

**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](http://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 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 15<sup>th</sup> 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](http://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](mailto: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](mailto: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**

<p><b>CLEMSON UNIVERSITY</b>          Timothy DeVol, Ph.D.          Environmental Engineering and Earth Sciences          342 Computer Court          Anderson, SC 29625-6510          864-656-1014          devol@clemson.edu</p>	<p><b>UNIVERSITY OF CALIFORNIA, BERKELEY</b>          Rachel Slaybaugh, Ph.D.          Department of Nuclear Engineering          4173 Etcheverry Hall          Berkeley, CA 94720-1731          570-850-3385          slaybaugh@berkeley.edu</p>
<p><b>COLORADO SCHOOL OF MINES</b>          Jeffrey King, Ph.D.          Nuclear Science and Engineering Program          1500 Illinois Street, Hill Hall 201          Golden, CO 80401          303-384-2133          kingjc@mines.edu</p>	<p><b>UNIVERSITY OF FLORIDA</b>          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</p>
<p><b>GEORGIA INSTITUTE OF TECHNOLOGY</b>          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</p>	<p><b>UNIVERSITY OF ILLINOIS, CHAMPAIGN</b>          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</p>
<p><b>MASSACHUSETTS INSTITUTE OF TECHNOLOGY</b>          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</p>	<p><b>UNIVERSITY OF MICHIGAN</b>          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          ijob@umich.edu</p>
<p><b>UNIVERSITY OF MISSOURI, COLUMBIA</b>          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</p>	<p><b>UNIVERSITY OF NEVADA, LAS VEGAS</b>          Artem Gelis, Ph.D.          Department of Radiochemistry          4505 S. Maryland Parkway          MS 4009          Las Vegas, Nevada 89154          702-895-2640          artem.gelis@unlv.edu</p>

<p><b>NORTH CAROLINA STATE UNIVERSITY</b>  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</p>	<p><b>OHIO STATE UNIVERSITY</b>  Vaibhav Sinha, Ph.D.  College of Engineering  Department of Mechanical and Aerospace Engineering  Scott Lab 428, 201 W. 19<sup>th</sup> Avenue  Columbus, OH 43210-1142  614-292-3571  sinha.181@osu.edu</p>
<p><b>OREGON STATE UNIVERSITY</b>  Camille Palmer, Ph.D.  School of Nuclear Science and Engineering  116 Radiation Center  Corvallis, OR 97331  541-737-7065  camille.palmer@oregonstate.edu</p>	<p><b>PENNSYLVANIA STATE UNIVERSITY</b>  Kenan Unlu, Ph.D.  Radiation Science and Engineering Center  101 Breazeale Nuclear Reactor  University Park, PA 16802  814-865-6351  k-unlu@psu.edu</p>
<p><b>PURDUE UNIVERSITY</b>  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</p>	<p><b>UNIVERSITY OF SOUTH CAROLINA</b>  Travis W. Knight, Ph.D.  Mechanical and Nuclear Engineering Department  300 Main Street  Columbia, SC 29208  803-777-1465  twknight@sc.edu</p>
<p><b>TEXAS A&amp;M UNIVERSITY</b>  Craig Marianno, Ph.D.  Nuclear Engineering Department  3473 TAMU  College Station, TX 77843-3473  979-845-6093  marianno@tamu.edu</p>	<p><b>UNIVERSITY OF TENNESSEE</b>  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</p>
<p><b>UNIVERSITY OF TEXAS</b>  Sheldon Landsberger, Ph.D.  Nuclear and Radiation Engineering Program  Nuclear Engineering Teaching Lab  Pickle Research Campus, R-9000  Austin, Texas 78712  512-232-2467  s.landsberger@mail.utexas.edu</p>	<p><b>VIRGINIA COMMONWEALTH UNIVERSITY</b>  Supathorn Phongikaroon, Ph.D.  Department of Mechanical &amp; Nuclear Engineering  401 West Main Street, Room E3253  PO Box 843015  Richmond, VA 23284-3015  804-827-2278  sphongikaroon@vcu.edu</p>
<p><b>UNIVERSITY OF WISCONSIN-MADISON</b>  Paul Wilson, Ph.D.  Department of Engineering Physics  1500 Engineering Drive  Madison, WI 53706  608-263-0807  paul.wilson@wisc.edu</p>	

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

<p><b>ARGONNE NATIONAL LABORATORY</b>          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</p>	<p><b>BROOKHAVEN NATIONAL LABORATORY</b>          Lisa Toler, Ph.D.          Brookhaven National Laboratory          Bldg. 490C; PO Box 5000          Upton, NY 11973          631-344-2276          toler@bnl.gov          www.bnl.gov</p>
<p><b>IDAHO NATIONAL LABORATORY</b>          Amanda Rynes          Idaho National Laboratory          PO Box 1625          Idaho Falls, ID 83415-3740          208-526-1616          Amanda.rynes@inl.gov          www.inl.gov</p>	<p><b>LOS ALAMOS NATIONAL LABORATORY</b>          Chloe McMath          Los Alamos National Laboratory          PO Box 1663, Mailstop J976          Los Alamos, NM 87545          505-412-7842          cmcmath@lanl.gov          www.lanl.gov</p>
<p><b>LAWRENCE LIVERMORE NATIONAL LABORATORY</b>          Yana Feldman          Lawrence Livermore National Laboratory          P.O. Box 808, L-184          Livermore, California 94551-0808          925-423-0604          feldman13@llnl.gov          www.llnl.gov</p>	<p><b>OAK RIDGE NATIONAL LABORATORY</b>          Jessica White-Horton          Oak Ridge National Laboratory          One Bethel Valley Road          Building 5300, MS 6315          Oak Ridge, TN 37830          865-574-1075          whitejl@ornl.gov          www.ornl.gov</p>
<p><b>PACIFIC NORTHWEST NATIONAL LABORATORY</b>          Rebecca Jones          Pacific Northwest National Laboratory          902 Battelle Boulevard          PO Box 999, MSIN K8-50          Richland, WA 99352          509-371-7745          rl.jones@pnnl.gov          www.pnnl.gov</p>	<p><b>SANDIA NATIONAL LABORATORIES</b>          Zoe Gasteum          Sandia National Laboratories          PO Box 5800          Albuquerque, NM 87185-1373          505-401-6959          zgastel@sandia.gov          www.sandia.gov</p>
<p><b>SAVANNAH RIVER NATIONAL LABORATORY</b>          Tim Hasty          Savannah River National Laboratory          Road 1, Building 773-42A          Aiken, SC 29808          803-725-8641          timothy.hasty@srnl.doe.gov          www.srnl.doe.gov</p>	<p><b>Y-12 NATIONAL SECURITY COMPLEX</b>          Chantell Murphy, Ph.D.          Y-12 National Security Complex          PO Box 2009, MS 8112          Oak Ridge, TN 37831-8112          865-241-9580          chantell.murphy@cns.doe.gov          www.y12.doe.gov</p>

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

**JOINT RESEARCH CENTER, GERMANY**

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**JOINT RESEARCH CENTER, ITALY**

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**JÜLICH LABORATORY**

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<http://www.fz-juelich.de/iek/iek-6/safeguards-security>