U.S. DEPARTMENT OF ENERGY | Office of Science

DOE Office of Science - Workforce Development Overview

National Academies' Committee on Increasing Diversity and Inclusion in the Leadership of Competed Space Missions

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What is the Committee's ask?

"In developing recommendations to NASA, the committee has been asked to consider policies and best practices for overcoming barriers to diversity and inclusion at other federal agencies.

To inform the committee's work, we would be delighted if you could give a presentation on specific policies and programs at the Department of Energy designed:

- to address issues of diversity, equity, and inclusion in the STEM workforce (e.g., fellowships, internships, grants, etc., under STEM Rising.) and

- to train and develop the next generation of scientists, engineers, and researchers.

Additionally, where applicable, we would be interested in hearing about DOE's approach(es) to management, evaluation and assessment of program effectiveness. "

DOE's Role in Science and Engineering Education

DOE has a more than 60-year history of training and educating scientists and engineers in the United States—its primary role in STEM education:

- ❑ Training highly skilled workers that are the foundation of DOE's science and technology enterprise
- ❑ Promoting targeted areas of science and energy literacy at all levels

DOE supports thousands of undergraduates, graduate students, and postdocs annually on R&D awards and projects at universities and national laboratories.

- **SC has a vibrant ecosystem for workforce development (WD)**
  - SC research programs and advanced technology offices support *over 4,400 grad students and many postdocs annually on SC awards*, and also support tailored training opportunities specific to the fields and disciplines that are not adequately addressed by other Federal programs (e.g. computational science, accelerator science, nuclear physics, nuclear chemistry, and isotope R&D)
  - WDTS has built long-standing partnership with DOE national laboratories and supports over 1,400 internships and graduate training opportunities annually at all 17 DOE Labs, expanding the reach of SC workforce development efforts
- **SC coordinates with other DOE offices/units on STEM WD and actively represents DOE in inter-agency STEM efforts (*e.g.* OSTP/NSTC/QIS WD IWG, OSTP/NSTC/CoSTEM)**

SC STEM Training and Workforce Development

• **Computational Sciences Graduate Fellowship**
Supports graduate students obtaining a Ph.D. in high performance computational science and engineering. Requires a DOE lab practicum. ~20-25 fellowships awarded/year. Established over 28 years. (Evaluated by ASCAC periodically, renewal proposal solicited every 5 years)

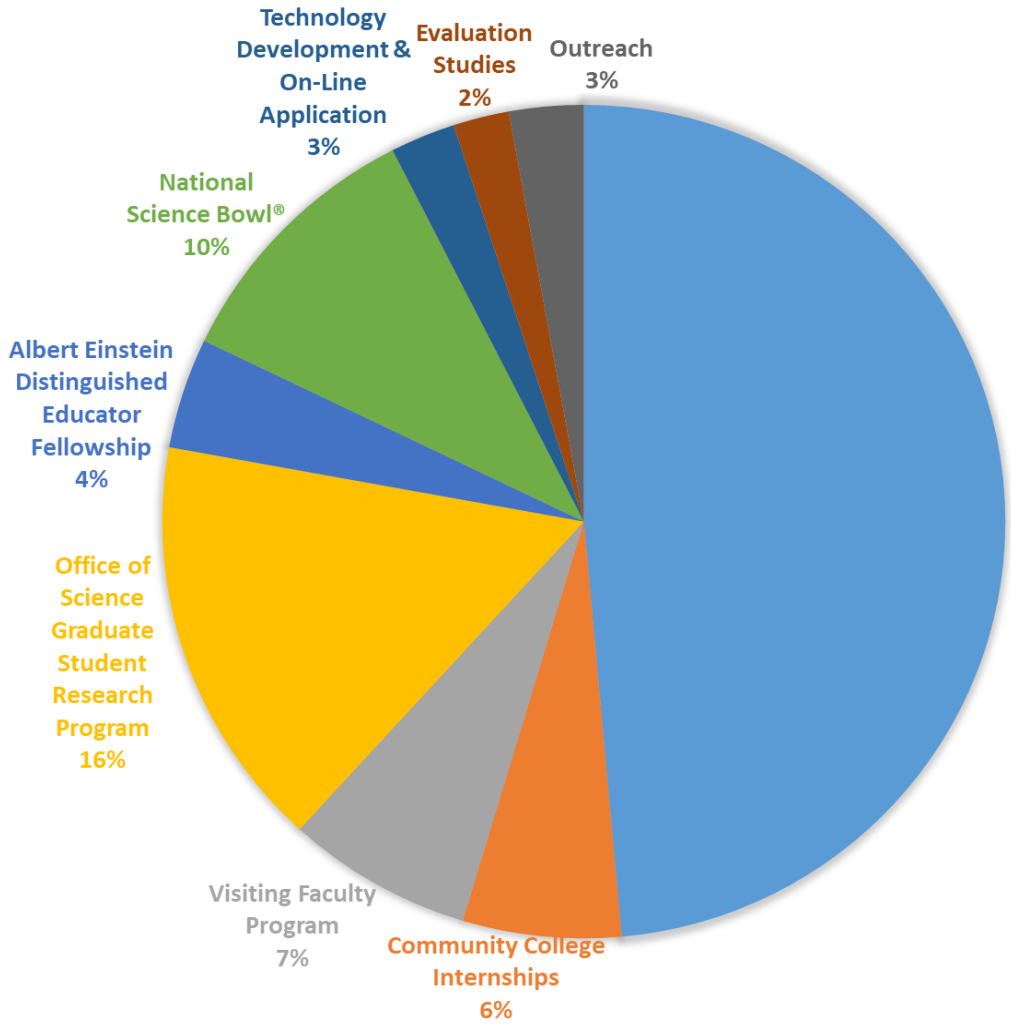
• **Nuclear Chemistry & Radiochemistry Summer School**
An intensive 6-week undergraduate course at an East/West Coast location. Classroom and laboratory work covers areas of nuclear chemistry and radiochemistry no longer part of university chemistry departments. Students earn undergraduate course credit. (~24 students per year). Most go into fields relevant to DOE. In operation since 1984. (University-lab partnership, renewal proposal solicited every 4-5 years)

• **U.S. Particle Accelerator School**
An intensive 2-week course curriculum for graduate students, postdocs, and DOE laboratory staff, and industry to learn the latest in accelerator and detector research and development. Held 2 times per year. Students can obtain course credit. Instructors come from DOE labs and universities and are volunteers. In operation since 1981. Over 350 participants a year. (Fermilab led, multi-lab/university partnership; reviewed and renewal proposal solicited every 3-4 year.)

• **Traineeships in Accelerator Science, Nuclear Physics, and Isotope R&D and Production**
University or national laboratory led programs focused on mission research training at the undergraduate/graduate level.

WDTS Investment Expands the SC Workforce Development Effort

An Example: FY 2020 WDTS Distribution of Funding (Enacted Total $28M, Typical Distribution)



Mission: To ensure a sustained pipeline for the science, technology, engineering, and mathematics (STEM) workforce for DOE mission.

Why WDTS?

✓A productive partner to other SC programs/offices for mission-driven Workforce Development

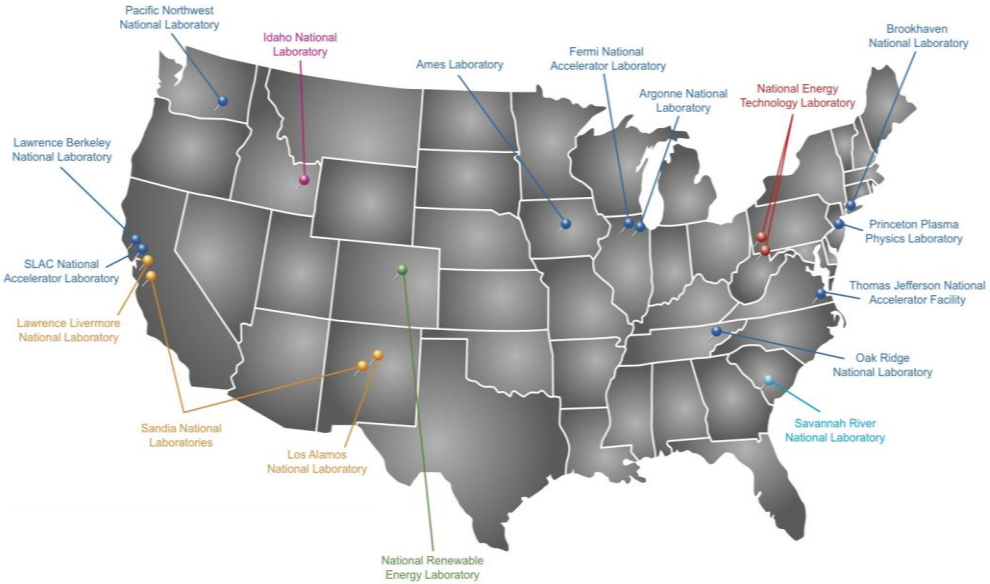
✓Cost-effective recruiting mechanism for future SC PIs

✓Enabling multiple pathways to Diversity, Equity, and Inclusion (DEI)

STEM Workforce Training Opportunities for Students and Faculty at DOE National Laboratories

WDTS manages the following programs via partnership with DOE national laboratories (>70% budget):

- Science Undergraduate Laboratory Internships - SULI
- **Community College Internships - CCI**
- **Visiting Faculty Program - VFP**
- Office of Science Graduate Student Research Program - SCGSR



The DOE system of National Laboratories is a unique asset for training and workforce development:

- DOE Labs employ >30,000 scientists and engineers (~14,000 at SC Labs)
- World-class scientific user facilities, capabilities, and resources
- Culture of team science, mentoring, and learning through discovery

Community College Internships (CCI)

The CCI program supports community college students who are interested in technical careers relevant to the DOE mission by providing technical training experiences at the DOE laboratories. Selected students participate as interns appointed at one of 16 participating DOE laboratories.

- CCI interns work on science and engineering technical projects with laboratory scientists, engineers, or technical staff who serve as mentors.
- Student deliverables include a research report, an oral or poster presentation, and pre- and post-participation surveys.
- 10 weeks during the Summer term (May-August), and some labs offer flexible Fall and Spring schedules in which 400 work hours may be distributed over 16 weeks.

Award Benefits:

- Paid internships ($600 weekly stipend, dedicated funding for travel and lodging).
- Labs provide training seminars and professional development opportunities.

Eligibility:

- U.S. citizen or legal permanent resident
- At least 18 years old at time of application
- Minimum cumulative GPA 3.0
- May participate in CCI twice; may apply up to three times

2021 Fall Application due May 27, 2021; 2022 Spring Term Application period to start July 15, 2021
2022 Summer Term Application period to start early October 2021

Full details, requirements, FAQs, and link to application at: https://science.osti.gov/wdts/CCI/

Visiting Faculty Program (VFP)

The Visiting Faculty Program (VFP) seeks to increase the research competitiveness of faculty members and students from institutions of higher education that are historically underrepresented in the research community to expand the workforce that addresses DOE mission areas.

- VFP appointees collaborate directly with research staff at DOE laboratories on projects that are connected robustly to ongoing host lab research.
- Faculty must establish a collaboration with a laboratory scientist to co-develop a 6-page research proposal before applying to VFP.
- Participants develop skills that are applicable to programs and STEM workforce development at their home institutions.

Award Benefits:

- Appointments are for 10 weeks in the summer term.
- Faculty: $14,000 stipend; round-trip domestic travel to laboratory; housing covered
- Undergraduates: Same as for SULI
- Graduate students: Travel and housing, but no stipend

Academic Institution Requirements:

- Schools may not have Carnegie Classifications of "Doctoral/Research Universities ratings of Very High or High Research Activity". However, all Historically Black Colleges and Universities (HBCU) are eligible.

Eligibility for Faculty:

- U.S. citizens or lawful permanent residents at time of application.
- Must work full time at an accredited, degree-granting, postsecondary U.S. institution (including community colleges). Adjunct or visiting faculty are ineligible.
- Must work in an area of physics, chemistry, non-medical biology, engineering, environmental sciences, geology or geosciences, mathematics, materials sciences, or computer or computational sciences.

2022 Summer Term Application to Start early October 2021

Full details, requirements, FAQs, and link to application at: https://science.osti.gov/wdts/VFP/

Reaching a New Energy Sciences Workforce (RENEW)

** New program proposed in the FY 2022 budget request*

- Outreach
- Listening tours & round tables to:
- Gain understanding about challenges
- Develop evidence-based solutions

- Identify unique SC Lab opportunities
- Partner with MSIs & professional societies
- Implement action plan

Competitively support new traineeship awards resulting in:

- "Hands on" experiences, mentoring, enhanced workforce DEI

- Tracking of post-traineeship outcomes
- Assessing program effectiveness

Intentionality Driven Outreach for Diversity: Promising Practices

- Brand messaging
  - DOE complex-wide branded materials
  - WDTS "Workforce Development Highlights"
- DOE host laboratories outreach activities for recruiting a more diverse applicant pool to WDTS laboratory-based programs
- WDTS targeted outreach to MSIs and URM
  - Minority Serving Institutions (MSIs) and Under-Represented Groups (URGs) focused recruiting
  - "Virtual Interns Fair" to MSIs and URGs
  - Professional societies and conferences focusing on MSIs/URM
  - Social media campaign
- Coordination with internal and external stakeholders

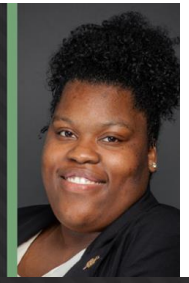
Helping Potential Applicants to See Themselves as WDTS Interns

Want to make a difference?

My research developed an automated system to analyze network traffic; the results can be used to diminish cyber threats and vulnerabilities to networked machines.

Lauri Kight
SULI, 2019 - LOS ALAMOS NATIONAL LABORATORY

Why wait?
Intern at a National Lab.



Want to make a difference?

Before my internship, I had completed only two semesters of community college. Little did I know, the experience would change the way I see myself as a person, student, and scientist.

Brenda Escobedo
CCI, 2018 - ARGONNE NATIONAL LABORATORY

Get the experience you need.
Intern at a National Lab.

Want to make a difference?

From scientific diving and coastal modeling to trace metal analysis, I learned many new approaches to ecosystem research.

Julia Indivero
SULI, 2017 - PACIFIC NORTHWEST NATIONAL LABORATORY

Get the experience you need.
Intern at a National Lab.

Want to make a difference?

As an automotive test engineer, I use telematics data to save lives and testing data to accelerate development of new technologies, like electric and autonomous vehicles.

Mwesi Musisi-Nkambwe
CCI & SULI, 2003-2007 - BROOKHAVEN NATIONAL

Get the experience you need.
Intern at a National Lab.

Want to make a difference?

I worked on a tool for plasma wakefield acceleration - a new way of making particle accelerators smaller and able to reach higher energies, allowing us to probe fundamental physics further than ever before.

Rafi Hessami
SULI, 2018 - SLAC NATIONAL ACCELERATOR LABORATORY

Why wait?
Intern at a National Lab.

Want to make a difference?

I am a materials engineer in the data storage industry. Through my work with microelectronics, I get to apply material properties to shape the future of data and how the world uses it.

Pierre Alameda
SULI, 2017 - AMES LABORATORY

Get the experience you need.
Intern at a National Lab.

Evolving Toward a Comprehensive Evaluation Portfolio for Workforce Development (FY 2021 enacted: $0.6M)

- **Lab Management:** External peer review, including site and reverse-site visits, of DOE laboratory education program offices and other performers [ORISE] who provide assessments of DOE/SC contractor program management. Additionally, other oversight activities such as monthly tag-up teleconference calls with DOE host lab education directors, and an annual meeting in Washington, DC, are held.
- **Federal Management:** Committee of Visitors (COV) reviews through a Federal Advisory Committee provide assessments of federal program management and the status of the WDTS programs relative to comparable programs supported by other agencies.
- **Program Impact: Short and Long-Term**
  - Measuring outcomes by term and year based on program data
  - Pilot longer term follow up study

Connect to STEM Pipeline via DOE Laboratories' Broader Activities

- The DOE laboratories are required to be good stewards in their regions.
  - Labs have extensive STEM education and STEM engagement programs.
  - Lab staff participate in outreach, including at the K-12 level.
- Activities are funded by other agencies, or organizations, or by laboratory overhead and not directed by DOE HQ.
- WDTS coordinates with all 17 DOE labs on awareness of K-12 activities (https://science.osti.gov/wdts/STEM-Resources).

An example: ORNL Science Trailers

Typically, more than 250,000 K-12 students; 12,000 educators; 2,500 graduate students; and 3,500 undergraduate students participate annually in opportunities at the DOE laboratories, funded by DOE and other federal and non-federal sources.

Coordination with Internal and External Stakeholders

- Collaborating with SC programs/offices to broadly engage MSIs and URGs. WDTS lead or co-lead those initiatives directly related to WDTS programs and to support science programs on others.

- Helping other DOE offices with STEM efforts via sharing information and outreach efforts.

- Coordinating with other Federal agencies via the National Science and Technology Council's Committee on STEM Education (CoSTEM)
  - WDTS represented DOE in "Federal Internships Opportunity Panel", February 18,2021, hosted by NSF INCLUDES

Backup slides

Science Undergraduate Laboratory Internships (SULI)

(FY 2021 enacted $13.8M, support ~1190 SULI interns)

The SULI program encourages undergraduate students and recent graduates to pursue science, technology, engineering, and mathematics careers by providing research experiences at the DOE laboratories.

- SULI participants work on science and engineering research projects with laboratory scientists and engineers who serve as mentors.
- Student deliverables include a research report, an oral or poster presentation, a peer review, a general audience abstract, and pre- and post-participation surveys.
- 10 weeks during the Summer term (May-August); 16 weeks during the Fall (August-December) or Spring (January-May) terms

Award Benefits:

- Paid internships ($600 weekly stipend, dedicated funding for travel and lodging).
- Labs provide training seminars and professional development opportunities.

Eligibility:

- U.S. citizen or legal permanent resident
- Undergraduates from 2- or 4-year colleges, sophomore through senior year or recent graduates
- At least 18 years old at time of application
- Minimum cumulative GPA 3.0
- May participate in SULI twice; may apply up to three times

2021 Fall Application due May 27, 2021; 2022 Spring Term Application period to start July 15, 2021
2022 Summer Term Application period to start early October 2021

Full details, requirements, FAQs, and link to application at: https://science.osti.gov/wdts/SULI/

Program Contact : sc.suli@science.doe.gov

Office of Science Graduate Student Research (SCGSR) Program

(FY2021 enacted $4.6M, support ~185 graduate students engaged in Ph.D. thesis research)

The SCGSR Program provides supplemental awards to outstanding graduate students to spend 3 to 12 months conducting part of their doctoral thesis/dissertation research at a host DOE national laboratory/facility in collaboration with a DOE laboratory scientist.

- Graduate students must apply online through the online application system.
- The application requires a research proposal and letters of support from both the graduate student's thesis advisor and the collaborating DOE laboratory scientist.
- Student's research and proposed SCGSR project must be aligned with one of the identified SCGSR priority research areas defined by the SC Program Offices and specified in the solicitation.
- Applications proposing to use an SC user facility must apply for user facility time separately.

Award Benefits:

- A monthly stipend of up to $3,000/month for general living expenses
- Reimbursement of inbound/outbound traveling expenses to/from the host DOE laboratory/facility of up to $2,000

(Award payments are provided directly to the student)

Eligibility:

- U.S. Citizen or Lawful Permanent Resident
- Qualified graduate program & Ph.D. Candidacy
- Graduate research aligned with an SCGSR priority research area
- Establishment of a collaborating DOE laboratory scientist at the time of application

Active awards cohorts include 2018 S2, 2019 S1, 2019 S2, 2020 S1, and 2020 S2;
2021 S1 applications under review; 2021 Solicitation 2 application to start mid. August 2021

Full details, requirements, FAQs, and link to application at: https://science.osti.gov/wdts/scgsr/

Interagency Coordination

NSTC Committee on STEM Education (CoSTEM) Agency Members:

National Science and Technology Council's Committee on STEM Education (CoSTEM) under the White House Office of Science and Technology Policy.

The Federal Coordination in STEM (FC-STEM) subcommittee oversees 5 Interagency Working Groups (*Convergence, Inclusion in STEM, Strategic Partnerships, Transparency and Accountability, and Computational Literacy*). SC represents DOE on the interagency working groups.