must be directed to grants.gov; 1-800-518-4726; or support@grants.gov

- Questions related to the content of the announcement must be submitted to the FedConnect portal

- Must be registered with FedConnect to submit questions and view responses

# Application Preparation and Submission

- Applicants must download application package, forms and instructions at grants.gov
- Applications must be submitted through grants.gov only( this will be indicated in the solicitation document)
  - **Must register at Grants.gov!**
  - Update SAM annually
- Applications must be submitted through grants.gov by **a qualified HBCU/OMI (Minority Serving Institution) authorized representative**

# Accessing NETL FOAs in FedConnect

- In an internet browser, enter the FedConnect URL [fedconnect.net](fedconnect.net)
- On the Main Page, click on **Search Public Opportunities Only**

# Accessing NETL FOAs in FedConnect (cont.)

- Under **Search Criteria**, select **Issuing Office**, type "**National Energy Technology Lab**", and click on **Search**

**public opportunities**

This is a list of publicly posted opportunities. To view a particular opportunity, click the hyperlink under the title. For more details on using this page, click Help.

Search Criteria | Advanced Options

Issuing Office | National Energy Technology Lab | Search

| Title | Type | Agency | Issuing Office | Issue Date | Response Due Date | PSC / FSC | NAICS | Reference Number |
|---|---|---|---|---|---|---|---|---|
| Vacuum Induction Melting (VIM) and Casting Furnace | Solicitation | DOE - DOE | National Energy Technology Lab | 11/9/2020 | 12/01/2020 04:00 PM US/Eastern | 4430 | 333994 | 89243321QFE000206 |
| Notice of Intent to Sole Source to FEI Houston Company for FEI PerGeos 1.0 soft | Special Notice | DOE - DOE | National Energy Technology Lab | 11/24/2020 1:27:09 PM | 11/30/2020 12:00 PM US/Eastern | 7A20 | 511210 | 89243321QFE000209 |
| Notice of Intent to Sole Source to EPRI Technology | Special Notice | DOE - DOE | National Energy Technology Lab | 11/20/2020 1:17:28 PM | | R415 | 541690 | 89243321RFE000048 |
| Emerging CO2 Storage Technologies: Optimizing Performance Through Minimization of Seismicity Risks and Monitoring Caprock Integrity | Funding Opportunity | DOE - DOE | National Energy Technology Lab | 11/16/2020 | 12/11/2020 08:00 PM US/Eastern | | | DE-FOA-0002401 |
| Notice of Intent to issue DE-FOA-0002438 titled Design, R&D, Validation, and Fabrication of a Prototype Carbon-Based Building | Funding Opportunity | DOE - DOE | National Energy Technology Lab | 11/12/2020 | 12/07/2020 08:00 PM US/Eastern | | | DE-FOA-0002442 |
| Broughton Volunteer Fire Department (BVFD) Services | Special Notice | DOE - DOE | National Energy Technology Lab | 11/10/2020 11:56:01 AM | 11/25/2020 05:00 PM US/Eastern | J012 | 922160 | 89243321QFE000207 |
| Notice of Intent to issue a Funding Opportunity Announcement (FOA) on behalf of DOE's Office of Fossil Energy (FE) entitled "Water Management For Thermal Power Generation". | Funding Opportunity | DOE - DOE | National Energy Technology Lab | 10/30/2020 | 12/15/2020 08:00 PM US/Eastern | | | DE-FOA-0002430 |
| Enabling Gasification of Blended Coal, Biomass and Plastic Wastes to Produce Hydrogen with Potential for Net Negative Carbon Dioxide Emissions. | Funding Opportunity | DOE - DOE | National Energy Technology Lab | 10/23/2020 | 11/19/2020 11:59 AM US/Eastern | | | DE-FOA-0002376 |
| Bottled Water and Dispenser Service for NETL | Solicitation | DOE - DOE | National Energy Technology Lab | 10/9/2020 | 10/23/2020 02:00 PM US/Eastern | S299 | 454390 | 89243320QFE000205 |
| Research Needs Related to Enhanced Weathering as a Mechanism for Carbon Dioxide Removal | Funding Opportunity | DOE - DOE | National Energy Technology Lab | 10/14/2020 | 11/06/2020 08:00 PM US/Eastern | | | DE-FOA-0002427 |

1 2 3 4 5 6 7 8 9 10 ...

# Accessing NETL FOAs in FedConnect (cont.)

- Click the **hyperlink** under the title to view

FedConnect.

Help

## public opportunities

This is a list of publicly posted opportunities. To view a particular opportunity, click the hyperlink under the title. For more details on using this page, click Help.

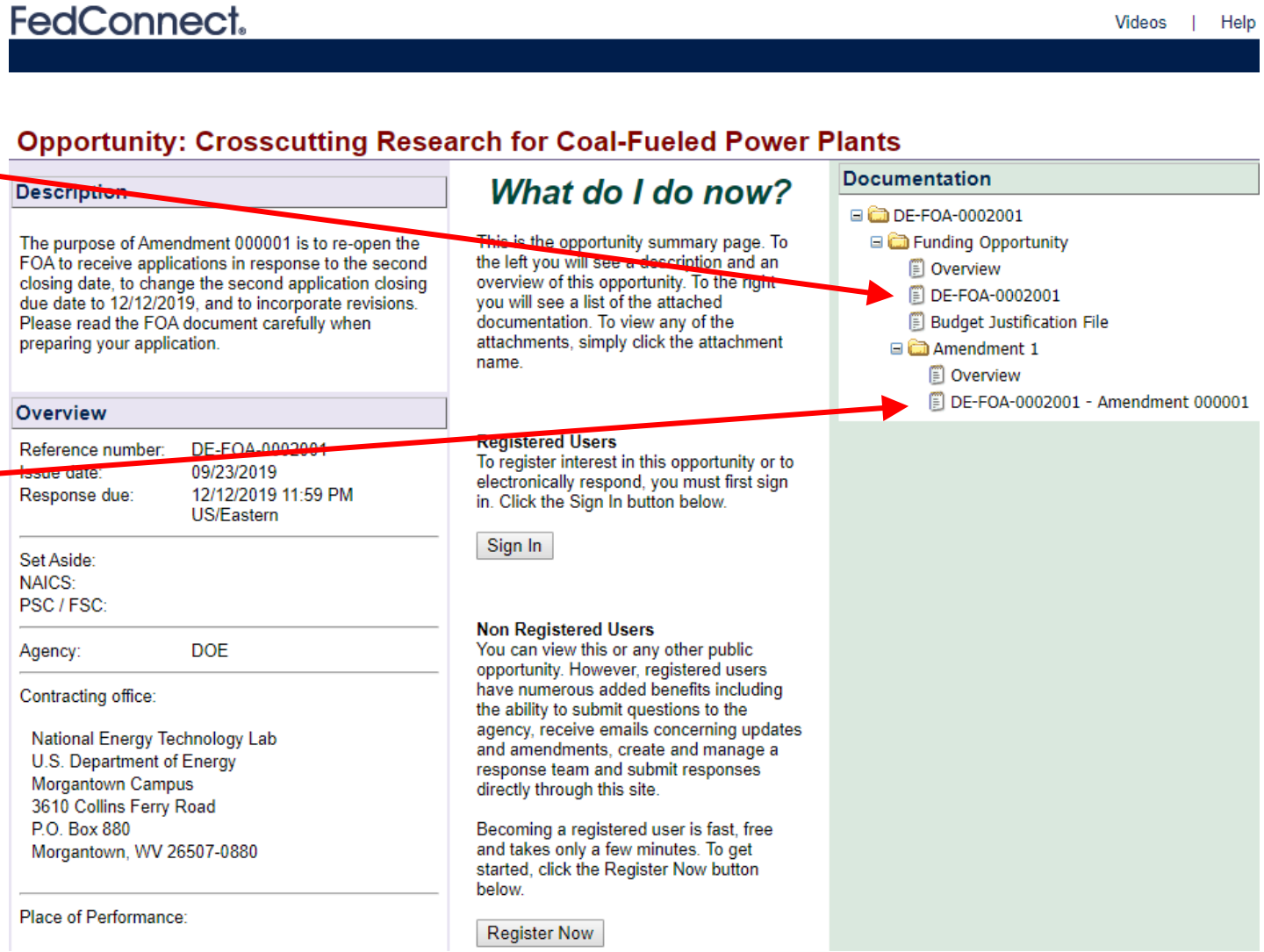
Search Criteria | Advanced Options

Issuing Office ▾ National Energy Technology Lab Search

| Title | Type | Agency | Issuing Office | Issue Date | Response Due Date | PSC / FSC | NAICS | Reference Number |
|---|---|---|---|---|---|---|---|---|
| Purchase of M15-400 Assy, RP Consistometer M15-40 | Special Notice | DOE - DOE | National Energy Technology Lab | 11/7/2019 10:05:42 AM | | 6635 | 811310 | 89243320RFE000029 |
| Notice of Intent to Sole Source to FEI Houston Gm | Special Notice | DOE - DOE | National Energy Technology Lab | 11/4/2019 11:02:25 AM | 11/15/2019 12:00 PM US/Eastern | 7030 | 334516 | 89243320QFE000146 |
| RFI: Energy Storage for Fossil Fuel Energy Systems | Funding Opportunity | DOE - DOE | National Energy Technology Lab | 10/30/2019 | 12/16/2019 08:00 PM US/Eastern | | | DE-FOA-0002209 |
| Security Support Services for the Office of the As | Sources Sought | DOE - DOE | National Energy Technology Lab | 10/25/2019 8:20:52 AM | 11/22/2019 08:00 PM US/Eastern | R430 | 561612 | 89243320NAU000002 |
| Revised Sources Sought Critical Minerals Market An | Pre-solicitation Notice | DOE - DOE | National Energy Technology Lab | 10/18/2019 2:45:14 PM | 11/15/2019 02:00 PM US/Eastern | R425 | 541720 | 89243320NFE000030 |

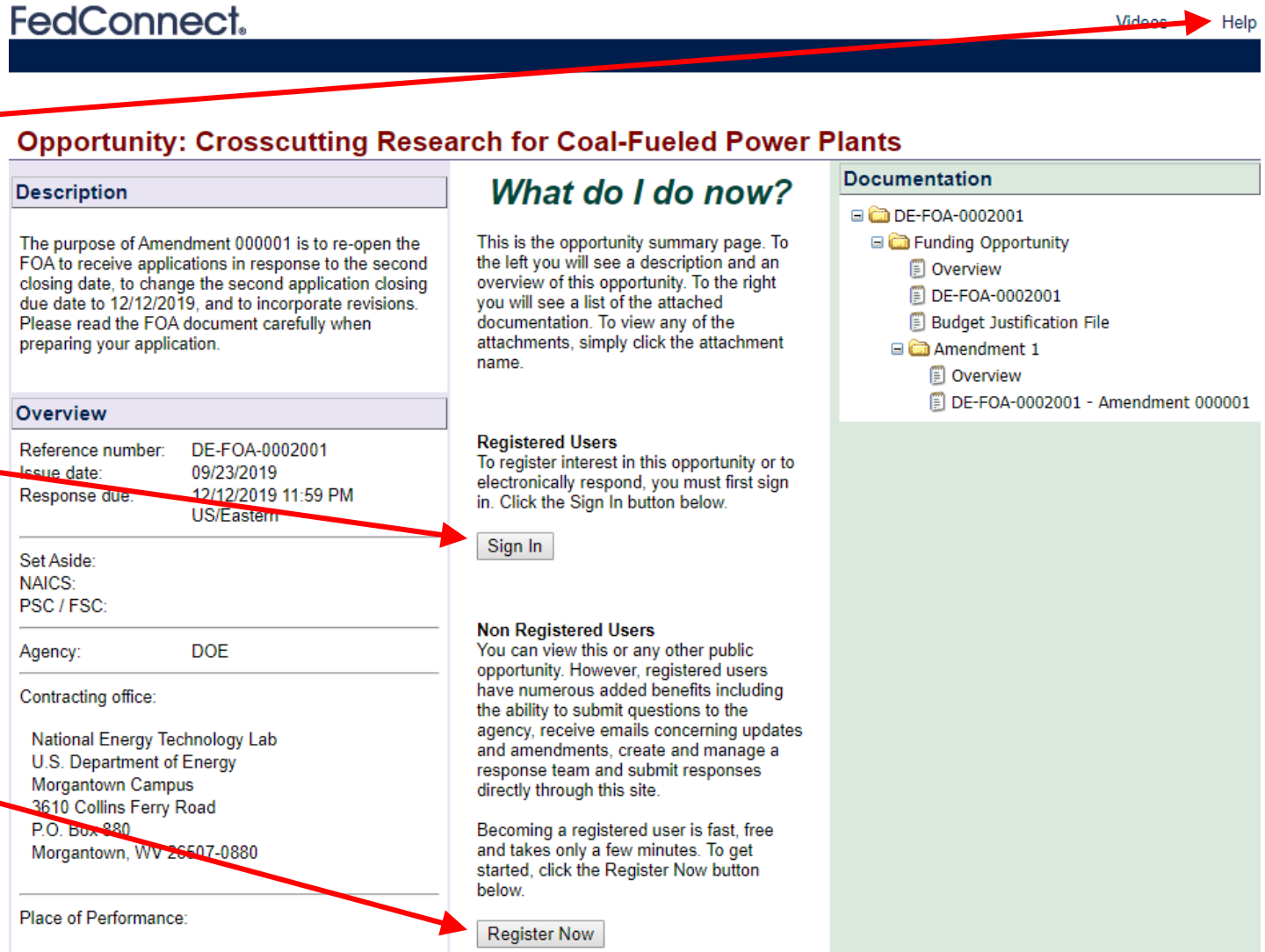
# Accessing NETL FOAs in FedConnect (cont.)

- Click on the **FOA Reference Number** under **Funding Opportunity** to view the FOA instructions
- To view Amendments to the FOA, click on the **FOA Reference Number** under **Amendment 1**



# Accessing NETL FOAs in FedConnect (cont.)

- **Help** buttons are available on each page to assist you navigate FedConnect
- To submit questions about this FOA or submit an application, Registered Users click on **Sign In**
- Click on **Register Now** to receive notifications and agency alerts, and view the message center



# Opportunities for Work with NETL

- NETL Research Programs use the websites below to post solicitations/funding opportunity announcements, receive proposals/applications, and disseminate other information for competitive awards. **Entities wishing to participate in these solicitations must register at these websites**.
  - Fedconnect https://www.fedconnect.net/
  - Grants.gov https://grants.gov/
- **Proposals will only be accepted through Grants.gov only**( this will be indicated in the solicitation document).
- Additional information can also be found at NETL Business website: https://netl.doe.gov/business/solicitations
- An email listserve of FECM announcements can be signed up for: https://public.govdelivery.com/accounts/USDOEOFE/subscriber/new

# Historically Black Colleges & Universities and Other Minority Institutions Announcement - *The FOA and Application*

NATIONAL ENERGY TECHNOLOGY LABORATORY

***Sarah Nathan***

*Federal Project Manager, Crosscutting Team*

***April 12, 2022***

***HBCU-OMI FECM Webinar***

# General Information

## Where to start?

- A typical Funding Opportunity Announcement (FOA) follows a standard format.
- **The Funding Opportunity contains 8 main sections** (with multiple sub-sections) laid out in the table of contents and focusing on the complete life cycle of the opportunity.
- It is important to familiarize yourself with the entire FOA and **pay close attention to this section to avoid submitting a "technically" non-responsive application.**

**Table Of Contents Main Sections**


I. Funding Opportunity Description

II. Award Information

III. Eligibility Information

IV. Application and Submission Information

V. Application Review Information

VI. Award Administration Information

VII. Questions/Agency Contacts

VIII. Other Information

IX. Appendices

# I. Funding Opportunity Description

## Where to start?

TABLE OF CONTENTS


I. FUNDING OPPORTUNITY DESCRIPTION
- i. AUTHORIZING STATUES
- ii. BACKGROUND/DESCRIPTION
- iii. OBJECTIVES/AREAS OF INTEREST
- iv. APPLICATIONS SPECIFICALLY NOT OF INTEREST


## Noteworthy Items

- **ii. Background/Description**
  - Provides information on what technology programs are funding the solicitation and introduction to the purpose of the announcement.
- **iii. Objectives/Area of Interests**
  - Provides important information on the technological objectives and research being sought, as well as the description of the Areas of Interest (AOIs).
  - **You will be applying to a specific AOI and understanding the FOA requirements for that AOI is critical to crafting a responsive application.**

    **(Will be discussed in detail in upcoming presentation)**
- **iv. Applications Specifically Not of Interest**
  - **Pay close attention to this section to avoid submitting a non-responsive application.**

# II. Award Information

## Where to start?

TABLE OF CONTENTS

A, TYPE OF APPLICATION

B. TYPE OF AWARD INSTRUMENT

C. AWARD OVERVIEW

i. ESTIMATED FUNDING, NUMBER OF AWARDS, ANTICIPATED AWARD SIZE, AND MAXIMUM DOE SHARE

ii. ESTIMATED PERIOD OF PERFORMANCE PER AREA OF INTEREST

## Noteworthy Items

- **C. Award Overview**

  I. **Estimated Funding, Number of Awards, Anticipated Award Size, and Maximum DOE Share**

  - Details anticipated number of awards, anticipated size (in funding) of each award, **and maximum amount in funding that DOE will contribute for any one award.**

  II. **Estimated Period of Performance per Area of Interest**

  - Includes the anticipated period of performance for projects awarded under each Area of Interest of the FOA.

# III. Eligibility Information

## Where to start?

TABLE OF CONTENTS


A. GENERAL
B. ELIGIBLE APPLICANTS
- i. RESTRICTED ELIGIBILITY
- ii. DOMESTIC ENTITIES
- iii. DOMESTIC PUBLIC ENTITIES (EXCLUDING FEDERAL ENTITIES)
- iv. FEDERALLY FUNDED RESEARCH AND DEVELOPMENT CENTERS AND NATIONAL LABS

C. COST SHARING
- i. COST SHARE REQUIREMENTS
- ii. LEGAL RESPONSIBILITY
- iii. COST SHARE ALLOCATION
- iv. COST SHARE TYPES AND ALLOWABILITY
- v. COST SHARE VERIFICATION
- vi. COST SHARE CONTRIBUTIONS BY FFRDCS

D. COMPLIANCE CRITERIA
E. RESPONSIVENESS CRITERIA
F. NUMBER OF SUBMITTALS ELIGIBLE FOR REVIEW
G. FELONY CONVICTIONS AND TAX LIABILITIES
H. QUESTIONS REGARDING ELIGIBILITY


## Noteworthy Items

- **B. Eligible Applicants**
  - **Will specify whether HBCU-OMI eligible applicants will be funded under awards**
    - **Other types of sub-recipients are permitted**
  - **FFRDC & National Labs are permitted to apply as subrecipients but not as a prime**
    - **National Labs are typically fully funded at project start. Please keep this in mind when creating budgets for the full project period.**

- **C. Cost Sharing**

  **I. Cost Share Requirements**

  - Will detail the required cost share for Applicants. Typically, HBCU-OMI FOAs do **not require cost share**, but it is allowable

- **D&E. Compliance Criteria, and Responsiveness Criteria**
  - These sections will detail **what is considered compliant, and responsive**, to the FOA. Only compliant and responsive applicants will be eligible to review.

**Make sure to read EACH section for compliance purposes.**

# IV. Application and Submission Information

## Where to start?

TABLE OF CONTENTS


A. FORM AND CONTENT REQUIREMENTS
B. FULL APPLICATIONS
- i. APPLICATION PACKAGE
- ii. CONTENT AND FORM OF FULL APPLICATION

C. POST-SELECTION INFORMATION REQUESTS
D. SUBMISSION DATES AND TIMES
E. INTERGOVERNMENTAL REVIEW
F. OTHER SUBMISSION AND REGISTRATION REQUIREMENT
- i. REGISTRATION PROCESS
- ii. WHERE TO SUBMIT
- iii. FULL APPLICATION PROOF OF TIMELY SUBMISSIONS

G. FUNDING RESTRICTIONS
H. PRE-AWARD COSTS
I. PRE-AWARD COSTS RELATED TO NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) REQUIREMENT
J. PERFORMANCE OF WORK IN THE UNITED STATES
K. FOREIGN TRAVEL
L. EQUIPMENT AND SUPPLIES
M. LOBBYING
N. ADDITIONAL APPLICATION AND SUBMISSION REQUIREMENTS


## Noteworthy Items

- **A. Form and Content Requirements**
  - Applicants will have to meet each of the specified form requirements under this section
- **B. Full Applications**

  ii. Content and Form of Full Application
    - Will detail the documents required in the Application.

# IV. Application and Submission Information

## Application Files

| SF-424 | Project / Performance Site Location(s) | Project Narrative | Summary for Public Release | Project Management Plan | Resume | SF424a Budget Justification | Budget Justification | Environmental Questionnaire | HBCU/OMI-eligible Document, if applicable |
|---|---|---|---|---|---|---|---|---|---|

- **The SF 424 online form is the principal form for submitting an application.**
- This form contains **all of the basic information regarding your organization and your proposed project** (project title, costs, etc.).
- Please make sure this form is filled out as completely as possible.
- Some areas of the form may not apply to your organization.

- **Form to indicate the primary site where the work will be performed.**
- If a portion of the project will be performed at any other site(s), identify the site location(s) in the blocks provided
- **Note that the Project/Performance Site Congressional District is entered using a 2-digit state code followed by a dash and a 3-digit Congressional district code.** For example "VA-001"

- **In this document, please state how your educational entity claims HBCU/OMI eligibility and provide a copy of that certification.**

# IV. Application and Submission Information

## Project Narrative

| SF-424 | Project / Performance Site Location(s) | **Project Narrative** | Summary for Public Release | Project Management Plan | Resume | SF424a Budget Justification | Budget Justification | Environmental Questionnaire | HBCU/OMI-eligible Document, if applicable |
|---|---|---|---|---|---|---|---|---|---|

— **The project narrative is the core item in the application package, where the concept, technology background, research plan, and potential improvement to the state of the art are presented.**

**Project Narratives Can Include:**

- Project Objectives
- Merit Review Criterion Discussion
- Relevance and Outcomes/Impacts
- Roles & Responsibilities of Participants
- Decision-making and Communication Strategy
- Management Capabilities
- Multiple Principal Investigators
- Facilities And Other Resources
- Equipment
- Bibliography And References
- Statement of Project Objectives (SOPO)

**Pay close attention to formatting requirements:**

- The Project Narrative File must be submitted in **Adobe PDF format.**
- For example: the project narrative **must not exceed twenty-five (25) pages,** including footnotes/endnotes, charts, graphs, maps, photographs, and other pictorial presentations, **when printed using standard 8.5" by 11" paper with 1-inch margins (top, bottom, left, and right) double spaced.**
- Cover Page, Table of Contents, Bibliography and References, Current and Pending Support, and Identification of Potential Conflicts of Interest or Bias in Selection of Reviewers sections **are NOT included in the Project Narrative page limitation.** The font **must be Times New Roman typeface, a black font color, and a font size of 11-point or larger (except in figures or tables, which may be 10-point font).**
- **Applicants tend to repeat themselves within an application. Please note that each file is a stand-alone document. Do not refer to another document within the current one.**

# IV. Application and Submission Information

## Project Narrative Sections

| SF-424 | Project / Performance Site Location(s) | **Project Narrative** | Summary for Public Release | Project Management Plan | Resume | SF424a Budget Justification | Budget Justification | Environmental Questionnaire | HBCU/OMI-eligible Document, if applicable |
|---|---|---|---|---|---|---|---|---|---|

| Narrative Section | Intent/Helpful Information |
|---|---|
| **Project Objectives** | Should provide a **clear, concise statement of the specific objectives/aims of the proposed project** |
| **MRC Discussion** | Applications are evaluated and scored in accordance with the **merit review criteria and weights provided in the FOA** |
| **Relevance & Outcomes/Impacts** | Justification for the proposed project should **include a clear statement of the importance in terms of the utility of the outcomes and the target community of beneficiaries** |
| **Roles & Responsibilities of Participants** | **Describe the roles and the work to be performed** by each participant/investigator, business agreements between the applicant and participants, and how the various efforts will be integrated and managed |
| **Decision-making and Communication Strategy** | Emphasis **on scientific/technical direction and mechanisms for controlling project scope, cost, and schedule**. |
| **Management Capabilities** | Provide information **relevant to the capabilities and experience of the PI and project team in managing technical projects of similar nature and complexity.** |
| **Facilities & Other Resources** | If appropriate, **indicate their capacities, pertinent capabilities, relative proximity, and extent of availability to the project** |
| **Equipment** | If you are proposing to acquire equipment, **describe comparable equipment, if any, already at your organization and explain why it cannot be used** |
| **Bibliography & References** | This section is not typically included in the page limitation of the project narrative |
| **Statement of Project Objectives (SOPO)** | The SOPO should contain a **clear, concise description of all activities to be completed** during project performance and follow the structure discussed below |

# IV. Application and Submission Information

## Application Files

| SF-424 | Project / Performance Site Location(s) | Project Narrative | **Summary for Public Release** | **Project Management Plan** | Resume | SF424a Budget Justification | Budget Justification | **Environmental Questionnaire** | HBCU/OMI-eligible Document, if applicable |
|---|---|---|---|---|---|---|---|---|---|

- **A key item to remember with the Project Summary file is that it can be publicly distributed, do not include ANY proprietary or business sensitive information.**
- Self-contained, one (1) page document
- **Identifies: name of the applicant; project director/principal investigator(s); project title; objectives of the project; description of the project; methods to be employed; potential impact (i.e., benefits, outcomes); major participants**

- **This plan typically includes the following sections:**
  - Executive Summary
  - Risk Management
  - Milestone Log
  - Funding and Costing Profile
  - Project Timeline
  - Success Criteria at Decision Points

**PMP is generally 6-8 pages when printed using standard 8.5" by 11" paper with 1" margins (top, bottom, left and right) single-spaced with font no smaller than 11- point.**

- Environmental questionnaire for each geographic site where project activities will take place must be completed
- **The form is located at** https://www.netl.doe.gov/sites/default/files/2018-02/451_1-1-3_0.pdf

# IV. Application and Submission Information

## Application Files

| SF-424 | Project / Performance Site Location(s) | Project Narrative | Summary for Public Release | Project Management Plan | **Resume** | SF424a Budget Justification | Budget Justification | Environmental Questionnaire | HBCU/OMI-eligible Document, if applicable |
|---|---|---|---|---|---|---|---|---|---|

- **Each key person proposed on the project, including sub-awardees and consultants, need to submit a 2-page resume with the application.**
- A key person is any individual **who contributes in a substantive, measurable way to the execution of the project.**
- This document should highlight education and training, professional experiences, publications **(you may list up to 10 and they should be those that are most closely related to the proposed project),** patents/copyrights/software systems developed, and synergistic activities **(no more than 5).** All resumes should be compiled into a single file.
- **Each resume should not exceed 2 pages including (if applicable):**
  - **Education and Training:** provide institution, major/area, degree, and year (Undergraduate, graduate, and postdoctoral training)
  - **Professional Experience:** Beginning with the current position, list in chronological order, include brief description of professional/academic positions
  - **Publications:** Provide a list of up to 10 publications most closely related to the proposed project. For each publication, identify the names of all authors (in the same sequence in which they appear in the publication), the article title, book or journal title, volume number, page numbers, year of publication, and website address (if available).
    - Patents, copyrights, and software systems developed may be provided in addition to or substituted for publications
  - **Synergistic Activities:** List no more than 5 professional and scholarly activities related to the effort proposed

# IV. Application and Submission Information

## Application Files

| SF-424 | Project / Performance Site Location(s) | Project Narrative | Summary for Public Release | Project Management Plan | Resume | **SF424A Budget Justification** | **Budget Justification** | Environmental Questionnaire | HBCU/OMI-eligible Document, if applicable |
|---|---|---|---|---|---|---|---|---|---|

- A separate budget for each year of support requested and a cumulative budget for the total project period are usually required
- **Use the SF 424A Excel, "Budget Information - Non-Construction Programs" form on the DOE Financial Assistance Forms Page at** https://www.energy.gov/management/office-management/operational-management/financial-assistance/financial-assistance-forms **under DOE budget forms**

- Justify the costs proposed in each Object Class Category/Cost Classification category.
- **For example:**
  - Identify key persons and personnel categories and the estimated costs for each person or category
  - Provide a list and cost of equipment
  - Identify proposed subaward/consultant work and cost of each subaward/consultant
  - Describe purpose of proposed travel, number of travelers, and number of travel days
  - List general categories of supplies and cost for each category

**Please note that if you are selected for award, you may be asked to break down these sections into more specific charges.**

# V. Application Review Information

## Where to start?

TABLE OF CONTENTS


A. REVIEW CRITERIA
- i. COMPLIANCE/RESPONSIVENESS REVIEW
- ii. FULL APPLICATION MERIT REVIEW CRITERIA

B. OTHER SELECTION FACTORS
- i. PROGRAM POLICY FACTORS

C. OTHER REVIEW REQUIREMENTS
- i. RISK ASSESSMENT
- ii. REPORTING MATTERS RELATED TO RECIPIENT INTEGRITY AND PERFORMANCE

D. REVIEW AND SELECTION PROCESS
- i. MERIT REVIEW
- ii. SELECTION
- iii. DISCUSSIONS AND AWARD


## Noteworthy Items

- **A. Review Criteria**

  **ii. Full Application Merit Review Criteria**

  - **This section will detail the merit review criteria that the application will be judged by. Each merit review criteria should be addressed via information within the application**

# Additional Sections (VI,VII, VIII, & IX)

- **VI Award Administration Notice-** Provides information on DOE's award administration processes

- **VII Questions/Agency Contacts** – Provides information on where to submit questions and lists appropriate agency contacts

- **VIII Other Information** – Provides information on additional requirements and templates

- **IX Appendices** – **Provides important templates to follow while developing your application**

# Responding to Areas of Interest (AOIs)

NATIONAL ENERGY TECHNOLOGY LABORATORY

***Sarah Nathan***
*Project Manager, Crosscutting Team*

***April 12, 2022***
***HBCU-OMI FECM Webinar***

# Areas of Interest

NATIONAL ENERGY TECHNOLOGY LABORATORY

## The FOA provides background materials regarding the topics often called "Areas of Interest" (AOIs)

| | |
|---|---|
| **Areas of Interest** | Describe in detail each area of research where NETL is seeking proposals |
| | Should be carefully considered as a potential topic for research proposals |
| | Number/types of areas of interest are dependent on funding in particular areas, DOE mission goals, and technology maturity |
| | Areas of Interest change annually |
| | May also include descriptions of research that are NOT being sought in the FOA |

# Previous Areas of Interest

NATIONAL ENERGY TECHNOLOGY LABORATORY

**FY 2021**
DE-FOA-0002398

AOI 1A: Energy-Water Nexus Implications and Opportunities of a Hydrogen Economy

AOI 1B: Electromagnetic Energy-Assisted Approaches to Convert Fossil Fuels to Low Cost Hydrogen

AOI 1C: Process and Materials Co-Optimization for the Production of Blue Hydrogen

AOI 2: Addressing High-Temperature Materials Supply Chain Challenges

AOI 3: 5G for Coal-Fired Power Generation

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**FY 2020**
DE-FOA-0002193

AOI 1: Quantum for Energy Systems and Technologies

AOI 2: Novel Sensors and Controls for Flexible Generation

AOI 3: Machine Learning for Computational Fluid Dynamics

AOI 4: Fast, Efficient, And Reliable Fossil Power with Integrated Energy Storage

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**FY 2019**
DE-FOA-0001991

AOI 1: Application of Novel Analytic Method(s) to Determine Arsenic and/or Selenium Concentrations in Fly Ash Waste Streams Generated from Coal Combustion

AOI 2: Cybersecure Sensors for Fossil Power Generation

AOI 3: Modeling Existing Coal Plant Challenges using High Performance Computing

AOI 4: Coal Plant Effluent Water Reuse

# Responding to FOAs

NATIONAL ENERGY TECHNOLOGY LABORATORY

## Read the FOA Carefully

- Understand the Background/Description
- Understand the specific Objectives
- Understand the topics NETL is interested in funding

## Read AOI Language Closely

- Understand where your research strengths best fit with NETL AOIs
- Look for specific thresholds or requirements
- Determine items that are not of interest within that topic area/area of interest

**Recycling Applications is Generally NOT a Successful Approach**

# Example Area of Interest

**FY 2021 AOI 1B: Electromagnetic Energy-Assisted Approaches to Convert Fossil Fuels to Low Cost Hydrogen (DE-FOA-0002398)**

## Not an Active Area of Interest

DOE seeks innovation in the use of alternative energy processes including microwave, radio frequency (RF), plasma, and other electromagnetic inputs for low cost hydrogen production from fossil fuels. Projects can be experimental, computational, or, a combination of the two. Experimental based studies should be focused on the development of an efficient catalyst material that interacts with electromagnetic fields with high single pass conversion of hydrocarbons with high selectivity to hydrogen. Studies can include combining reactions and separations steps within the same alternative energy system. The experimental projects should also include energy efficiency calculations of their process and comparison to traditional thermal methods. Economic advantages of an alternative energy are not exclusive to the chemical reaction, but can also include downstream energy gains and process simplifications from higher reaction selectivity.

Success metrics are (1) supporting technology transfer by publishing project work within a journal or conference proceeding, (2) demonstrating quantum chemistry techniques for hydrogen generation using an alternative energy source, and (3) demonstrating use of alternative energy for hydrogen generation with projected low costs.

# Responding to FOAs

NATIONAL ENERGY TECHNOLOGY LABORATORY

## Get Organized Early

- Create a Proposal Team
- Identify key research team members
- Consider teaming with other institutions
  - Provide letters of support
  - Financial investment if applicable
  - Be as specific as possible
- Develop an Application Preparation Schedule and Key Submittal Dates

## Ask Questions

- Use FedConnect to ask questions while FOA is open
  - **Can be used for technical, administrative, or FOA clarification** (differences between milestones, success criteria, deliverables, etc.)
- See if your questions have already been asked/answered on the server

# Responding to FOAs

NATIONAL ENERGY TECHNOLOGY LABORATORY

## Identify Required Submittals

- SF-424, Narrative, Abstract, Project Management Plan, Budget Justifications etc.
- Address **ALL** Areas
  - Follow the review criteria and ensure that all aspects are clearly addressed by your application

**Address the "Cake" prior to the "Icing"**

## Submit All Documentation

- Ensure that all required documentation is submitted
- **Failure to do so can result in a non-responsive application**
- Ensure Page limits, margins, spacing, font size (all specified within the FOA)
- Ensure cohesiveness and consistency between documentation (budgets, narrative, SOPO, PMP, etc.)

**Verify that the final application complies with ALL FOA requirements**

# Questions?

VISIT US AT: **www.NETL.DOE.gov**

**@NETL_DOE**

**@NETL_DOE**

**@NationalEnergyTechnologyLaboratory**

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# Thank you for attending the 2022 Spring HBCU-OMI FECM Webinar

## Any Questions?

NATIONAL ENERGY TECHNOLOGY LABORATORY

Solutions for Today | Options for Tomorrow

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