



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Quantum Information Science in the Department of Energy Office of Science

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National QIS Research Centers: A Major Investment in QIS

- Authorized by and consistent with the National Quantum Initiative Act, signed into law in December 2018
- First large-scale QIS effort that crosses the technical breadth of Office of Science
- Scope built on extensive community-wide RFI inputs– from technical scope to partnership model to management construct

- ❖ Significant National Impact
- ❖ Major Cross-Cutting Challenge
- ❖ Science and Technology Innovation Chain
 - ❖ QIS Ecosystem Stewardship
 - ❖ Multi-Disciplinary Leadership
- ❖ Collaborative Management Structure
- ❖ Well-Structured Plan and Metrics



Workforce Development for Teachers and Scientists (WDTS): QIS Workforce Development in DOE

Approach

- Established a working group on “Educational Needs for the Future Scientific Workforce”, focusing on Quantum Information Sciences (QIS)
- Representatives from industry, universities, and DOE’s National Laboratories
- Gathered information from group members and from outside experts



Perspectives

- *Supply side:* Educational, degree granting institutions that provide training in academic settings
- *Demand side:*
 - ✓ Industries that support development and manufacturing of QIS technologies
 - ✓ Government labs and universities that conduct QIS R&D



Demand Side Findings

- QIS will create a large demand for trained workers: from basic research scientists to development engineers to skilled technicians to manufacture new QIS technologies
- DOE has a significant role on demand-side as its research at national labs and at universities (supported through grants) requires a large and growing number of QIS scientists, engineers, and technicians



Supply Side Findings

- Hands-on training and availability of QIS expertise are limiting factors in QIS training at colleges and universities
- Equipment is expensive, requires significant expertise and resources to operate and maintain
- Partnerships between DOE and universities can contribute to future QIS workforce needs by offering training opportunities at DOE’s national labs
 - ✓ Access to leading QIS expertise and specialized equipment
 - ✓ Hands-on training with QIS experts

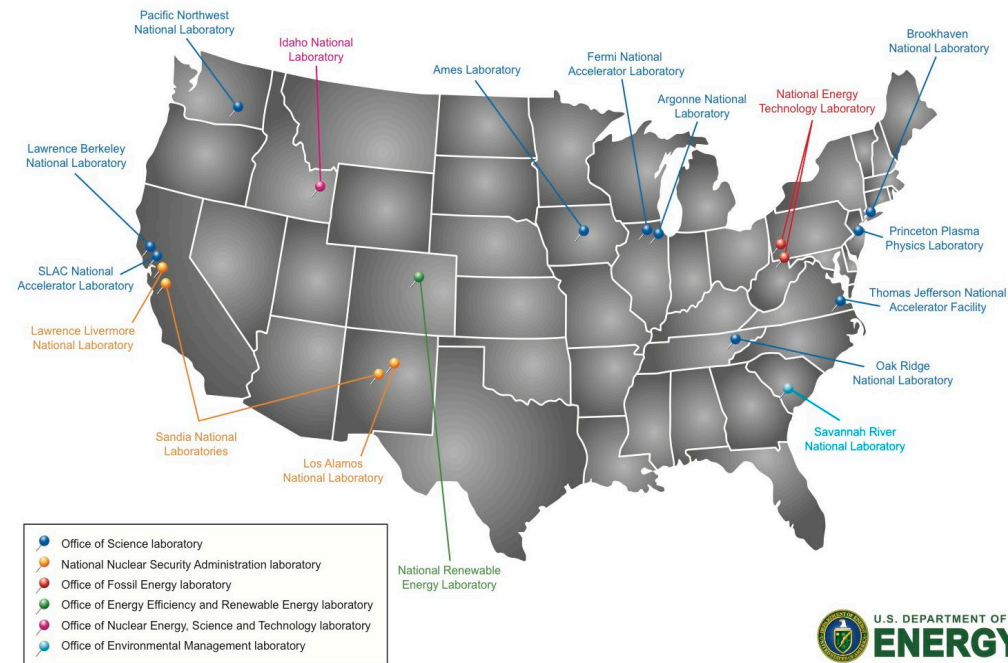
SC STEM Workforce Training Opportunities for Students and Faculty at DOE National Laboratories

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

SC's Office of Workforce Development for Teachers and Scientists (WDTS) sponsors DOE Laboratory Based Workforce Training Programs:

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

[Find Details at https://science.osti.gov/wdts](https://science.osti.gov/wdts)



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

Partnerships to Deliver Future Leaders

DOE Computational Science Graduate Fellowship (CSGF)

2019 incoming class of Computational Science Graduate Fellows

- Started in 1991 to broadly train advanced computational scientists
- Funded by both DOE-SC/ASCR and NNSA/ASC
 - Currently, CSGF supports 99 students at 41 universities in 22 states.
 - More than 500 students at 65 U.S. universities have trained as fellows.
- Requires that fellows
 - plan and follow a plan of study that transcends the bounds of traditional academic disciplines
 - participate in 12-week research experience at DOE lab
- Benefits
 - Up to four years of support, including full tuition/required fees paid
 - Yearly stipend of \$38,000 plus an Academic allowance
 - Annual program review with peers, Alumni and DOE/Lab scientists

<https://www.krellinst.org/csgf/>



CSGF alumni work in DOE laboratories, industry and educational institutions



DOE Office of Science Continues to Expand its QIS Investments

