DEPARTMENT OF ENERGY: NUCLEAR S&T WORKFORCE DEVELOPMENT PROGRAMS

Funding Area: **Nuclear Science and Technology**

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1 Introduction

The U.S. Department of Energy (DOE) national laboratories use their expertise in nuclear science and technology (S&T) to support a robust national nuclear S&T enterprise from the ground up. Traditional academic programs do not provide all the elements necessary to develop this expertise, so the DOE has initiated a number of supplemental programs to develop and support the nuclear S&T workforce pipeline.

This document catalogs existing workforce development programs that are supported by a number of DOE offices (such as the Offices of Nuclear Energy, Science, Energy Efficiency, and Environmental Management), and by the National Nuclear Security Administration (NNSA) and the Naval Reactor Program. Workforce development programs in nuclear S&T administered through the Department of Homeland Security, the Nuclear Regulatory Commission, and the Department of Defense are also included. The information about these programs, which is cataloged below, is drawn from the program websites. Some programs, such as the Minority Serving Institutes Partnership Programs (MSIPPs) are available through more than one DOE office, so they appear in more than one section of this document.

2 U.S. Department of Energy (DOE): Office of Nuclear Energy (NE)

2.1 Nuclear Energy University Program (NEUP)

Investing in the next generation of nuclear energy leaders and advancing nuclear innovation in universities is vital to the Office of Nuclear Energy's (NE) mission. This investment is accomplished primarily through NE's Nuclear Energy University Program (NEUP), which was created in 2009 to consolidate university support under one initiative and better integrate university research within NE. The program's current annual budget is on the order of \$30 million. For more information, see <https://neup.inl.gov>.

2.1.1 Research and Development (R&D)

NEUP engages U.S. colleges and universities to conduct research and development (R&D), enhance infrastructure, and support student education, thereby helping to sustain a world-class nuclear-energy workforce. The program's goal is to support outstanding, cutting-edge, and innovative research at U.S. universities by:

- Administering NEUP R&D awards to revitalize nuclear education and support NE's R&D program objectives;
- Attracting the brightest students to the nuclear professions;
- Supporting the Nation's intellectual capital in nuclear-energy-related engineering and relevant nuclear science, such as health physics, nuclear materials science, radiochemistry, and applied nuclear physics;
- Improving relevant university and college infrastructure for nuclear-energy-related R&D and student education; and

- Facilitating the transfer of knowledge from an aging nuclear workforce to the next generation of workers.

2.1.2 Integrated University Program (IUP)

Through the Integrated University Program (IUP), the DOE is awarding more than \$5 million in undergraduate scholarships and graduate fellowships to students in nuclear-energy-related engineering and science programs at universities across the country. Through the IUP, undergraduates will receive a \$7,500 scholarship. Fellowship winners will receive \$50,000 annually over 3 years to support their graduate studies and research. The graduate fellowships will also include \$5,000 toward a summer internship at a U.S. national laboratory or other approved facility to strengthen the ties between students and the DOE's nuclear energy research programs. The selected students will study a broad range of critical nuclear energy issues, from fuel cycle sustainability to reactor efficiency and design.

Undergraduate scholars must be U.S. citizens or permanent legal residents, entering at least their sophomore year at an eligible (IUP-accepted) college or university, and studying nuclear science or engineering, or a related field. Graduate fellows must be U.S. citizens or permanent legal residents, entering their first or second year of graduate studies at an IUP-accepted college or university, and studying nuclear science or engineering, or a related field. For more information, see <https://neup.inl.gov/SitePages/Fellowship%20Information.aspx>.

2.2 DOE Traineeship in Nuclear Radiochemistry

The new DOE Traineeship in Nuclear Radiochemistry program was announced in January of 2016 and is jointly funded by NE and DOE's Office of Environmental Management (EM). This program will support one or more 5-year proposals from universities that plan to train graduate students in radiochemistry. The graduate training program includes a combination of targeted, relevant, and innovative science, technology, engineering, and mathematics (STEM) coursework; mentored graduate research; and other required activities in radiochemistry. These activities are designed to address essential knowledge and skills and to leverage DOE capabilities and assets. Activities could include focused workshops, seminars, research practicums at DOE laboratories or other DOE-supported assets, internships with strategic partners, or participation in external courses and programs.

Graduate student trainees must be U.S. citizens. Approximately \$3 million is expected to be available to fund up to a 5-year traineeship program beginning in fiscal year (FY) 2016. The first traineeship was awarded to Washington State University in 2016.

3 DOE: National Nuclear Security Administration (NNSA)

3.1 Student Career Experience Program (SCEP)

The National Nuclear Security Administration's (NNSA's) Student Career Experience Program (SCEP) gives undergraduate and graduate students the opportunity to combine academic studies with on-the-job training and experience directly related to their academic programs. Students

have the opportunity to work on NNSA projects, earn money, and take advantage a benefits package while maintaining student status and completing their education.

SCEP allows NNSA managers to evaluate student performance in real work situations and discover first-hand their abilities as potential employees. Students who successfully complete both education and work requirements are eligible for conversion to a full-time position at NNSA. For more information, see <http://nnsa.energy.gov/federalemloyment/ourjobs/studentsopportunities/scep>.

3.2 Student Temporary Employment Program (STEP)

The NNSA's Student Temporary Employment Program (STEP) is a work-study combination for high school through graduate school students. Opportunities range from full-time summer employment to positions that can last for as long as the student is enrolled at a school. Students can work part-time when school is in session and full-time during semester and summer breaks, or may work only during the summer months.

The students' position at NNSA need not be related to their academic field of study. Opportunities vary, but they generally cover a wide range of clerical, administrative, professional, and technical positions that support NNSA's missions. Students are paid at regular government salary rates in line with their assigned duties, and they can be promoted or rewarded based on their performance. For more information, see <http://nnsa.energy.gov/federalemloyment/ourjobs/studentsopportunities/step>.

3.3 Minority Serving Institution (MSI) Internship Program

NNSA strives to recruit and hire a highly skilled workforce representing America's rich diversity. The Minority Serving Institution (MSI) Internship Program is available to students who currently attend a participating MSI. The program allows these students to gain real-world work experience related to their academic background at scientific facilities and Federal offices across the country. NNSA also provides opportunities for Hispanic high school through post-graduate students. Each program is open to students pursuing degrees in a variety of disciplines. The goal of this program is for these opportunities to lead students to consider careers in public service.

Students combine studies with on-the-job training and experience directly related to their academic program, enabling them to make more informed career choices in the future. The MSI internship lasts for 10 weeks during students' summer break, providing them the opportunity to work on projects at NNSA's laboratories, Federal field offices, or small business partners. Many MSI interns with science, technology, engineering, or mathematics backgrounds work in research environments with the nation's top scientists and engineers. For more information, see <http://nnsa.energy.gov/federalemloyment/ourjobs/studentsopportunities/msi>.

3.4 NNSA Minority Serving Institutes Partnership Program (MSIPP)

The Minority Serving Institutes Partnership Program (MSIPP) is designed to enrich the STEM capabilities of historically black colleges and universities (HBCUs) in a sustainable manner that aligns with the broad interests of DOE sites and emphasizes the entire career pipeline. The partnership also provides STEM students with the cutting-edge resources and technology housed at DOE facilities, ultimately increasing STEM student retention.

3.4.1 MSIPP Advanced Manufacturing Consortium

In an ongoing effort to build a sustainable STEM pipeline between DOE's sites/laboratories and HBCUs, the National Security Campus (NSC) helped form the Advanced Manufacturing Consortium under the MSIPP.

This year, MSIPP funded three NSC student interns from Hampton University and Howard University to further the Advanced Manufacturing Consortium. These students were given assignments in physical properties testing, product design, and modeling and simulation—three key focus areas for the NSC in the support of continued Advanced Manufacturing Technology.

3.4.2 MSIPP Cybersecurity Consortium

The Cybersecurity Consortium was established by NNSA's MSIPP. It allows participating schools to open doors to DOE sites and facilities for student members of the consortium. The partnership will strengthen and expand MSI institutional capacity and research in DOE and NNSA missions and increase participation of MSI faculty collaborative research, technical workshops, expert panel reviews and studies, and competitive processes. It will also draw DOE scientists and engineers into the MSIs for curriculum development, teaching, mentoring, and research.

Thirteen HBCUs received the first allocation of the \$25 million award in FY 2015. The grant supports a partnership between the HBCUs, Charleston County School District, and two NNSA laboratories (Sandia National Laboratories [SNL] and Lawrence Livermore National Laboratory [LLNL]). The grants will help NNSA partner with the next generation of future leaders, increase the number of minority students pursuing cybersecurity careers, and thereby support NNSA in meeting its cybersecurity demands. The grants will also help to attract minority graduates for employment in NNSA laboratories and plants.

3.5 Research Collaborations and Consortia

3.5.1 University of Kansas and Honeywell Collaboration for NNSA

The University of Kansas's research collaboration will position faculty and students to work with industry on technologies that enhance national security. The University of Kansas and Honeywell Federal Manufacturing & Technologies, the managing contractor of the Kansas City National Security Campus, agreed upon this collaboration in February 16, 2016. The agreement will expedite future research contracts, enabling the two organizations to work more closely on

research and development projects. It will also promote interaction and exchange between University of Kansas researchers and Honeywell engineers.

The University and Kansas and Honeywell held a technical exchange day that featured selected university department chairs, center directors, and researchers making presentations on topics of mutual interest. In addition, Honeywell is making its first long-term loan of advanced research equipment, and is funding a research project at the university. For more information, see <https://honeywell.com/sites/aero-kcp/News-Events/Pages/NSCmilestone.aspx>.

3.5.2 University of California Consortium

NNSA granted \$25 million to a University of California, Berkeley-led consortium of eight universities for R&D in nuclear science and security. This long-term investment supports the consortium at \$5 million per year for 5 years. The other consortium members include Michigan State University; the University of California, Davis; the University of California, Irvine; the University of Nevada, Las Vegas; George Washington University; Texas A&M University; and the University of Tennessee, Knoxville. These eight universities partner with five national laboratories (Los Alamos National Laboratory [LANL], Lawrence Berkeley National Laboratory [LBL], LLNL, Oak Ridge National Laboratory [ORNL], and SNL). One of NNSA's missions is to lead investment in the R&D of new technologies in support of the Nation's nuclear security and nonproliferation goals. To support this mission, NNSA sponsors R&D across all disciplines of nuclear science and security. The consortium's three primary objectives supporting this mission are to:

- Provide an effective conduit for integration of basic academic and applied national laboratory research.
- Provide basic research in concepts, technologies, and paradigms that is complementary to laboratory research and required for meeting the nonproliferation mission.
- Prepare new nonproliferation experts for careers in the DOE laboratories and related federal service.

The new consortium will carry out R&D in four technical areas: nuclear and particle physics; radiochemistry and forensics; nuclear engineering; and nuclear instrumentation and radiation detection. Linking these R&D areas are four crosscutting disciplines: nuclear data; modeling and simulation; nuclear security policy; and education and training. Together they provide a framework that yields new ideas and relevant technology developments, and equips personnel with the integrated capabilities required for the nuclear security mission.

3.5.3 Nuclear Science and Security Consortium (NSSC)

In 2011, the NNSA awarded the Nuclear Science and Security Consortium (NSSC) \$25 million to establish a 5-year program to train the next generation of nuclear security experts. An additional \$1.5M was awarded in 2011 for scholarships, research projects, and summer fellowships in collaboration with minority-serving institutions. The NSSC was established as a University of California (UC) Berkeley-led consortium offering hands-on experience at

four DOE national laboratories. Partner universities in the first phase of the consortium included UC Berkeley, Michigan State University, UC Irvine, UC Davis, Washington University in St. Louis, the Institute on Global Conflict and Cooperation at UC San Diego, and the University of Nevada, Las Vegas. Partner national laboratories included LBL, LLNL, LANL, and SNL. In 2016, the NSSC successfully competed for an additional 5 years of support. Partner universities in the second phase of the consortium include UC Berkeley, Michigan State University, UC Irvine, UC Davis, George Washington University, Texas A&M University, the University of Tennessee, Knoxville, and the University of Nevada, Las Vegas. Partner national laboratories include LBL, LLNL, LANL, ORNL, and SNL.

The NNSC trains undergraduate students and postdocs in nuclear and particle physics, nuclear chemistry and forensics, nuclear engineering, radiation detection and instrumentation, nuclear data, modeling and simulation, and nuclear security policy. NSSC undergraduates and postdocs engage with the national laboratories through collaborative research and in-residence summer school programs. For more information, see <http://nssc.berkeley.edu>.

3.5.4 Consortium for Verification Technology (CVT)

The Consortium for Verification Technology (CVT) consists of 13 leading universities and nine national laboratories working together to provide the research and development and human capital needed to address technology and policy issues in treaty-compliance monitoring. The underlying issues include nuclear nonproliferation and safeguards in support of the mission of the NNSA's Defense Nuclear Nonproliferation Research and Development office. The university partners to the consortium are University of Michigan (UM), Massachusetts Institute of Technology (MIT), Princeton University, Columbia University, North Carolina State University (NCSU), University of Hawaii (UH), Pennsylvania State University (PSU), Duke University, University of Wisconsin (UW), University of Florida (UF), Oregon State University (OSU), Yale University, and the University of Illinois at Urbana-Champaign (UIUC). The university participants will execute research projects in collaboration with the DOE national laboratories, including Brookhaven National Laboratory (BNL), LANL, LLNL, SNL, Idaho National Laboratory (INL), ORNL, Pacific Northwest National Laboratory (PNNL), LBNL, and Princeton Plasma Physics Laboratory (PPPL). Laboratory scientists bring relevant expertise to the consortium by partnering in research with university professors, researchers, postdocs, and graduate students and by mentoring CVT fellows during summer internships.

Opportunities are available for both undergraduate and graduate students through the participating institutions. Undergraduates in their junior or senior year of study can apply for a summer scholarship. Graduate students can apply for a fellowship that provides a monthly stipend and payment of tuition and fees. Postdocs can apply for salaries and benefits. For more information, see <http://cvt.engin.umich.edu>.

3.5.5 Consortium for Nonproliferation Enabling Capabilities (CNEC)

In 2014 North Carolina (NC) State was awarded a 5-year, \$25 million grant by the NNSA's Office of Defense Nuclear Nonproliferation Research and Development to develop the next generation of leaders with practical experience in technical fields relevant to nuclear

nonproliferation. The Consortium for Nonproliferation Enabling Capabilities (CNEC) is comprised of seven partner universities (NC State, Georgia Tech, Kansas State University, NC A&T State University, Purdue University, University of Illinois at Urbana-Champaign, and University of Michigan) and three national laboratories (LANL, ORNL, and PNNL).

Applicants to the CNEC fellowship program must have either applied to a graduate program, or be already enrolled in a graduate program, at a qualifying college or university with the ultimate objective of earning a doctoral degree in a field that is relevant to CNEC's goals and mission. Eligibility requirements include a 3.5 GPA for undergraduate applicants and a 3.7 GPA for graduate applicants. All applicants must be U.S. citizens or permanent residents of the United States. Applicants must demonstrate that their graduate program and research plans are of high quality and relevant to CNEC's mission. The program will cover full tuition and fees and provide a \$33,000 annual stipend (\$2750/month) to each fellow for up to 4 years. Funds for stipends and tuition and fees will be provided to the fellow's institution by CNEC for disbursement to the fellow. Each fellow will be provided with travel support to the annual University Industry Technical Interchange (UITI) review meeting, an annual meeting that presents current research and activities in the nuclear nonproliferation community. Fellows will be required to present their research at the UITI meetings. Continuing support for a fellow is contingent on their maintaining a 3.7 GPA throughout their graduate academic career and on their making steady progress toward earning their target degree. Fellows will be required to complete annual reports on their current status and achievements during the previous year, for review and comment by their academic advisors before transmittal to CNEC. The academic advisor is required to assess the progress that has been made by the fellow in the previous year and recommend whether or not the fellowship should be renewed for another year. For more information, see <https://www.cnec.ncsu.edu>.

3.5.6 NNSA Graduate Fellowship Program (NGFP)

The NNSA Graduate Fellowship Program (NGFP) is a full-time, salaried fellowship program the DOE sponsors for highly motivated graduate students who are interested in a career in nuclear security.

Working directly in NNSA offices nationwide, fellows engage in a full year of:

- Hands-on experience in nuclear security and nonproliferation
- Career development, professional networking, and specialized training
- Extensive interaction and collaboration with security professionals and leading researchers

NGFP is administered by PNNL and provides participants with training and practical experience that contribute to a safer world. For more information, see <http://ngp.pnnl.gov>.

3.5.7 Nuclear Nonproliferation International Safeguards (NNIS) Graduate Fellowship Program

This program is designed to meet the NNSA's needs for appropriately trained personnel in research and development in areas pertinent to Nuclear Nonproliferation and International Safeguards (NNIS). This fellowship program, which is administered by the University of South Carolina Aiken (USCA), Sponsored Research Office through a Cooperative Agreement with the South Carolina Universities Research and Education Foundation (SCUREF), seeks to build collaboration between leading nuclear technology programs and schools studying the policy aspects of nuclear nonproliferation. The primary emphasis of this fellowship is to produce doctoral graduates who are familiar with both the technical and policy aspects of nonproliferation and international safeguards. This fellowship program is designed to provide incentives for universities to invest in and develop their nuclear scientists and engineering programs. Specifically, this program's goal is to encourage talented students to continue their education and seek a graduate education in research related to international safeguards and nuclear nonproliferation.

Fellows receive a monthly stipend of \$2,200. The program is open to full-time students who are pursuing a master's degree or a doctorate in an applicable field of study. Students must be U.S. citizens. Master's candidates can participate in the fellowship program for up to 2 years, and doctoral candidates can participate for up to 4 years. All fellows must participate in a 3-month practicum at a designated DOE/NNSA facility. For more information, see <http://www.scuref.org/nnis-01>.

3.6 Computational Science Graduate Fellowship (CSGF)

The DOE Computational Science Graduate Fellowship (CSGF) program provides outstanding benefits and opportunities to students pursuing doctoral degrees in fields of study that use high-performance computing to solve complex science and engineering problems.

The program fosters a community of bright, energetic, and committed Ph.D. students, alumni, DOE laboratory staff, and other scientists who share a common desire to impact the nation while advancing their science. Fellowship students represent diverse scientific and engineering disciplines but all use mathematical and computing techniques in their research. This program is administered by the Krell Institute. For more information, see <http://www.krellinst.org/csgf>.

3.7 Stewardship Science Graduate Fellowship (SSGF)

The Stewardship Science Graduate Fellowship (SSGF) trains scientists to meet U.S. workforce needs in advanced science and engineering by providing financial benefits and professional development to students pursuing a Ph.D. in fields of study that solve complex science and engineering problems critical to stewardship science.

The program offers a yearly stipend, paid tuition and fees, a yearly academic allowance, and the opportunity to complete a 12-week practicum at a NNSA laboratory. This program is administered by the Krell Institute. For more information, see <http://www.krellinst.org/ssgf>.

4 DOE: Office of Science

4.1 Science Undergraduate Laboratory Internships (SULI)

This program encourages undergraduate students to pursue STEM careers by providing research experiences at DOE laboratories. Selected students participate as interns appointed at one of 17 participating DOE laboratories and facilities. They perform research, under the guidance of laboratory staff scientists or engineers, on projects that support the DOE mission.

The SULI program is sponsored and managed by the Office of Science's Office of Workforce Development for Teachers and Scientists (WDTS) in collaboration with the DOE laboratories and facilities. Internship appointments are 10 weeks in duration for the summer term (May through August) or 16 weeks in duration for the fall (August through December) and spring (January through May) terms. Each DOE laboratory or facility offers different research opportunities; not all DOE laboratories or facilities offer internships during the fall and spring terms. For more information, see <http://science.energy.gov/wdts/suli>.

4.2 Community College Internships (CCI)

The Community College Internships (CCI) program seeks to encourage community college students to enter technical careers relevant to the DOE mission by providing technical training experiences at DOE laboratories. Selected students receive an internship at one of 15 participating DOE laboratories, where they work on technologies, instrumentation projects, or major research facilities that support DOE's mission, under the guidance of laboratory staff scientists or engineers.

The CCI program is sponsored and managed by the Office of Science's Office of Workforce Development for Teachers and Scientists (WDTS) in collaboration with the DOE laboratories.

Applications for the CCI program are solicited annually for three separate internship terms. Internship appointments are 10 weeks in duration for the summer (May through August), fall (August through December), and spring (January through May) terms. In the fall and spring terms, there is an option for a flexible schedule, where 400 hours can be spent onsite at a host laboratory, spread over a 16-week term. This option is available at the discretion of host laboratories. For this schedule, weekly stipends are based on a 40 hours/week payment, prorated accordingly, and housing allowances are based upon a 10-week duration appointment. Each DOE laboratory or facility offers different research opportunities; not all DOE laboratories and facilities offer internships during the fall and spring terms. For more information, see <http://science.energy.gov/wdts/ci>.

4.3 Visiting Faculty Program (VFP)

The Visiting Faculty Program (VFP), formerly called Faculty and Student Teams (FaST), seeks to increase the research competitiveness of faculty members and their students at institutions historically underrepresented in the research community in order to expand the workforce vital to the DOE mission areas. As part of the program, selected university/college faculty members

collaborate with DOE laboratory research staff on a research project of mutual interest. Faculty member participants may invite up to two students (one of whom may be a graduate student) to participate in the research project. The VFP is sponsored and managed by WDTS in collaboration with the DOE laboratories.

Applications for the VFP are solicited annually for appointments to the summer term (May through August), which is 10 weeks long. Each of the 14 participating DOE laboratories offers different research opportunities (not all laboratories participate). Interested faculty members are encouraged to contact DOE laboratory scientists in advance to discuss research projects of mutual interest. Student participation is optional. For more information, see <http://science.energy.gov/wdts/vfp>.

4.4 Office of Science Graduate Student Research (SCGSR) Program

The goal of the Office of Science Graduate Student Research (SCGSR) program is to prepare graduate students for STEM careers, which are critically important to the DOE Office of Science mission, by providing graduate thesis research opportunities at DOE laboratories. The SCGSR's program provides supplemental awards to outstanding U.S. graduate students to pursue part of their graduate thesis research at a DOE laboratory in areas that address scientific challenges central to the Office of Science mission. The research opportunity is expected to advance the graduate students' overall doctoral thesis while providing access to the expertise, resources, and capabilities available at the DOE laboratories.

The SCGSR's program is sponsored and managed by WDTS, in collaboration with the six Office of Science research programs and the DOE national laboratories. Online application and awards administration support is provided by Oak Ridge Institute of Science and Education (ORISE) under Oak Ridge Associated Universities (ORAU).

The SCGSR's program provides supplemental funds for graduate awardees to conduct part of their thesis research at a host DOE laboratory in collaboration with a DOE laboratory scientist within a defined award period. The award period for the proposed research project at DOE laboratories may range from 3 to 12 consecutive months. For more information, see <http://science.energy.gov/wdts/scgsr>.

4.5 Nuclear Chemistry Summer School (NCSS)

The Division of Nuclear Chemistry and Technology of the American Chemical Society sponsors and administers summer schools in nuclear and radiochemistry that are funded by the DOE. Selected students are awarded fellowships that include a \$4,000 stipend and six college credits at Stony Brook University (State University of New York at Stony Brook). Students who participate in the 6-week summer program at Brookhaven National Laboratory will have the opportunity to visit research sites, attend a guest lecture series, and meet and interact with prominent research scientists in nuclear and radiochemistry.

The summer school program was founded as an educational outreach and workforce development activity to promote expertise in nuclear science and to provide trained personnel to meet national needs in nuclear research, the nuclear power industry, and nuclear medicine. Twelve students are chosen for each of the two sites, Brookhaven National Laboratory and San Jose State University. Students must be U.S. citizens who are entering their sophomore or junior year of undergraduate studies at a U.S. college or university, and must have completed at least 2 years of chemistry, 1 year of physics, and 1 year of calculus. For more information, see <https://www.bnl.gov/ccss>.

5 DOE: Office of Energy Efficiency and Renewable Energy (EERE)

5.1 EERE Robotics Internship Program

The EERE Robotics Internship Program is a partnership between the public and private sectors to continue the development of the future robotics technical and engineering workforce. Various corporate partners across the United States will host hands-on, short-term internships where participants will perform research or other technical activities under the guidance of a mentor who is a technical staff scientist or engineer at the host facility.

The 2016 summer internship will be for 10 weeks at various locations across the United States. Participants will receive a minimum stipend of \$600 per week (based on academic level), housing allowance, and compensation for all inbound and outbound travel. For more information, see <http://www.orise.orau.gov/roboticsinternship>.

6 DOE: Office of Environmental Management

6.1 EM Minority Serving Institutions Partnership Program (MSIPP)

Created by the DOE's Office of Environmental Management (EM) to increase the numbers of minorities with science and engineering experience in areas important to the success of the EM mission. EM's mission is to lead the safe cleanup of the environment following five decades of nuclear energy development and research. MSIPP provides financial assistance for STEM activities at MSIs engaged in research and related STEM efforts supporting EM.

MSIPP invites students attending MSIs to pursue hands-on research relating to EM's environmental cleanup mission. Participants complete a 10-week summer internship at one of several participating DOE laboratories, utilizing their facilities and equipment under the guidance of a senior research staff member. In addition to doing research, students also participate in enrichment activities, such as laboratory and site tours, professional development seminars, and workshops.

During the appointment period, students receive either a stipend or salary commensurate with cost of living at the location of the host laboratory. Students may also be eligible for reimbursement for the cost of one round trip domestic travel to and from the host laboratory. Housing information will be provided to interns prior to arrival at the host laboratory, and will

vary from laboratory to laboratory. The program is administered by Savannah River National Laboratory. For more information, see <http://www.srs.gov/general/srnl/msipp/internships.htm>.

6.2 Oak Ridge Office of Environmental Management (OREM) Science Education and Internship Program

The Oak Ridge Office of Environmental Management (OREM) Science Education and Internship Program offer unique opportunities that introduce students or recent graduates to the agency's mission and operations. Participants in the program gain a competitive edge as they apply their education, talent, and skills in a variety of scientific research settings within the OREM complex.

Appointments are available for individuals studying fire protection and engineering, chemical engineering, civil/structural engineering, environmental engineering, industrial engineering, mechanical engineering, nuclear engineering, environmental science, occupational safety and health, physical science, and information technology. More information is available at <http://orise.ornl.gov/orem-internship/description/index.html>.

7 DOE: Office of Energy Policy and Systems Analysis

The DOE Science, Technology, and Policy (STP) Program provides an opportunity for students, postgraduates, established scientists, and faculty to participate in programs, projects, and activities for the Energy Policy and Systems Analysis (EPSA) that support the mission of the DOE. Participants will gain insight into the federal government's role in the creation and implementation of policies that will affect energy technology development; contribute to the implementation of energy policies by applying their scientific and technical expertise to the development of solutions to issues of importance to the DOE; and continue their education and involvement in areas that support the DOE mission in either a technical or a policy-related role. Participants will become part of a group of highly trained scientists and engineers with the education, background, and experience to be part of the workforce that supports the DOE's mission in the future.

8 DOE: Naval Reactors Division

8.1 Rickover Graduate Fellowship in Nuclear Engineering

This program helps the Naval Reactors Division of DOE meet its need for appropriately trained personnel to maintain and develop science and engineering technology for naval nuclear propulsion. The program assists in preparing students for roles in naval nuclear propulsion and supports the broader objective of advancing fission energy development through the research efforts of the fellows. The most applicable technical areas include reactor physics, nuclear materials science and engineering, radiation shielding technology, thermal hydraulics, and computational fluid dynamics. The principle emphasis is on students seeking Ph.D. degrees in nuclear engineering, or in closely related fields. More information is available at <https://www.scuref.org/rfp-01/>

9 DOE: Other

9.1 Pathways Programs

On December 27, 2010, President Obama signed Executive Order 13562, “Recruiting and Hiring Students and Recent Graduates,” establishing two new programs and modifying another. These programs, collectively called the Pathways Programs, are streamlined developmental programs tailored to promote employment opportunities for students and recent graduates in the federal workforce.

9.1.1 Internship Program

The new Internship Program provides students the opportunity to explore careers with Federal agencies and earn income for their work while attending school. Interns’ responsibilities will be related to their field of study. The program is administered by participating federal agencies.

The Internship Program is designed for students who are currently in high school, college, trade school, or any other qualifying educational institution, pursuing a degree or certificate. Upon successfully completing the program, qualified interns may be hired to a permanent position by the agency where they were employed. For more information, see <https://www.opm.gov/policy-data-oversight/hiring-information/students-recent-graduates#intern>.

9.1.2 Recent Graduates Program

Through the Recent Graduates Program, individuals who have graduated from a qualifying associates, bachelor’s, master’s, professional, doctorate, vocational, or technical degree or certificate from a qualifying educational institution within the previous 2 years (or 6 years for veterans) can gain experience working in the federal government. This program is designed to support the exploration of careers in the civil service, and potentially the hiring and retention of qualified employees.

This program is for people who have recently graduated from qualifying educational institutions or programs (2 years from the date the graduate completed an academic course of study, or 6 years for veterans whose military service prevented them from applying). During the program, graduates receive mentorship, career guidance, and formal interactive training. Upon successful completion of the program, successful candidates may be hired to a permanent position. For more information, see <https://www.opm.gov/policy-data-oversight/hiring-information/students-recent-graduates>.

9.1.3 Presidential Management Fellows (PMF) Program

The reinvigorated Presidential Management Fellows (PMF) Program is for people who obtained an advanced degree (e.g., a graduate or professional degree) within the preceding 2 years. For more than three decades, the PMF Program has been the federal government’s premier leadership development program for advanced degree candidates. This program is now for

individuals who have received a qualifying advanced degree within the preceding 2 years. For more information, see <https://www.pmf.gov/opportunity/index.aspx>.

9.2 DOE Scholars Program

The DOE Scholars Program offers unique opportunities that introduce students or post-graduates to the agency's mission and operations. Participants in the DOE Scholars Program gain a competitive edge as they apply their education, talent, and skills in a variety of scientific research settings within the DOE complex. Appointments are available for a variety of disciplines at participating DOE facilities nationwide, including engineering, physical sciences, environmental sciences, computer science and information technology, physics, business, policy, program management, mathematics, statistics, safety and health, accounting and finance, law, communications, and other related areas.

The Scholars Program is open to U.S. citizens who are at least 16 years of age and an undergraduate, graduate, or postgraduate of an accredited institute of higher education. For more information, see <http://orise.ornl.gov/doescholars>.

9.3 Mickey Leland Fellowship Program (DOE Office of Fossil Energy)

The MLEF program was created in 1995 with the goal of improving opportunities for under-represented students in the STEM fields. The mission of the MLEF program is to strengthen a diverse pipeline of future STEM professionals. Selected candidates train under the mentorship of program officials and scientists on focused research projects, consistent with the mission of the Office of Fossil Energy. During these 10-week energy fellowships, participants receive a stipend, and some students may be eligible for housing and travel allowances for the duration of the program. They also gain insight into how DOE is working to meet the energy challenges of the future. At the conclusion of the program, Fellows attend a "Technical Forum" where they present their research findings and tour a nearby technical site.

To apply, candidates must be at least 18 years old, have a cumulative grade point average (GPA) of at least 3.0, and be a U.S. citizen. Candidates must also be currently enrolled full-time as a degree-seeking student in a STEM program at an accredited college or university at the BS, MS, or Ph.D. level (students pursuing an Associate's degree are eligible to apply if transferring to pursue a BS for fall 2017), and must be at least a college sophomore at the time of application. For more information, see <http://orise.ornl.gov/mlef/index.html>.

9.4 Minority Educational Institution Student Partnership Program

The Minority Educational Institution Student Partnership Program offers talented undergraduate and graduate students summer internship positions with the DOE and National Laboratories. Positions involve scientific research or a focus on policy, business, and government relations. Internships include lodging, round trip airfare, and student stipends. As program participants, students receive an intensive 8–10 week assignment to "jump-start" their careers and develop their potential for future opportunities within the federal government. Students work side-by-side

with leading scientists, engineers, and other top professionals to develop professional skills and enhance leadership capabilities.

To apply, undergraduate and graduate students must have completed at least 24 undergraduate semester hours, be at least 18 years of age, be a U.S. citizen, be enrolled as a full-time student, and maintain a minimum GPA of 3.0. High-school students must have completed their sophomore year of high school, be enrolled as a full-time high school student, maintain a minimum GPA of 3.0, be at least 16 years of age, be a U.S. citizen, and live in the Washington, D.C., metropolitan area. For more information, see <https://doemeispp.org/index.cfm/home>.

9.5 Hampton University Graduate Studies (HUGS) Summer Program

The Hampton University Graduate Studies (HUGS) summer program at Thomas Jefferson National Accelerator facility (Jefferson Lab) is an internationally renowned summer school in nuclear physics designed to train the next generation of researchers. Over the past 30 years, HUGS at Jefferson Lab (formerly HUGS at CEBAF) has provided hundreds of students with a strong background in contemporary research topics in nuclear physics, and many former students now hold prestigious faculty or staff positions in academia and industry.

HUGS is designed for second- and third-year experimental or theoretical nuclear physics graduate students who have finished their coursework. Students who are well into a research project are encouraged to apply as well. Students are selected on a competitive basis from each year's pool of applicants. The HUGS program provides support to a large portion of the accepted participants by covering their local expenses, and in exceptional cases their domestic travel expenses. The students will be housed onsite at Jefferson Lab, where they will have many opportunities to interact with the lecturers, as well as Jefferson Lab staff, graduate students, and visitors. For more information, see <https://www.jlab.org/hugs>.

9.6 Exotic Beam Summer School

The aim of the annual Exotic Beam Summer School is to introduce students and young researchers to the various facets of the science surrounding exotic nuclei, such as nuclear structure, nuclear astrophysics, fundamental interactions, and the application of nuclear science and technology. Through these summer schools, the research community will be able to more fully exploit the opportunities created by next-generation exotic beam facilities, such as the Facility for Rare Isotope Beams (FRIB).

During the summer school, students will receive lectures from leading researchers in the field of nuclear physics with exotic beams. Lectures will focus on theoretical, experimental, technical and applied topics. Students will also participate in hands-on activities, learning about the techniques and instrumentation needed to carry out experiments with exotic beams. The program is open to U.S. citizens, and to foreign students with appropriate visas. For more information, see <https://people.nsl.msui.edu/~iwasaki/ebss2016.html>.

10 Programs Outside of DOE

10.1 U.S. Department of Homeland Security (DHS)

The programs below are administered by the South Carolina Universities Research and Education Foundation (SCURF).

10.1.1 Nuclear Forensics Graduate Fellowship Program

The Nuclear Forensics Graduate Fellowship Program (NFGFP), established in 2008 by the U.S. Department of Homeland Security (DHS), enables fellows to gain unique, hands-on experience through laboratory practica and close interaction with technical and policy experts throughout the nuclear forensics community. To qualify, graduate students must be enrolled full time at a DHS-approved university and perform research within the objectives of the fellowship program, and fellows are to continue working toward achieving a doctoral degree during the summer months. The initial fellowship appointment is for a 12-month period, renewable for up to a total of 60 months. Each fellow is required to complete two 10-week practica at a DOE national laboratory, Department of Defense (DoD) laboratory, or federal agency conducting research related to technical nuclear forensics.

Applicants must be U.S. citizens. In addition to tuition, fellows receive a monthly stipend of \$2,400 throughout the duration of their appointment. Fellows will also receive a dislocation allowance of \$550 (prorated) while on a practicum assignment. The deadline for applying to this program is February 2. For more information, see <http://www.scuref.org/nfgf-01>.

10.1.2 Nuclear Forensics Undergraduate Scholarship Program

The Nuclear Forensics Undergraduate Scholarship Program (NFUSP), established in 2011 by the DHS, supports hands-on experience through unique summer research opportunities at the DOE national laboratories. The recipient receives a \$10,000 stipend to participate in a 9- to-12-week summer appointment at a national laboratory, performing study and research within the objectives of the DHS/Domestic Nuclear Detection Office (DNDO) nuclear forensics mission.

Eligible students will be pursuing undergraduate degrees in nuclear and geochemical sciences, including but not limited to physics, chemistry, engineering, and material science. Applicants must be US citizens. For more information, see <http://www.scuref.org/nfus-01/>.

10.1.3 Nuclear Forensics Junior Faculty Award Program

The Nuclear Forensics Junior Faculty Award Program (NFJFAP) was established in 2010 by the DHS to provide universities with an incentive to promote, recruit, and retain qualified personnel to teach within nuclear forensics-related degree programs, to contribute to associated research and development projects, and to encourage talented individuals who have recently received a Ph.D. in a discipline related to nuclear forensics to consider and/or advance their careers at an academic institution. Awards are renewable for a two-year period and are set at a maximum of

\$75,000 a year; an additional \$25,000 may be added annually to this amount if the university can demonstrate in its application that it will match the additional \$25,000.

Only accredited colleges and universities in the United States and Puerto Rico are eligible to apply. The recipient of the NFJFAP award must be in a tenure-track position and must meet the definition of a “junior faculty member” (less than 6 years of experience as a university faculty member at the time of application). All personnel who will be directly supported by this award must be U.S. citizens. For more information, see <http://www.scuref.org/njfa-01>.

10.1.4 Nuclear Forensics Education Award Program

The DHS established the Nuclear Forensics Education Award Program (NFEAP) in 2009 to encourage universities to develop interdisciplinary programs, in partnership with national laboratories, to support and advance the science and technology associated with nuclear forensics. The program awards \$100,000 cost-shared grants to colleges and universities to support educational programs in analytical, geological, and radiochemistry, nuclear physics and engineering, and materials science. Universities may use the NFEAP award to develop nuclear forensics curriculum and research programs that complement ongoing research at the national laboratories, construct or improve on-campus laboratory facilities, enhance faculty member qualifications or hire new faculty, sponsor students, and make other improvements that align with US government nuclear forensics mission priorities.

Only accredited colleges and universities in the United States and Puerto Rico are eligible to apply. Applicants should present a general scope of the intended educational program as well as provisions for cost-sharing of at least 50 percent of the annual award. All key personnel who will be directly supported by this award must be US citizens. For more information, see <http://www.scuref.org/nfea-10>.

10.1.5 Nuclear Forensics Minority Serving Institution Collaboration Award Program

The DHS established the Nuclear Forensics Minority Serving Institution Collaboration Award Program (NF/MSI) to strengthen the engineering and science programs at MSIs throughout the United States. The program has two objectives: (1) to support the enhancement of undergraduate and/or graduate chemistry, math, physics, and engineering programs at MSIs (curriculum development, instruction, student support, and related activities); and (2) to establish formal linkages among the universities participating in the Nuclear Forensics Graduate Fellowship Program, the nation's MSIs, and DOE National Laboratories engaged in nuclear forensics research. The awards—up to \$75,000 per year for a 3-year period—can be used to support faculty salaries, student scholarships and fellowships, travel, laboratory and equipment improvements, coursework, and any suggested academic program enhancements in activities among the universities and with the listed national laboratories.

Proposals must support a graduate-level program or a BS-level program that prepares students for a graduate program in a nuclear forensics related discipline, and should incorporate student internship and cooperative research opportunities at the national laboratories. Proposals must

document cost-sharing of at least 50% of the annual award, which may include in-kind expenditures. Any faculty member or student receiving funds from this award must be a U.S. citizen. For more information, see <http://www.scuref.org/nf-msi-01>.

10.1.6 Nuclear Forensics Undergraduate Summer School (NFUSS)

The Nuclear Forensics Undergraduate Summer School (NFUSS) is a 6-week course designed to provide undergraduate students with comprehensive, experimental, hands-on training in topics essential to nuclear forensics. Through laboratory experiments and complementary lectures, students are introduced to the practice and technical aspects of nuclear forensic science. Students also gain a thorough understanding of the underlying science supporting this field of work.

Each student will receive financial compensation to cover tuition, fees, housing, and meals, as well as a \$5,000 stipend. A portion of the stipend will be used to cover travel costs to and from the NFUSS as well as travel costs for a field trip to a national laboratory. Applicants must be U.S. citizens who are currently engaged in undergraduate studies in the physical sciences. For more information, see <https://www.dhs.gov/homeland-security-careers/nuclear-forensics-undergraduate-summer-school>.

10.1.7 HS-STEM Summer Internship Program

The DHS Science and Technology Directorate Office of University Programs sponsors a 10-week summer internship program for students majoring in homeland security related science, technology, engineering and mathematics (HS-STEM) disciplines. The program provides students with quality research experiences at federal research facilities located across the country and allows students the opportunity to establish connections with DHS professionals. It is open to undergraduate and graduate students in a broad spectrum of HS-STEM Disciplines and DHS mission-relevant Research Areas. The ultimate goals of the program are to engage a diverse, educated and skilled pool of scientists and engineers in HS-STEM areas and to promote long-term relationships between students, researchers, DHS and research facilities to enhance the HS-STEM workforce.

The Oak Ridge Institute for Science and Education (ORISE) administers this program through an interagency agreement between the U.S. Department of Energy (DOE) and the U.S. Department of Homeland Security (DHS). ORISE is managed by ORAU for DOE. ORISE will be responsible for the application and review process, notification and implementation of the program. For more information, see <http://www.ornl.gov/dhseducation/internships/index.html>.

10.2 U.S. Nuclear Regulatory Commission (NRC)

10.2.1 Minority-Serving Institutions Program

The goal of the NRC's Minority-Serving Institutions Program is to help minority-serving institutions increase the number of students and faculty from groups underrepresented in fields related to the nuclear industry. The Minority-Serving Institutions (MSI) program provides grants for programs and activities conducted by MSIs, educational institutions and other organizations

to help them recruit and retain students, ensure availability of instructional and training experiences, provide opportunities for career exposure and on-the-job training (OJT), create research and development opportunities, develop leadership skills, offer mentoring opportunities and make internships available. For more information, see <http://www.nrc.gov/about-nrc/grants.html#negp>.

10.2.2 Nuclear Education Grant Program—Curricula Development

As part of the Energy Policy Act of 2005, the U.S. Nuclear Regulatory Commission (NRC) under the Nuclear Education Grant Program funds up to \$4.7 million in grants to institutions of higher education to support courses, studies, training, curricula, and disciplines pertaining to nuclear safety, security, or environmental protection, and any other fields that the Commission determines to be critical to the regulatory mission of the NRC. For more information, see <http://www.nrc.gov/about-nrc/grants.html#negp>.

10.2.3 Nuclear Education Program

The Nuclear Education Program provides funding for undergraduate scholarships, graduate fellowships, trade school scholarships, and faculty development grants. NRC only awards grants directly to accredited U.S. institutions of higher education and does not award individual scholarships or fellowships. All scholarship, fellowship, faculty development, and trade schools and community colleges students and supported faculty must be United States citizens or noncitizen nationals of the United States, or have been lawfully admitted to the United States for permanent residence.

10.2.3.1 Scholarship and Fellowship

The **Scholarship** program provides funding to 4-year colleges and universities to award scholarships to individuals pursuing nuclear science, engineering, and other disciplines that may be beneficial in developing and maintaining a nuclear workforce. Students must be enrolled in an undergraduate degree program offered by an accredited institution of higher education in the United States. The Scholarship program is a 2-year program. Scholarship funds may be requested for up to \$200,000 total costs for the project period. A scholarship student may not receive more than \$10,000 per year or \$20,000 over a 2-year period.

The **Fellowship** program provides funding to colleges and universities to award fellowships to individuals pursuing nuclear science, engineering and other disciplines which may be beneficial in developing and maintaining a nuclear workforce. Students must be enrolled in a graduate degree program offered by an accredited institution of higher education in the United States. The Fellowship program is a 4-year program. Fellowship funds may be requested for up to \$400,000 total costs for the project period. A postgraduate student may not receive funding in excess of \$50,000 per year over a 4-year period.

NRC requires students receiving funds under the NRC Scholarship and Fellowship grant programs to serve 6 months in nuclear-related employment for each full or partial year of academic support. For more information, see <http://www.nrc.gov/about-nrc/grants.html#negp>.

10.2.3.2 Faculty Development

The Faculty Development program provides grants to attract and retain highly qualified individuals in academic teaching careers. The grants specifically target probationary, tenure-track faculty during the first 6 years of their career and new faculty hires in nuclear, mechanical, civil, environmental, electrical, fire protection, and materials sciences engineering as well as health physics. Grants may include support for developing applications for new research or continuing research projects in their areas of expertise. The program provides support to enable newer faculty to enhance their careers as professors and researchers in the university department where employed. Note: Trade Schools and Community Colleges are not eligible for Faculty Development grants.

The Faculty Development program is a 3-year program. The base award is up to \$300,000. However, the NRC may increase the award, up to \$450,000, to the extent that the increase is matched dollar for dollar by the recipient. For example, an award in the amount of \$400,000 would require a match of \$100,000 from the recipient. For more information, see <http://www.nrc.gov/about-nrc/grants.html#negp>.

10.2.3.3 Trade School and Community College Scholarship

The Trade School and Community College program supports scholarships for nuclear science, engineering, technology, and related disciplines to develop a workforce capable of supporting the design, construction, operation, and regulation of nuclear facilities and the safe handling of nuclear materials. The Trade School and Community College program is a 2-year program. Trade School and Community College funds may be requested for up to \$150,000 total costs for the project period. A scholarship student may not receive more than \$10,000 over a 2-year period. NRC requires students receiving funds under the Trade School and Community College Scholarship grant program to serve 6 months in nuclear-related employment for each full or partial year of academic support.

Trade Schools and Community Colleges may only apply to the Trade School and Community College Scholarship Grant program. Trade Schools and Community Colleges are not eligible for Faculty Development grants. For more information, see <http://www.nrc.gov/about-nrc/grants.html#negp>.

10.3 U.S. Department of Defense (DoD)

10.3.1 Science, Mathematics, & Research for Transformation (SMART) Scholarship for Service Program

The DoD established the Science, Mathematics, & Research for Transformation (SMART) Scholarship for Service Program to support undergraduate and graduate students pursuing degrees in STEM disciplines. The program aims to increase the number of civilian scientists and engineers working at DoD laboratories. Scholarships cover tuition and education-related fees and pay a stipend ranging from \$25,000 to \$38,000. Other benefits include opportunities for summer

research internships, a health insurance allowance, mentoring, and employment placement after graduation.

Applicants must be a citizen of the United States, Australia, Canada, New Zealand, or the United Kingdom at the time of application and be at least 18 years old as of August 1, 2017.

Undergraduate applicants must be enrolled in a regionally accredited U.S. college or university and have a high-school diploma/GED certificate and a minimum cumulative GPA of 3.0 at the time of the award. Graduate applicants can be either currently enrolled in or awaiting admission to a regionally accredited U.S. college or university. For more information, see <http://smart.asee.org>.

10.3.2 Naval Research Enterprise Intern Program

The Naval Research Enterprise Internship Program (NREIP) encourages undergraduate and graduate students to pursue science and engineering careers by offering 10-week summer internships at more than 30 laboratories operated by the Department of the Navy (DON). Under the program, interns participate in research and enrich their education through mentoring by lab personnel. Interns receive a stipend ranging from \$5,400 to \$10,800. Participation in NREIP can lead to employment within the DON upon graduation.

Applicants must be U.S. citizens enrolled in an undergraduate or graduate-school program at an institution accredited by the U.S. Department of Education. They must be majoring in a discipline relevant to the research interests of the laboratories and must be on track to earn at least 31 academic credit hours by the end of spring 2017. Candidates are selected for the program based on academic achievement, personal statements, recommendation, and career and research interests. For more information, see <http://nreip.asee.org>.

10.3.3 Naval Research Lab Postdoctoral Fellowship Program

The Naval Research Lab Postdoctoral Fellowship Program is sponsored by the DON's Naval Research Laboratory (NRL), its corporate research laboratory. Established in 1923, the NRL conducts a broadly based multidisciplinary program of scientific research in advanced technological development, techniques, systems, and related operational procedures. NRL is one of the largest scientific institutions within the U.S. government. Its fellowship program is designed to increase the involvement of creative and highly trained scientists and engineers from academia and industry to scientific and technical areas of interest and relevance to the Navy.

Fellowships are open to citizens of the United States and to legal permanent residents. Candidates must have a doctorate in a research discipline and complete a 5- to 10-page proposal addressing a technical problem of mutual interest to the applicant and to the research facility. Participants will work in a unique Navy laboratory environment with senior laboratory scientists and engineers. The program awards 40 to 45 new postdoctoral appointments per year. Awards are for one year and may be renewable for a second and third year. For more information, see <http://nrl.asee.org>.

10.3.4 National Space Club Scholars Project

The National Aeronautics and Space Administration (NASA) sponsors the National Space Club Scholars Project, a summer intern experience for up to 30 high-school students to work with space scientists and engineers. Internships take place for 6 weeks from June until August. The project lets students experience how research and development organizations operate on a day-to-day basis, consistent with NASA's mission to inspire the next generation of explorers. Participants work with a technical professional in a field related to their stated interests and expertise, such as earth and space science, computer science, and engineering. Participants receive a stipend of \$1,000.

Internships are open to U.S. citizens who will be at least 16 years old by the start of the session and who will complete their sophomore year in high school by the end of the current academic year. They must be permanent residents within commuting distance of NASA's Goddard Space Flight Center in Greenbelt, Maryland; or the Wallops Flight Facility in Wallops Island, Virginia. For complete details and an application form, visit https://www.nasa.gov/offices/education/programs/descriptions/National_Space_Club_Scholars.html.

10.3.5 Naval Nuclear Propulsion Fellowship

The DOE's Office of Naval Reactors sponsors the Naval Nuclear Propulsion Fellowship. This program is designed to encourage talented graduate students majoring in nuclear, electrical, mechanical, or materials engineering to pursue study and research in such areas as reactor physics, materials science, two-phase flow, and reactor shielding. Fellows receive full support for tuition and education-related fees, a \$2,100 monthly stipend, and a summer internship at the Knolls Atomic Power Laboratory in Niskayuna, New York, or Bettis Atomic Power Laboratory in Pittsburgh, Pennsylvania.

Students with an undergraduate degree in the physical sciences or engineering are eligible to apply for the Naval Nuclear Propulsion Fellowship. The program is open to all U.S. citizens who will be entering graduate school or who are currently enrolled in a qualified course of study and are interested in pursuing a research topic applicable to the Naval Nuclear Propulsion Program. For more information, see <http://www.nei.org>.

10.3.6 Air Force Research Laboratory (AFRL) Scholars Program

The Air Force Research Laboratory (AFRL) Scholars Program offers paid summer internship opportunities to high-school, undergraduate, and graduate-school students pursuing STEM degrees. Some locations also offer internships to university students pursuing education-related degrees and to K–12 professional educators. Internships are 8 or more weeks in duration. Interns receive a weekly stipend whose amount varies based on level of education.

Internships are open to U.S. citizens age 16 and older with a GPA of at least 3.0. Candidates must be enrolled at or accepted by a degree-granting institution and carry at least a half-time academic course load for the semester immediately preceding the internship period and for the semester immediately following the internship. Participants work with and are mentored by

AFRL scientists and engineers on cutting-edge research and technology. Graduate interns collaborate with AFRL on current research and can incorporate the research into their graduate work.

10.3.7 College Qualified Leaders (CQL)

College Qualified Leaders (CQL), sponsored by the Army Educational Outreach Program (AEOP) of the U.S. Army, offers firsthand research experience in DoD laboratories. Undergraduates are matched with scientists in mentoring relationships, providing real-world STEM experience and fostering the desire to pursue a STEM career. Selected participants receive a stipend based on education and experience and may participate in CQL year-round.

CQL internships are typically work-study arrangements lasting 6 months or longer, although some locations also offer 8- to 12-week summer internships. Participation is open to U.S. citizens and U.S. permanent legal residents. Applications are accepted year-round; there is no application deadline. Internships take place at Army laboratories in locations throughout the United States. For more information and to apply, visit <http://www.usaeop.com/programs/apprenticeships/cql>.

10.3.8 Undergraduate Research Apprenticeship Program (URAP)

The Undergraduate Research Apprenticeship Program, sponsored by the Army Educational Outreach Program of the U.S. Army, provides undergraduate students with an authentic science and engineering research experience working with university researchers. Under this program, students are mentored by scientists or engineers and develop skills that help prepare them for a career in science or engineering. Programs run from June through August and are conducted at laboratories on numerous university campuses throughout the United States.

Participants receive an educational stipend equivalent to \$10 per hour, and are allowed to work up to 300 hours total. Under the program, students contribute to the Army's research in the laboratory while learning research methods, using advanced research equipment, and becoming a part of an active research group. For more information, see <http://www.usaeop.com/programs/apprenticeships/urap>.

10.3.9 National Defense Science and Engineering Graduate (NDSEG) Fellowships

The National Defense Science and Engineering Graduate (NDSEG) Fellowships are sponsored by the Air Force Office of Scientific Research, the Army Research Office, and the Office of Naval Research, under the direction of the Director of Defense Research and Engineering. Awarded annually, the fellowships support students pursuing a doctorate in one of 15 science or engineering disciplines. Fellowships last for three years and pay full tuition and fees, a monthly stipend, and up to \$1,000 a year in medical insurance. Fellows may use their award at any university that offers a doctoral program in one of the 15 supported disciplines.

The program is open only to U.S. citizens or native citizens of a U.S. possession. Applicants must be in the final year of their undergraduate studies or at the beginning of their doctoral studies. For more information or to apply, visit <http://ndseg.asee.org>.

10.3.10 Naval Research Enterprise Internship Program (NREIP)

The Naval Research Enterprise Internship Program (NREIP) offers an opportunity for undergraduate and graduate students to participate in research at one of approximately 36 DON laboratories. Designed to encourage the pursuit of science and engineering careers, the 10-week summer program also affords the chance to work under the guidance of a research mentor. Participation in the program may also lead to employment upon graduation. About 590 students received NREIP internships last year.

Candidates are selected based on academic achievement, personal statements, recommendations, and career and research interests. The internship includes a stipend ranging from \$5,400 to \$10,800 and based on the student's years of participation in the program. Applicants must be U.S. citizens majoring in a discipline relevant to a laboratory's research interests. Candidates must be on track to attain at least 31 credit hours before the internship program commences. Some laboratories may accept permanent U.S. residents or individuals with dual citizenship. For more information, see <http://nreip.asee.org>.

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