

Workforce Development for Teachers and Scientists

Overview

The Workforce Development for Teachers and Scientists (WDTS) program mission is to help ensure that DOE has a sustained pipeline of science, technology, engineering, and mathematics (STEM) workers. This is accomplished through support of undergraduate internships, graduate thesis research, and visiting faculty programs at the DOE laboratories; the Albert Einstein Distinguished Educator Fellowship for K–12 STEM teachers, administered by WDTS for DOE and for a number of other federal agencies; and annual, nationwide, middle- and high-school science competitions culminating in the National Science Bowl[®] in Washington D.C. These investments help develop the next generation of scientists and engineers to support the DOE mission, administer programs, and conduct research.

WDTS activities rely significantly on DOE's 17 laboratories, which employ more than 30,000 workers with STEM backgrounds. The DOE laboratory system provides access to leading scientists; world-class scientific user facilities and instrumentation; and large-scale, multidisciplinary research programs unavailable in universities or industry. WDTS leverages these assets to develop and train post-secondary students and educators in support of the DOE mission.

Highlights of the FY 2015 Budget Request

Programs conducted at the DOE Laboratories increase in order to support additional highly qualified applicants to conduct research in mission-critical areas at the DOE laboratories. The pool of highly qualified applicants is growing, as are placement opportunities at DOE host laboratories. The FY 2015 Request supports growth while maintaining programmatic standards of quality and impact for these experience-based STEM learning opportunities.

Description

Activities at the DOE Laboratories

Activities include the Science Undergraduate Laboratory Internships, Community College Internships, Graduate Student Research Program, and Visiting Faculty Program. These activities provide opportunities for participants to engage in research requiring specialized instrumentation; large-scale, multidisciplinary efforts; and/or scientific user facilities. WDTS activities are aligned with the strategic objectives of the National Science and Technology Council Committee on STEM Education (CoSTEM) Federal STEM Education 5-Year Strategic Plan^a.

The **Science Undergraduate Laboratory Internships (SULI)** program goal is to encourage undergraduate students to enter STEM careers especially relevant to the DOE mission by providing research experiences at DOE national laboratories under the direction of scientific and technical laboratory staff who serve as research advisors and mentors. With its long history, the SULI program places undergraduate students in paid internships in science and engineering research activities at DOE laboratories, working with laboratory staff scientists and engineers on projects related to ongoing research programs. Appointments are for 10 weeks during the summer term and 16 weeks during the fall and spring terms.

The **Community College Internships (CCI)** program goal is to encourage community college students to pursue technical careers relevant to the DOE mission by providing technical training experiences at DOE laboratories under the direction of laboratory staff who serve as advisors and mentors. The CCI program places students in paid internships in technologies supporting laboratory work under the supervision of a laboratory technician or researcher. Appointments are for 10 weeks during the summer term and 16 weeks during the planned fall and spring terms.

The **Office of Science Graduate Student Research (SCGSR)** program goal is to enhance graduate student preparedness for STEM careers critically important to the Office of Science mission by providing graduate thesis research opportunities at DOE laboratories. The program provides research awards for graduate students to pursue part of their graduate thesis

^a http://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf

research at a DOE laboratory in areas that address scientific challenges central to the Office of Science mission. Graduate students pursuing Ph.D. degrees in physics, chemistry, materials sciences, non-medical biology, mathematics, computer or computational sciences, or specific areas of environmental sciences aligned with the Office of Science mission are eligible for research awards to conduct part of their graduate thesis research at a DOE laboratory in collaboration with a DOE laboratory scientist. Research award terms range from 3 months to 1 year.

The **Visiting Faculty Program (VFP)** goal is to increase the research competitiveness of faculty members and students at post-secondary institutions of higher education historically underrepresented in the research community in order to expand the workforce that addresses DOE mission areas. Through direct collaboration with research staff at DOE host laboratories, VFP appointments provide an opportunity for faculty and students to develop skills applicable to programs at their home institutions; this helps increase the STEM workforce in DOE science mission areas at institutions historically underrepresented within the DOE enterprise. Appointments are in the summer term for 10 weeks.

Albert Einstein Distinguished Educator Fellowship

The Albert Einstein Distinguished Educator Fellowship Act of 1994 charges the Department of Energy with administering a fellowship program for elementary and secondary school mathematics and science teachers that focuses on bringing teachers' real-world expertise to government to help inform federal STEM education goals and programs. Selected teachers spend eleven months in a Congressional office or a Federal agency. WDTS manages the Albert Einstein Distinguished Educator Fellowship (AEF) program for the Federal government. Fellows are supported by DOE and other Federal agencies. Typically, the Office of Science supports 6 Fellows each year; 4 are placed in Congressional offices and 2 are placed in the Office of Science. Other DOE offices, as well as the National Science Foundation, National Aeronautics and Space Administration, and National Oceanic and Atmospheric Administration also participate. The Fellows provide educational expertise, years of teaching experience, and personal insights to these offices to advance science, mathematics, and technology education programs.

National Science Bowl®

The DOE Office of Science National Science Bowl® (NSB) is a nationwide academic competition testing students' knowledge in all areas of mathematics and science, including energy. High school and middle school students are quizzed in a fast-paced, question-and-answer format. Since 1991, more than 225,000 students have participated in regional and national competitions.

The National Science Bowl® regional winning teams receive all-expenses paid trips to Washington D.C. to compete at the National Finals in late April. Competing teams are composed of four students, one alternate, and a teacher who serves as an advisor and coach. The Office of Science manages the National Science Bowl®, provides central management of 115 regional events, and sponsors the NSB finals competition.

In 2013, 5,000 middle school students from 725 schools and 9,090 high school students from 1,450 schools participated in the regional competitions, with 46 middle school and 69 high school teams (550 students) participating in the National Finals in Washington, D.C. More than 5,000 volunteers also participated in the local and national competitions.

In 2013, Alaska hosted regional middle and high school competitions for the first time, making the National Science Bowl® accessible to students in all fifty states.

The DOE National Science Bowl® is aligned with the CoSTEM Federal STEM Education 5-Year Strategic Plan priority investment area for STEM engagement.

Technology Development and On-Line Application

This activity modernizes on-line systems used to manage applications and review, data collection, and evaluation for WDTS programs. A project to develop, build, and launch new online application and program support systems is progressing to improve program management, execution, and evaluation by WDTS program staff and by DOE laboratory staff. The build schedule was met, enabling an inaugural launch in time for the 2013 summer internship programs. Since launch, the new online systems have enabled improved management of application and participant information and the collection and

archiving of participant deliverables (such as research reports). An important component of the systems is the ability to support regular evidence-based evaluation of program performance and impact. A phased approach is being used to develop and build the systems. Following full completion of the systems supporting the 2014 SULI, CCI, and VFP Summer Term, the systems for the Albert Einstein Distinguished Educator Fellowship, the Graduate Student Research Program, and National Science Bowl[®] will be updated or developed.

Evaluation Studies

The Evaluation Studies activity supports work to assess whether WDTS programs meet established goals through the use of collection and analysis of data and other materials, including pre- and post-participation questionnaires, participant deliverables, notable outcomes (publications, presentations, patents, etc.), and longitudinal participant tracking.

Prior Committee of Visitors reviews found little evaluation of activities across WDTS but noted that the data collection and evaluation plans under development provided some innovative options for gathering workforce information and for tracking participants. In FY 2014, evaluation plans for each WDTS activity will be completed. Enhanced data analysis efforts, a Committee of Visitors review, and external peer review activities will begin in FY 2014 and continue into FY 2015.

Evaluation Studies is aligned with the GPRA Modernization Act of 2010, the President's management priorities,^a and the 2008 Congressionally-mandated Academic Competitiveness Council initiative, which emphasized the need for federal programs (including STEM education programs) to demonstrate their effectiveness through rigorous evidence-based evaluation. WDTS works cooperatively with Office of Science programs, other DOE programs, and other federal agencies through CoSTEM to share best practices for STEM program evaluation to ensure the implementation of evaluation processes appropriate to the nature and scale of the program effort.

Outreach

WDTS engages in outreach activities, some in cooperation with other DOE program offices and select federal agencies, that seek to broaden participation in and enhance the student internships, the Graduate Student Research program, and the Visiting Faculty Program. The WDTS website^b is the most widely used tool for prospective program participants to obtain information about WDTS. Website content has been optimized for mobile devices. Active outreach is also conducted via the web using live webinar virtual meetings to highlight the programs, their opportunities, and the WDTS internship experience, where a portfolio of live webinars delivered to broad stakeholder communities is being built, including access to recorded content. To improve access and user friendliness, the webinar solution offers robust voice over data, does not require software downloads aside from free Apps for mobile devices, and enables platform-independent access on the client side.

Laboratory Equipment Donation Program

The Laboratory Equipment Donation Program provides excess laboratory equipment to faculty at non-profit research institutions and post-secondary educational institutions. Through the Energy Asset Disposal System, DOE sites identify excess equipment and colleges and universities can then search for equipment of interest and apply via the website. The equipment is free, but the receiving institution pays for shipping costs.

^a <http://www.whitehouse.gov/administration/eop/ostp/nstc/committees/costem>

^b <http://science.energy.gov/wdts/>

**Workforce Development for Teachers and Scientists
Funding (\$K)**

	FY 2013 Current	FY 2014 Enacted	FY 2014 Current	FY 2015 Request	FY 2015 vs. FY 2014 Enacted
Activities at the DOE Laboratories					
Science Undergraduate Laboratory Internships	7,296	7,800	7,800	8,300	+500
Community College Internships	694	700	700	1,000	+300
Graduate Student Research Program (formerly Office of Science Graduate Fellowship)	2,986	10,700	10,700	2,500	-8,200
Visiting Faculty Program	1,310	1,300	1,300	1,700	+400
Total, Activities at the DOE Laboratories	12,286	20,500	20,500	13,500	-7,000
Albert Einstein Distinguished Educator Fellowship	1,200	1,200	1,200	1,200	0
National Science Bowl[®]	2,800	2,800	2,800	2,900	+100
Technology Development and On-Line Application Evaluation Studies	550	550	550	750	+200
Outreach	300	600	600	600	0
Laboratory Equipment Donation Program	300	800	800	500	-300
Laboratory Equipment Donation Program	50	50	50	50	0
Total, Workforce Development for Teachers and Scientists	17,486	26,500	26,500	19,500	-7,000

Program Accomplishments

Program Evaluation of the DOE Laboratory Activities. In FY 2013, WDTS executed the first of what will be triennial peer-reviews of activities at DOE laboratories (SULI, CCI, and VFP). The primary outcome of this subject matter expert review is the development and implementation of programmatic core requirements. These core requirements, which are aligned with evaluation logic models and related evaluation instruments, sets management standards for WDTS laboratory programs across the DOE laboratory complex.

Technology Development. In FY 2013, WDTS launched a new online management system for programmatic activities at DOE laboratories. In this system, applications, applicant reviews, applicant placements, participant deliverables, and participant feedback (in the form of pre- and post- participation questionnaires) are managed in one integrated web-based system, which uses an advanced information architecture for ease of use and a relational database structure for facile tracking, measurement, and reporting of data.

Workforce Development for Teachers and Scientists

Activities and Explanation of Changes

FY 2014 Enacted	FY 2015 Request	Explanation of Changes FY 2015 vs FY 2014 Enacted
Activities at the DOE Laboratories		
<p><i>Science Undergraduate Laboratory Internships</i></p> <p>SULI will support approximately 725 students. Consistent with Congressional direction in the FY 2014 Consolidated Appropriations Act, of the funds appropriated to WDTS, \$500,000 is provided to support approximately 35 additional SULI students, accommodating increasing numbers of highly qualified applicants and DOE laboratory mentor interests in hosting additional semester term students.</p>	<p><i>Science Undergraduate Laboratory Internships</i></p> <p>SULI will support approximately 760 students, including support for an additional 35 fall and spring semester students.</p>	<p><i>Science Undergraduate Laboratory Internships</i></p> <p>Approximately 35 additional SULI students are supported to accommodate increasing numbers of highly qualified applicants and DOE laboratory mentor interests in hosting additional fall and spring semester students.</p>
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<p><i>Community College Internships</i></p> <p>CCI will support approximately 70 students.</p>	<p>CCI will support approximately 90 students.</p>	<p>Approximately 20 additional CCI students are supported for newly available fall and spring semester terms, aligning CCI with SULI program and addressing DOE laboratory mentor interests in hosting CCI students for the longer, 16-week semester terms.</p>
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<p><i>Graduate Student Research Program</i></p> <p>The SCGSR program will support approximately 100 graduate students for periods of 3 months to 1 year to conduct a part of their thesis research at DOE laboratories.</p>	<p>The SCGSR program will support approximately 130 graduate students for periods of 3 months to 1 year to conduct a part of their thesis research at DOE laboratories.</p>	<p>Approximately 30 additional awards will be provided in high priority research areas such as applied mathematics and computational sciences particle accelerator and detector science, actinide and nuclear chemistry, and neutron scattering science.</p>

FY 2014 Enacted	FY 2015 Request	Explanation of Changes FY 2015 vs FY 2014 Enacted
<p>Consistent with Congressional direction in the FY 2014 Consolidated Appropriations Act, of the funds appropriated to WDTS, \$8,700,000 is provided for the Computational Sciences Graduate Fellowship (CSGF) program to fully-fund approximately 20 Fellows, to be overseen by the Office of Advanced Scientific Computing Research.</p>		<p>No funds are provided for the CSGF activity.</p>
<i>Visiting Faculty Program</i>		
<p>VFP will support approximately 50 faculty and 20 students.</p>	<p>VFP will support approximately 65 faculty and 30 students.</p>	<p>VFP supports approximately 15 additional faculty and 10 of their students, drawn from smaller colleges and universities, Historically Black Colleges and Universities, and Hispanic-Serving Institutions.</p>
Albert Einstein Distinguished Educator Fellowship		
<p>The FY 2014 request supports 6 Fellows.</p>	<p>The FY 2015 request supports 6 Fellows.</p>	<p>No change.</p>
National Science Bowl[®]		
<p>WDTS sponsors the finals competition and provides central management of 115 regional events, involving 14,000 students from all fifty states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. National Finals: April 24-28, 2014.</p>	<p>WDTS sponsors the finals competition and provides central management of 115 regional events, involving 14,000 students from all fifty states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. National Finals: April 23-27, 2015.</p>	<p>Funding is maintained to support a constant number of regional teams each year at the national finals competition.</p>
Technology Development and On-line Application Systems		
<p>Funding in FY 2014 completes the design, build, and implementation of online management systems for the SULI, CCI, VFP, and Albert Einstein Distinguished Educator Fellowship (AEF) programs, including evaluation. Funding also supports the development of the application system for the SCGSR program.</p>	<p>Funding in FY 2015 completes the design, build, and implementation of online management systems for the SCGSR, including the participant deliverables and evaluation components, and the National Science Bowl[®]. Funding also provides increased capacity for collecting data in support of evaluation studies.</p>	<p>Funding provides increased capacity for collecting data in support of evaluation studies.</p>

FY 2014 Enacted	FY 2015 Request	Explanation of Changes FY 2015 vs FY 2014 Enacted
Evaluation Studies		
<p>FY 2014 funding supports the implementation of evaluation plans for SULI, CCI, VFP, and AEF programs, including data archiving, curation, and analyses. It also supports a Committee of Visitors review of Federal program oversight and management. Consistent with Congressional direction in the FY 2014 Consolidated Appropriations Act, of the funds appropriated to WDTS, \$300,000 is provided to support increased evaluation, data analysis, and external peer review of programs for effectiveness.</p>	<p>FY 2015 funding supports enhanced evaluation efforts initiated in FY 2014, and the implementation of an evaluation plan for the SCGSR, including data archiving, curation, and analyses.</p>	<p>No change.</p>
Outreach		
<p>Funding supports webinars and the launch of a WDTS website-based host DOE lab selection tool for stakeholders and a WDTS website landing page providing links to the portfolio of live and recorded webinars.</p> <p>Consistent with Congressional direction in the FY 2014 Consolidated Appropriations Act, of the funds appropriated to WDTS, \$500,000 is provided for the QuarkNet program, to be overseen by the Office of High Energy Physics.</p>	<p>Funding supports development and deployment of a public web portal to track the inventory of STEM workforce internship and outreach activities and opportunities across the DOE laboratory complex.</p> <p>Enhanced outreach activities to the scientific community aimed at assessing the Office of Science mission-driven disciplinary workforce needs in the next 5 to 10 years are initiated.</p>	<p>Funding continues the ongoing activity. No funds are provided for the QuarkNet activity.</p>
Laboratory Equipment Donation Program		
<p>Funding continues the ongoing program.</p>	<p>Funding continues the ongoing program.</p>	<p>No change.</p>