

**U.S. DEPARTMENT OF ENERGY
NATIONAL NUCLEAR SECURITY ADMINISTRATION
OFFICE OF INTERNATIONAL NUCLEAR SAFEGUARDS**

**Nuclear Nonproliferation International Safeguards
Graduate Fellowship Program**



Deadline for Applications for 2021-2022
February 15, 2021

Awards Announced April 2021

Administered by:
**The University of South Carolina Aiken through a Cooperative Agreement with
the South Carolina Universities Research and Education Foundation**

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INTRODUCTION TO THE NUCLEAR NONPROLIFERATION INTERNATIONAL SAFEGUARDS GRADUATE FELLOWSHIP PROGRAM

The Department of Energy (DOE) National Nuclear Security Administration's (NNSA) Office of International Nuclear Safeguards (OINS) is a comprehensive, multi-million-dollar program dedicated to developing the policies, concepts, technologies, expertise, infrastructure, and human capital necessary to sustain and enhance international nuclear safeguards. DOE/NNSA is the principal federal sponsor of the Nuclear Nonproliferation International Safeguards (NNIS) Graduate Fellowship Program.

Increasing costs for graduate education and demand for employees with bachelor's degrees in nuclear-related science and engineering has reduced the number of qualified students seeking advanced degrees in those fields. Simultaneously, demand for Ph.Ds. in the radiopharmaceutical, nuclear power, defense, and waste management industries means that fewer scientists and engineers with advanced degrees are available to pursue careers in nuclear nonproliferation and safeguards. This, coupled with the retirement of a broad range of nuclear scientists and engineers who were educated in the 1970s, has exacerbated the issue.

The NNIS Graduate Fellowship Program provides financial support for exceptional students pursuing technical doctoral research relevant to the field of international safeguards. Participating universities foster partnerships between science/engineering programs and programs focused on nuclear nonproliferation and safeguards policy. Armed with both deep technical expertise and policy understanding, NNIS Fellows are primed to take on the exciting and challenging work of international nuclear safeguards.

EXPLANATION OF INTERNATIONAL NUCLEAR SAFEGUARDS

International nuclear safeguards consist of technical measures that the International Atomic Energy Agency (IAEA) uses to verify that countries are in compliance with their legally binding commitments not to pursue nuclear weapons. They comprise a wide variety of tools, methods, and technologies that provide assurances to the international community that a country's nuclear activities are exclusively peaceful. Common safeguards measures include destructive and non-destructive assay of nuclear material, review and analysis of nuclear material accounting data and other facility operator records, facility design information verification, containment (e.g., use of tamper-indicating tags and seals), surveillance, environmental sampling, satellite imagery review and analysis, and open source searches for safeguards-relevant information, amongst others.

RESEARCH OBJECTIVES

The objective of the NNIS Graduate Fellowship Program is to identify and educate highly trained scientists and engineers to take on the challenges and opportunities of international nuclear safeguards. NNIS Fellows must demonstrate the safeguards-impact of their funded research, and an intent to pursue a career that will positively contribute to the international safeguards regime. To that end, applications shall describe:

- The potential safeguards impact of their research. For example, will research results enhance the IAEA's technical capabilities to detect the diversion of nuclear material, facility misuse, or undeclared nuclear activities in a timely manner? Will the research results lead to greater efficiency in the implementation of safeguards, e.g., by allowing the IAEA to spend less time on in-field verification? Why does this matter? The best applications will link research proposals to priorities identified in the IAEA Long-Term Safeguards R&D plan, or other indications of IAEA and/or United States Government (USG) safeguards interest/concern.
- The specific existing or future technical safeguards challenge that the research addresses. For example, if research intends to improve containment/surveillance (C/S) capabilities, how specifically will that be achieved? By designing a more sensitive monitor? Improving telemetry? Developing a new material for use in tamper-evident seals?
- The dearth of viable fixes to the technical challenges they propose to address.

PROGRAM BENEFITS

The maximum value of any individual award, including stipend and tuition and associated fees is \$65,000/yr.

STIPEND

Fellows receive a monthly stipend of no more than \$2,500. Fellows will also receive an additional Dislocation Allowance of \$600 per month (prorated) while on a practicum assignment.

The DOE/NNSA attempts to provide adequate funding to its Fellowship participants to meet the cost of graduate school, but other awards, prizes, and similar payments (including veteran's benefits) that do not require a product or service may be accepted. USCA must be informed in advance if a Fellow plans to accept a research assistantship or other employment. Payment received for such employment may result in an equivalent deduction from the Fellow's stipend. USCA reserves the right to withdraw the Fellowship if the Fellow receives compensation without notifying USCA as to the nature and extent of any payment.

TUITION AND FEES

The USCA Special Programs, Charleston Office pays tuition and fees (up to \$35,000 per year) directly to the participating university upon receipt of invoice. Optional, refundable, and penalty fees (such as late registration and duplication fees) are not payable by USCA. Health insurance fees will be paid by only if they are required for all enrolled graduate students at the Fellow's university. All tuition and fee charges must be certified consistent with those made to regular graduate students and necessary for enrollment into the graduate program. In no case will the annual cost of *tuition, fees, and stipend* exceed \$65,000 per Fellow.

In August of each year, the USCA Special Programs, Charleston Office notifies the bursar's office at each university regarding invoicing procedures for Fellowship students. Students will receive a copy of this correspondence and should retain this copy for use in discussing any billing errors with their university's bursar office.

TRAVEL

Travel expenses must be approved by the USCA Special Programs, Charleston Office and the sponsor prior to actual travel and must be U.S. General Services Administration (GSA)-compliant. In general, travel reimbursements are considered for seminars, conferences, and workshops associated with this program or any meeting for which the sponsor requests attendance. Full or partial reimbursements may be authorized depending on the availability of funds. Fellows should submit a Travel Request Form to the USCA Special Programs, Charleston Office at least 30 days before the anticipated travel dates.

Travel expenses will be reimbursed for the Fellow to travel to/from the practicum site providing that the distance is more than 50 miles one-way from the Fellow's university. It is the Fellow's responsibility to find the least expensive mode of travel. No expenses are paid for food or lodging at the practicum site. All travel must be authorized in advance by the USCA Special Programs, Charleston Office and the sponsor and must be GSA compliant.

Full or partial travel reimbursement is also considered on occasions requiring the Fellow to consult with the university graduate committee and/or deliver a presentation of thesis/dissertation research.

THESIS RESEARCH AT PARTICIPATING DOE/NNSA DESIGNATED CENTERS

A Fellow may request to spend all or part of the time working on thesis/dissertation research at one of the participating DOE/NNSA-approved facilities listed at the end of this booklet. Off-campus research requires that the Fellow complete a request form and have it endorsed by the faculty advisor, facility coordinator, and facility advisor. Facility advisors must agree to mentor and supervise the Fellow and coordinate activities with facility personnel throughout the research assignment. Facility advisors should also serve on the Fellow's graduate thesis research committee, if approved by the university.

FELLOWSHIP OBLIGATIONS

PROGRAMS AT PARTICIPATING UNIVERSITIES

Fellowship awardees are required to attend a university participating in the NNIS Fellowship Graduate Program. To become a participating university, interested faculty members must submit an application, which can be found at www.scuref.org. Universities selected to participate in the program will have demonstrated a commitment to advancing nuclear nonproliferation international safeguards education and creating a sustainable academic program. The list of participating universities and university Fellowship coordinators is provided at the end of this booklet. Interested Fellowship applicants may contact any Fellowship coordinator directly for detailed information related to the university's nuclear nonproliferation international safeguards program.

ENROLLMENT

Fellowship appointment is contingent upon acceptance into an approved program at a participating university. The initial Fellowship appointment is for a 12-month period, typically renewable for up to 48 months for Doctoral candidates, and 24 months for Master's candidates. Prorated for previously completed graduate work, appointments may be shorter than the maximum allowable number of months. Extensions beyond the initial appointment will be considered on a case by case basis.

Throughout their Fellowship period, Fellows must be enrolled full-time at an approved university and working towards the degree described in their application. During the summer months, Fellows conduct relevant research, enroll in summer classes, complete a practicum assignment, or perform a combination of any of these activities.

TERMS OF APPOINTMENT

Each Fellow must agree to the terms and conditions of appointment delineated in their appointment letter and Terms of Appointment document. This includes agreement to pursue the course of study and research described in their application, participate in at least one summer practicum, and entertain DOE/DOE contractor employment opportunities. Fellows must inform the USCA Special Programs, Charleston Office of address changes and must complete any evaluation/assessment questionnaires sent by USCA for program information and/or evaluation during the Fellowship and for at least five years after the end of their Fellowship.

ANNUAL RENEWAL

Each Fellowship appointment is renewed annually through a renewal application process. Each renewal is based upon the Fellow's maintaining excellent performance and professionalism including, but not limited to, passing examinations in pursuit of a masters or doctoral degree required by their academic department, progressing research toward completion of a degree, and otherwise maintaining eligibility for a degree (for example, maintaining necessary grade point average and good standing with their academic department and university). Renewal forms along with supporting references and current official transcripts must be submitted to the USCA Special Programs, Charleston Office by February 15th of each year. All awards and renewals are subject to the continuing availability of funding.

PRACTICUM

Fellows are required to participate in at least one practicum for *at least* three months at a designated DOE/NNSA facility to gain applied experience. Fellows typically complete a practicum during the summer and select a practicum opportunity that can be used to support their thesis research. Fellows are responsible for securing their own practicum appointments by contacting the appropriate laboratory coordinator and completing a practicum request form. In addition to the opportunities at US national laboratories, there are also international practicum opportunities at EU laboratories listed on the last page of this booklet. Fellows interested in an international practicum should contact the USCA Special Programs Charleston Office to discuss practicum opportunities abroad. Fellows may be required to apply for security clearance upon acceptance of a practicum appointment at a DOE/NNSA facility or an affiliated federal agency.

PUBLICATION ACKNOWLEDGMENT

DOE/NNSA and USCA encourage Fellows to publish reports and articles in scientific and engineering journals and present posters or papers at conferences. Prior to submission, *all* materials must undergo appropriate security and export control reviews required by the university and/or laboratory at which the research was conducted. The Fellow must submit any abstracts, articles, reports, posters, papers, theses, etc. to the USCA Special Programs, Charleston Office *at least three weeks* before submission for publication or presentation. These works should show the joint affiliation of the Fellow with the university and, if appropriate, with the laboratory at which the research was conducted, and acknowledge Fellowship support with the following:

“This research was performed under appointment to the Nuclear Nonproliferation International Safeguards Fellowship Program sponsored by the Department of Energy, National Nuclear Security Administration’s Office of International Nuclear Safeguards (NA-241).”

APPLICATION PROCEDURES

ELIGIBILITY

This Fellowship is open to all U.S. Citizens about to enroll in or currently enrolled in a qualified course of study at a participating university with at least one full year of graduate work remaining at the beginning of September 2021. Candidates with dual citizenship must notify the University of South Carolina Aiken (USCA), Special Programs, Charleston Office. It is the policy of DOE and its program administrators, the South Carolina Universities Research and Education Foundation (SCUREF) and USCA, to recruit and nominate participants without regard to race, age, gender, sexual orientation, religion, color, national origin, physical or mental disability, or special disabled or veteran status.

APPLICATION DEADLINE

The current competition cycle for this program is from November 2020 – February 2021. *The USCA Special Programs, Charleston Office must receive all parts of the application by February 15, 2021.* GRE scores are *required* for a complete application. GRE scores earned before 2011 will not be accepted. USCA will not process late and/or incomplete applications. Please include the Fellowship program name on all correspondence.

A complete application includes the following components:

- Application Form
- Three (3) References
- Official Transcripts (undergraduate and graduate transcripts must be sent directly from the university registrar)
- GRE scores (GRE code 5949 – scores must be sent directly from ETS)

Forms are located at www.scuref.org. Applicants should submit all materials electronically through the SCUREF website. If you are unable to submit the application electronically, please contact Nicole Huchet at (843) 793-1079, nicoleh@usca.edu.

Transcripts should be sent directly from the university registrar by fax, mail, or email to:

USCA, Special Programs, Charleston Office
PO Box 1026
Johns Island, South Carolina 29457
843-614-6421 fax
nicoleh@usca.edu

UPS/Fed Ex/DHL address:
USCA, Special Programs, Charleston Office
2860 Maybank Highway
#1026 (You must use the pound/hashtag sign)
Johns Island, SC 29455

EVALUATION OF APPLICATIONS

Applicants are responsible to ensure that his or her application is complete. After the application deadline, the USCA Special Programs, Charleston Office will distribute the NNIS applications to an independent panel for review. The review panel is composed of university, DOE/NNSA, and national laboratory personnel directly responsible for instruction and/or research in the international safeguards and nuclear nonproliferation fields. The DOE/NNSA program sponsor reviews the applications and the panel's recommendations and approves the final selection.

Applications are evaluated based on academic performance, relevant coursework, GRE scores, demonstrated commitment to the field of international nuclear safeguards, research relevance, and references. The number of Fellowships awarded annually is contingent on the number of Fellows graduating from the program and the availability of funds.

After the DOE/NNSA approves the award recipients, USCA Special Programs, Charleston Office notifies applicants of their award status. Notification usually occurs in mid-April. USCA Special Programs, Charleston Office is responsible for the daily administration of the NNIS on behalf of the program sponsors, and assists Fellows and universities with questions regarding stipends, payment of tuition and fees, practicum assignments, travel, and related issues.

**NUCLEAR NONPROLIFERATION INTERNATIONAL SAFEGUARDS FELLOWSHIP PROGRAM
PARTICIPATING UNIVERSITIES**

CLEMSON UNIVERSITY Timothy DeVol, Ph.D. Environmental Engineering and Earth Sciences 342 Computer Court Anderson, SC 29625-6510 864-656-1014 devol@clemson.edu	UNIVERSITY OF CALIFORNIA, BERKELEY Rachel Slaybaugh, Ph.D. Department of Nuclear Engineering 4173 Etcheverry Hall Berkeley, CA 94720-1731 570-850-3385 slaybaugh@berkeley.edu
COLORADO SCHOOL OF MINES Jeffrey King, Ph.D. Nuclear Science and Engineering Program 1500 Illinois Street, Hill Hall 201 Golden, CO 80401 303-384-2133 kingjc@mines.edu	UNIVERSITY OF FLORIDA James Baciak, Ph.D. Department of Materials Science and Engineering 549 Gale Lemerand Drive Gainesville, FL 32611-6400 352-273-2131 jebaciak@mse.ufl.edu
GEORGIA INSTITUTE OF TECHNOLOGY Steven Biegalski, Ph.D. The George W. Woodruff School of Mechanical Engineering, Nuclear and Radiological Engineering, and Medical Sciences Program 770 State Street, Boggs Building, Suite 3-44 Atlanta, GA 30332-0745 404-385-5973 steven.biegalski@me.gatech.edu	UNIVERSITY OF ILLINOIS, CHAMPAIGN Angela Di Fulvio, Ph.D. Department of Nuclear, Plasma, and Radiological Engineering 116 Talbot Laboratory 104 S. Wright St. Urbana, IL 61801 217-300-3739 difulvio@illinois.edu
MASSACHUSETTS INSTITUTE OF TECHNOLOGY Areg Danagoulian, Ph.D. Department of Nuclear Science and Engineering 77 Massachusetts Avenue Building 24-220 Cambridge, MA 02319 617-324-6329 aregjan@mit.edu	UNIVERSITY OF MICHIGAN Igor Jovanovic, Ph.D. Department of Nuclear Eng. and Radiological Sciences 2355 Bonisteel Boulevard 1902 Cooley Building Ann Arbor, MI 48109-2104 734-647-4989 ijov@umich.edu
UNIVERSITY OF MISSOURI, COLUMBIA John Brockman, Ph.D. University of Missouri Research Reactor Center 1513 Research Park Drive Columbia, MO 65211 573-884-8095 brockmanjd@missouri.edu Alternate contact: Ms. Gayla Neumeyer 573-882-8366, neumeyerg@missouri.edu	UNIVERSITY OF NEVADA, LAS VEGAS Artem Gelis, Ph.D. Department of Radiochemistry 4505 S. Maryland Parkway MS 4009 Las Vegas, Nevada 89154 702-895-2640 artem.gelis@unlv.edu

NORTH CAROLINA STATE UNIVERSITY John Mattingly, Ph.D. Department of Nuclear Engineering 2148 Burlington Nuclear Laboratory 2500 Stinson Drive Raleigh, North Carolina 27695-7909 919-515-0224 john_mattingly@ncsu.edu	OHIO STATE UNIVERSITY Vaibhav Sinha, Ph.D. College of Engineering Department of Mechanical and Aerospace Engineering Scott Lab 428, 201 W. 19 th Avenue Columbus, OH 43210-1142 614-292-3571 sinha.181@osu.edu
OREGON STATE UNIVERSITY Camille Palmer, Ph.D. School of Nuclear Science and Engineering 116 Radiation Center Corvallis, OR 97331 541-737-7065 camille.palmer@oregonstate.edu	PENNSYLVANIA STATE UNIVERSITY Kenan Unlu, Ph.D. Radiation Science and Engineering Center 101 Breazeale Nuclear Reactor University Park, PA 16802 814-865-6351 k-unlu@psu.edu
PURDUE UNIVERSITY Jason T. Harris, Ph.D. Center for Radiological and Nuclear Security 550 Stadium Mall Drive West Lafayette, IN 47907 765-496-1271 jtharris@purdue.edu	UNIVERSITY OF SOUTH CAROLINA Travis W. Knight, Ph.D. Mechanical and Nuclear Engineering Department 300 Main Street Columbia, SC 29208 803-777-1465 twknight@sc.edu
TEXAS A&M UNIVERSITY Craig Marianno, Ph.D. Nuclear Engineering Department 3473 TAMU College Station, TX 77843-3473 979-845-6093 marianno@tamu.edu	UNIVERSITY OF TENNESSEE Howard Hall, Ph.D. Department of Nuclear Engineering Nuclear Engineering Building, 1412 Circle Drive Knoxville, TN 37996-1410 865-974-2525 howard.hall@utk.edu
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UNIVERSITY OF WISCONSIN-MADISON Paul Wilson, Ph.D. Department of Engineering Physics 1500 Engineering Drive Madison, WI 53706 608-263-0807 paul.wilson@wisc.edu	

NUCLEAR NONPROLIFERATION INTERNATIONAL SAFEGUARDS FELLOWSHIP PROGRAM
PARTICIPATING US PRACTICUM CENTERS AND COORDINATORS

ARGONNE NATIONAL LABORATORY Claudio Gariazzo, Ph.D. Argonne National Laboratory 9700 S. Cass Ave, Bldg. 315, Rm L122 Argonne, IL 60439 Phone: 630-252-4812 cgariazzo@anl.gov www.anl.gov	BROOKHAVEN NATIONAL LABORATORY Lisa Toler, Ph.D. Brookhaven National Laboratory Bldg. 490C; PO Box 5000 Upton, NY 11973 631-344-2276 toler@bnl.gov www.bnl.gov
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NUCLEAR NONPROLIFERATION INTERNATIONAL SAFEGUARDS FELLOWSHIP PROGRAM
PARTICIPATING INTERNATIONAL PRACTICUM CENTERS AND COORDINATORS

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