

FY2022 Fellowship Awards

<u>Academic Institution</u>	<u>Amount Awarded</u>	<u>Title of Proposal</u>
University of Pittsburgh	\$400,000.00	PITT NUCLEAR ENGINEERING GRADUATE FELLOWSHIP PROGRAM
Rensselaer Polytechnic Institute	\$400,000.00	Rensselaer Nuclear Science and Engineering Fellowship Program
University of Virginia	\$400,000.00	Fellowship for Next Generation Nuclear (NGN) Science at the University of Virginia
Colorado School of Mines	\$400,000.00	Colorado School of Mines Nuclear Science and Engineering Fellowship Program
University of Nevada - Reno	\$399,998.00	The University of Nevada, Reno Fellowship Program in Materials and Thermal Science for Nuclear Energy
University of Wisconsin - Madison	\$399,980.00	University of Wisconsin-Madison Graduate Fellowship Program in Nuclear Engineering
University of Illinois at Urbana - Champaign	\$400,000.00	University of Illinois at Urbana-Champaign Nuclear Engineering Fellowship Program
Georgia Institute of Technology	\$400,000.00	The Nuclear and Radiological Engineering Fellowship Program at the Georgia Institute of Technology
University of Missouri S&T - (Rolla)	\$400,000.00	Graduate Fellowships in Nuclear Engineering at Missouri S&T (2023-2027)
The Ohio State University	\$400,000.00	Ohio State University Fellowship Program – FY2023
Virginia Polytechnic Institute and State University	\$400,000.00	Virginia Tech Multi-campus Nuclear Engineering Fellowship Program
University of Texas - Austin	\$398,135.00	University of Texas Nuclear Education Fellowship Program
University of New Haven	\$400,000.00	University of New Haven/ University of Hartford and Industrial Partners Collaborative Nuclear Fellowship Program Applied Research in Fabrication, Testing and Simulation of Nuclear Power System

PITT NUCLEAR ENGINEERING GRADUATE FELLOWSHIP PROGRAM

Executive Summary:

The Stephen R. Tritch Nuclear Engineering Program at the University of Pittsburgh will establish two (2) graduate fellowships to attract and retain highly qualified graduate students from diverse backgrounds into the Nuclear Engineering Program for an enriched graduate experience along three facets:

1. **Research:** In areas that will advance the current state of the art in nuclear power.
2. **Engagement:** Engaging students in professional societies to build a commitment to service and become strategically networked in the nuclear community.
3. **Leadership:** Training in cross-cutting skills for leadership of engineering.

Through this program, the fellows will receive an educational experience that leads to a Ph.D. and either a Nuclear Engineering Certificate or MS in Nuclear Engineering. The program partnership with Westinghouse and the local nuclear industry offers the fellows a unique education and training experience. The University will provide cost-share through partial student tuition and indirect cost. This project will provide an essential recruiting tool and graduate student support to strengthen nuclear engineering research and education at the University of Pittsburgh.

Principal Investigator: Heng Ban, heng.ban@pitt.edu

Rensselaer Nuclear Science and Engineering Fellowship Program

Executive Summary:

The objective of the proposed Rensselaer fellowship program is to attract and train talented graduate students in nuclear science and engineering, thus developing and maintaining the nuclear workforce needed in US industry, government and research institutes. We will offer fellowship support for graduate students to pursue education and careers in the nuclear science and engineering field. Students who are awarded Fellowship will receive a full tuition waiver and a competitive graduate student stipend per calendar year. The fellowship program aims to recruit, train and advise the fellowship students and develop their skill sets as a sustainable pipeline to fulfill the missions of nuclear science & engineering discipline. We will award up to two fellowships per year, over four years. The project will ultimately benefit US nuclear energy sectors by promoting two important goals. First, by supporting new graduate students, the fellowship will encourage advanced training and experience for those entering the nuclear field. Second, the fellowship opportunities will increase the interest in nuclear science and engineering graduate study, leading to a greater number and diversity of those being trained in nuclear energy and technology.

Principal Investigator: Wei Ji, jiw2@rpi.edu

Fellowship for Next Generation Nuclear (NGN) Science at the University of Virginia

Executive Summary:

The proposed Next Generation Nuclear (NGN) program at the University of Virginia (UVA) will award 2 graduate students (on average) for each of 4 years. Between 4 and 8 individual recipients are anticipated. To make the fellowships attractive to high-caliber graduate students, students will be offered an annual stipend, which is similar to other high-profile national graduate fellowship programs. In order to make sure the student's full stipend, tuition, health insurance, and research needs are met, the faculty advisors, departments, and the School of Engineering and Applied Science (SEAS) agree to cover these expenses from other sources, as a demonstration of their investment in the program. In short, all tuition and other educational and living expenses (stipend and health insurance) incurred by the student will be paid on their behalf. This will be accomplished through supplementary research assistantships and teaching assistantships, as described in the full proposal below and as successfully carried out by the PI during a previous NRC Graduate Fellowship Grant.

The major goal of the NGN program at UVA is to develop a workforce to support the design, construction, operation, and regulation of nuclear facilities and the safe handling of nuclear materials. The student research projects in which the NGN Fellows will participate will focus on nuclear materials topics such as those briefly described in the body of this proposal document. In addition to taking part in cutting-edge nuclear materials research, NGN fellowship students will be provided with education in topics germane to modern nuclear materials applications including materials characterization, radiation damage, electrochemistry, oxidation, mechanical behavior, thermal transport, machine learning, and uncertainty quantification.

The PI represents UVA on the board of the Virginia Nuclear Energy Consortium (VNEC), whose membership includes major nuclear industry partners from across the state and the nation (Dominion Energy, Appalachian Power, BWX Technologies, Framatome, GE-Hitachi, Huntington Ingalls-Newport News Shipbuilding, Lightbridge, and NuScale Power), as well as partner universities (Virginia Tech, Virginia Commonwealth University, and Liberty University). Discussions with representatives from industry, the DOE national labs, and the NRC itself over the past year have highlighted that their greatest need is in the area of workforce development. The NGN Fellowship will not only benefit the students who are awarded and advance the research objectives of their faculty mentors and other sponsors, it will also serve a larger goal of making members of the university community (students, staff, and faculty) aware of the many opportunities and exciting advances that are presently taking place within the nuclear science and technology sector, including opportunities within federal agencies like the NRC, DOE (including NNSA), NASA, and the DoD (including the Nuclear Navy), as well as industry. Aspects of nuclear medicine, health physics, nuclear energy, nuclear security, and space exploration will be highlighted. This will be accomplished partly by requiring NGN Fellowship recipients to present their research activities in an Annual NGN Symposium, which will also offer invited members of the nuclear science and technology community a platform to highlight their organization's activities and employment opportunities. In Virginia, the job of recruiting has just

become easier, because the key role of nuclear energy in our state's current and future economy has been recently highlighted by the governor in a recently released Energy Plan, and he has furthermore announced plans to establish a Virginia Energy Innovation Fund and called for the creation of a Virginia Nuclear Innovation Hub (Hub) for research.

Principal Investigator: Sean R. Agnew, agnew@virginia.edu

Colorado School of Mines Nuclear Science and Engineering Fellowship Program

Executive Summary:

Starting in the 2015/2016 academic year, the Colorado School of Mines (CSM) established a Nuclear Science and Engineering graduate fellowship program to increase graduate enrollment in our graduate nuclear engineering degree programs. The funding requested will add support for two additional graduate Fellows per year with the intention to attract top students to the Nuclear Science and Engineering (NSE) Program. Potential Fellows will be selected from the pool of NSE Program applicants and NSE faculty will mentor and advise the Fellows throughout the Fellows' time at CSM. Particular emphasis will be placed on encouraging and tracking the Fellows' academic and research progress. While predominantly aimed at Ph.D. candidates, the program will also consider outstanding M.S. students.

Principal Investigator: Jeffrey King, kingjc@mines.edu

The University of Nevada, Reno Fellowship Program in Materials and Thermal Science for Nuclear Energy

Executive Summary:

For nearly 30 years, University of Nevada, Reno (UNR) faculty members have been involved in research related to advanced nuclear power. Focused research has been performed in the areas of materials development and reliability for nuclear applications, and the safety of packaging used for transfer, storage, and transport of nuclear materials. These research programs have been funded by the Department of Energy (DOE), Nuclear Energy University Program (NEUP), US Nuclear Regulatory Commission, National Laboratories, the State of Nevada and industry. We currently have several ongoing funded research programs. We hereby propose to continue the Fellowship Program in Materials and Thermal Science for Nuclear Energy that supports outstanding students to earn graduate degrees at UNR. The primary aim is to increase the number and quality of students graduating with Ph.D. degrees at UNR who will support the design, development, construction, operation, monitoring, and regulation of nuclear facilities, and the safe handling of nuclear materials. Fellows will be encouraged to spend one summer at the NRC, a National Laboratory, or an industrial nuclear facility for their professional advancement.

Principal Investigator: Dev Chidambaram, dcc@unr.edu

University of Wisconsin-Madison Graduate Fellowship Program in Nuclear Engineering

Executive Summary:

The Engineering Physics (EP) Department at the University of Wisconsin-Madison (UW-Madison) requests support for two fellowships for its Graduate Fellowship Program in Nuclear Engineering and Engineering Physics (NEEP), in support of outstanding doctoral students interested in nuclear power systems engineering and a career and employment in nuclear power related fields. Recipients will serve six months for each year of academic support. Employment may be with the U.S. Nuclear Regulatory Commission, other Federal agencies, State agencies, Department of Energy laboratories, nuclear-related industry, or academia in their sponsored fields of study. Prof. Paul Wilson, Grainger Professor of Nuclear Engineering and Chair of the Department of Engineering Physics will administer the department's highly successful fellowship program. Prof. Couet will assist with the management of the NRC Fellowship Education Grant awards, including the review and revision of the process for selecting Fellows. The fellowship program will continue to recruit and enroll high-quality, diverse students from a wide array of undergraduate science and engineering disciplines, and will award two doctoral fellowships to obtain a Ph.D. degree in Nuclear Engineering and Engineering Physics. The recruitment, selection and program administration of the students and the assessment of their progress will use proven techniques from the EP department and the GERS program. The expected time duration to obtain a Ph.D. degree will be about 48 months. If additional time is required for degree completion, their research advisor, the EP department and the GERS programs will supplement the fellowships. Interested candidates will be invited to the department's Discover Wisconsin Weekend to meet with faculty. Evaluation of program's success will utilize EP faculty to provide an ongoing review of each student's progress toward their degree and will be in accordance with the principles and policies of the UW-Madison Graduate School Fellowships. The program will recruit students into the NEEP program from majority institutions, from our traditional minority-serving institutional partners through the OPPS/GERS program and the South Carolina State University program with which we have an articulation agreement.

Principal Investigator: Paul Wilson, paul.wilson@wisc.edu

University of Illinois at Urbana-Champaign Nuclear Engineering Fellowship Program

Executive Summary:

The objectives of this program are to attract and educate top US graduate students in nuclear engineering. This will be accomplished with the financial resources from the NRC and the academic and administrative resources from the Department of Nuclear, Plasma, and Radiological Engineering (NPRE) at the University of Illinois at Urbana-Champaign. This program will ensure the best and brightest students are well prepared to join the nuclear workforce following a very strong, competitive graduate education in nuclear engineering. The NRC Fellowship resources will be used to attract, mentor, and support at least four (4) graduate students each year for the four-year duration of the award.

Principal Investigator: Rizwan Uddin, rizwan@illinois.edu

The Nuclear and Radiological Engineering Fellowship Program at the Georgia Institute of Technology

Executive Summary:

The Nuclear and Radiological Engineering (NRE) program in the Woodruff School at Georgia Institute of Technology is proposing to create a nuclear and radiological engineering fellowship program. The fellowship program will provide 8 one-year fellowships (2 fellowships each year for 4 years) for highly qualified graduate students. The proposed fellowships will cover up to the cost of tuition, mandatory student fees, books and supplies, and stipends. The fellowship program will focus on the recruiting and retention of top nuclear engineering students who come to Georgia Institute of Technology to obtain an MS or Ph.D. degree in nuclear engineering.

Principal Investigator: Steven Biegalski, steven.biegalski@me.gatech.edu

Graduate Fellowships in Nuclear Engineering at Missouri S&T (2023-2027)

Executive Summary:

Statement of the Project's Objectives & Benefits

Being the only ABET accredited nuclear engineering program in the state, Missouri S&T produces many high-quality BS nuclear engineering, most of them being US citizens. Many of these students together with additional students from other universities compete to be admitted in our graduate program to pursue advanced degrees in nuclear engineering, science, and technology. Some students are unable to follow their passion due to financial difficulties.

Missouri S&T is requesting NRC a fellowship grant of \$400,000 to be awarded to two of these highly motivated and deserving students to complete their PhD in nuclear engineering with a firm commitment to pursue a career in the nuclear field. The selection process for these students will primarily focus on academic excellence, motivation, and focus to nuclear engineering and science. These NRC fellowship recipients will be strengthening the nuclear industry workforce to support the design, construction, operation, regulation of nuclear facilities, safe handling of nuclear materials, and to benefit the nuclear sector broadly. Success of the fellowship grant is expected based on the outcome of our previous fellowship grants from NRC. These past fellowships have helped twenty-three (23) students obtain graduate degrees by continuing graduate studies in nuclear engineering. Of these, seven (7) obtained PhD degrees, twelve (12) obtained MS degree and four (4) are still ongoing. Seventeen (17) of the fellowship beneficiaries with degrees awarded reported nuclear-related employment. They now work in industry or national laboratories across the United States of America.

Principal Investigator: Shoaib Usman, usmans@mst.edu

Ohio State University Fellowship Program – FY2023

Executive Summary:

The Ohio State University Nuclear Engineering Program proposes to administer a fellowship program grant that will provide 12 terms of graduate fellowship support over 4 years in the total amount of \$400,000. It is anticipated that total student-term support equivalent to either one Ph.D. student or two Master's-degree students will benefit from this fellowship support.

As described in the proposal, tuition and a monthly stipend is provided to fellowship students. Additionally, a travel allowance and lab access fees will give students support to further their research utilizing state-of-the-art facilities.

In recent years, fellowship support by the NRC has played a major role in attracting quality domestic students to our program, with assurance that at the end of their education they will enter the nuclear workforce. The proposal describes how candidates would be recruited and ultimately selected as fellows, as well as the review considerations to evaluate the effectiveness of the program and opportunities to improve. Special effort is involved in the recruiting program to attract qualified students from under-represented groups to be included in the pool of students evaluated. The awardees of this fellowship are expected to conduct research in areas that support NRC mission and nuclear energy in general, which includes Probabilistic Risk Assessment, Instrumentation and Control, Materials Science, Radiation Detection and Measurement, Reactor Physics, and Thermal Hydraulics.

Principal Investigator: Lei Raymond Cao, cao.152@osu.edu

Virginia Tech Multi-campus Nuclear Engineering Fellowship Program

Executive Summary:

The objective of this proposal is to offer graduate fellowships to students who are enrolled in the Virginia Tech Nuclear Engineering Program (VT-NEP) at the Blacksburg and the Greater Washington DC (GWDC) campuses. This includes the graduates of US Naval academy who are enrolled in an accelerated program. The fellows pursue graduate education in Nuclear Engineering with focus on different aspects of nuclear power and nuclear nonproliferation and safeguards. The Principal Investigator (PI), Prof. Haghghat (Director of the VT-NEP that is housed within the Mechanical Engineering Department), will be responsible for planning, directing, and executing the proposed fellowship program.

Between 2008 and 2019, NEP has received 6 fellowship programs; two programs which were awarded in 2018 and 2019 will be ending in 2022 and 2023. Thus far, 17 fellows have completed graduate degrees (2 PhDs, 14 MS & 1 MENG) in NE, and from these graduates, 13 are employed in various organizations and 4 are pursuing PhD degrees in NE. Currently, under the two existing fellowship programs, 5 students are funded. The NRC fellowship programs have been highly instrumental for our success in attracting outstanding group of students and offering them multi-year funding.

Principal Investigator: Alireza Haghghat, haghghat@vt.edu

University of Texas Nuclear Education Fellowship Program

Executive Summary:

We will establish two NRC fellowship lines over the four-year performance period to continue to build the graduate program at The University of Texas at Austin (UT-Austin), which is a Hispanic Serving Institution (HSI). One line will support three MS students for up to two years, while the other will support two MS/PhD students for up to three years. Typically, only one year of funding will be given and the students will then transition to funded research projects with any of the five faculty members. Such a prescription has been highly successful in the past to maximize the NRC fellows. We will utilize the fellowships to expand our applicant pool by advertising to our undergraduate students in a variety of majors, promoting the program at large venues, such as the American Nuclear Society (ANS) National and Student conferences, and through presentations and distribution of promotional materials to faculty colleagues at target institutions. In addition, we will utilize the University of Texas Equal Opportunity in Engineering Office to distribute the publicity information to professional societies targeting minorities and underrepresented groups such as Equal Opportunities for Engineers (EOE), minority-serving Texas Research Experience (TRES), Society of Women Engineers, (SWE), National Society of Black Engineers (NSBE) and Society of Hispanic Professional Engineers (SHPE). The student application process and the ongoing evaluation procedure for the fellowship recipients has been designed to ensure that a high-quality, diverse group of students become fellows, that these students produce outstanding work while they are supported, and that they meet the fellowship obligation of employment within the nuclear industry.

Principal Investigator: Sheldon Landsberger, s.landsberger@mail.utexas.edu

University of New Haven/ University of Hartford and Industrial Partners Collaborative Nuclear Fellowship Program Applied Research in Fabrication, Testing and Simulation of Nuclear Power System

Executive Summary:

Objectives and Benefits: The purpose of this Fellowship grant proposal to the US Nuclear Regulatory Commission is to provide support to the University of New Haven in collaboration with the University of Hartford and their industrial partners in furthering graduate level education and applied research in nuclear engineering. The Fellowship will fund at least six Masters-level students (~ 1 per year at each University, 6 total) over the four years of the program. We will work with our industrial partners to identify appropriate applied research topics that will enhance the learning of our MS students. We have identified broad initial topics that include Nuclear Power generation and instrumentation. For Nuclear Power generation we anticipate topics in fabrication, testing and operation of Pressurized Water Reactors. For instrumentation we expect to include topics on fabrication, testing and new sensor development efforts. The program will address an urgent need for nuclear engineering education and expertise. Within the state of Connecticut, nuclear reactors produce more than 40% of the electricity, the Electric Boat division of General Dynamics leads the nation's nuclear submarine design, build and in-service support effort while the former Canberra group (Now Mirion Technologies) provides world class radiation detection instrumentation to both the medical and nuclear power fields. There is significant demand for specialized graduate level nuclear engineering education program in our region.

Principal Investigator: Tom Filburn, tfilburn@newhaven.edu