FY 2019 Fellowship Grant Awards

Institution	Amount	Title
Louisiana State University	$400,000	LSU Expanded Nuclear Science and Engineering Graduate Fellowship Program
Missouri University of Science and Technology	$400,000	Graduate Fellowships in Nuclear Engineering at Missouri S&T (2019-2023)
North Carolina State University	$394,852	North Carolina State University's Graduate Fellowship in Nuclear Engineering (NCSU-GFINE0
Purdue University	$400,000	Nuclear Science and Engineering Fellowship Program at Purdue University
Texas A&M University	$400,000	Texas Nuclear Engineering Graduate Fellowship Program
Universidad del Turabo	$400,000	Enhancing Engineering Graduate Students Research Experiences at Universidad del Turabo
University of Missouri Columbia	$400,000	MU Graduate Fellowship Program in Current and Advanced Nuclear Fuels and Materials Analysis
University of Nevada Las Vegas	$400,000	Nuclear Engineering Doctoral Fellowship Program at UNLV
University of Notre Dame	$400,000	Establishing a Applied Nuclear Fellowship at the Nuclear Science Laboratory (NSL) at the University of Notre Dame (ND)
University of Puerto Rico at Mayaguez	$400,000	UPRM Graduate Fellowship Program in Nuclear Reactors Thermohydraulics and Neutron Moderation
University of Tennessee	$400,000	Sustainable Pipeline of Educational Excellence for Nuclear Engineering Graduate Students at the University of Tennessee

University of Texas at Austin	$399,163	University of Texas Nuclear Education Fellowship Program
University of Texas El Paso	$400,000	LEAN – A Novel Approach to Facilitate Graduate Student Success in Nuclear Science and Engineering
University of Utah	$400,000	Expansion of Nuclear Education at the University of Utah
University of Wisconsin – Madison	$400,000	University of Wisconsin-Madison Graduate Fellowship Program in Nuclear Engineering
Utah State University	$400,000	Graduate Fellowship Program To Support Nuclear Engineering Research At Utah State University
Virginia Polytechnic Institute	$400,000	Virginia Tech Multi-campus Nuclear Engineering Fellowship Program

LSU Expanded Nuclear Science and Engineering Graduate Fellowship Program

Executive Summary:

In light of the growing nuclear workforce demand nationwide and the increasing volume of Nuclear Science and Engineering research activities at Louisiana State University (LSU), the Expanded Nuclear Science and Engineering Graduate Fellowship Program is proposed by LSU to strengthen its established nuclear graduate education, with the request of a total fund of $400,000 to support at least 8 graduate-student-years for 4 years. The proposed project is part of LSU's continuous efforts to expand and reinforce its current nuclear education components, which have experienced a remarkable renaissance in recent years with a substantial growth of student enrollment and faculty recruitment funded by two US NRC's Faculty Development Grants to support 3 new nuclear faculty members; all of whom are serving as the PI and Co-PIs of this proposal. Designed by 5 PIs from 4 academic divisions (College of Engineering, College of Science, College of the Coast & Environment, and Center for Energy Studies), the program is aimed at expanding LSU's nuclear graduate education endeavor to include more academic departments, namely Environmental Sciences and Chemistry, beyond the initial Mechanical & Industrial Engineering and Geology, and to recruit and support more high quality graduate students to receive well rounded training and conduct integrated research in broader nuclear related areas of nuclear materials, radioactive waste management, radiation detection, radiochemistry, and health physics. The existing strong ties between LSU and the local nuclear industry, as well as its close alignment with LSU's Strategic Plan of "Bridging the Coast, Energy, and Environment", provide critical boost to the success of the program.

Principal Investigator: Fengyuan Lu, luf@lsu.edu

Graduate Fellowships in Nuclear Engineering at Missouri S&T (2019-2023)

EXECUTIVE SUMMARY:

Statement of the Project's Objectives & Benefits: Missouri University of Science & Technology (Missouri S&T) is pleased to submit this fellowship proposal for graduate students pursuing MS or PhD degrees in Nuclear Engineering. A total of $400,000 is being requested from USNRC during a four-year period (June 30, 2019 – June 29, 2023). The Missouri S&T NE program has seen 8% increase in undergraduate and graduate student enrollment over the last decade. The increase in graduate students within the same period is 124%. The requested USNRC funding will provide a stipend equivalent to a half-time research assistantship for two fellows each year for four years. In addition, the fellowships will also support the fellows with lab supplies. The fellows will be recruited nationally by advertising the fellowship to all nuclear engineering programs in the nation. The selection criteria will be academic merit (GPA, GRE scores, and recommendation letters) with consideration given to financial need. The fellowships will provide opportunities for high performance students to pursue research in nationally important areas in nuclear engineering in collaboration with national laboratories and nuclear industries.

Principal Investigator: Hyoung K. Lee; leehk@mst.edu

North Carolina State University's Graduate Fellowship In Nuclear Engineering

Executive Summary:

We propose to administer a financial aid mechanism for graduate students in nuclear engineering named the 'North Carolina State University's Graduate Fellowship In Nuclear Engineering' (NCSU–GFINE). The primary objective of NCSU–GFINE is to enhance the ability of NCSU's Department of Nuclear Engineering to recruit and retain outstanding individuals and to provide incentive to the sponsored graduate students to maintain high academic performance along with promotion of diversity in the department's graduate student population. Ultimately, the collective effort by US educational institutions to raise the admission standards and to diversify their graduate student populations, as proposed here for NCSU, will translate into a highly competent and diverse cadre of leaders for the nuclear engineering endeavor at large. The benefit to the nation from NCSU–GFINE is that it will contribute to the production of a highly competitive group of advanced-degree nuclear engineers capable of assuming leadership positions in their area of specialization within the field of nuclear engineering. The diverse profile of NCSU–GFINE fellows will be reflective of the US's population and supportive of the nation's goals of achieving social justice and economic equity for underprivileged groups. The so-developed workforce will be best positioned to lead the nation's charge to reinvigorate its nuclear industry, and will shepherd the design, construction, operation, and regulation of new and innovative nuclear facilities, while maintaining the safety and security of processes for the handling of requisite nuclear materials. The commitment by NCSU's Department of Nuclear Engineering and College of Engineering to the success of NCSU–GFINE is evidenced by the increased number of faculty members.

Principal Investigator: K. Linga (KL) Murty, murty@ncsu.edu

Nuclear Science and Engineering Fellowship Program at Purdue University

Executive Summary:

Project Objectives and Benefits: The main objective of the proposed program is to recruit, retain, monitor and mentor domestic students of high academic ability and performance so that they graduate to become career professionals and leaders in various nuclear engineering communities including nuclear power industry, national laboratories, regulatory agencies and other nuclear-related government agencies. We are particularly interested in attracting strong and enthusiastic students from groups that are typically underrepresented in engineering and science, in general, and in the nuclear industry, in particular. The immediate benefit of the proposed program to the nuclear industry is clear – approximately five to ten MS and PhD graduates who will be funded between one to two years by this program will serve the industry and ultimately provide leadership. The proposed program will also provide extended benefits by positioning these future leaders to influence current students in Nuclear Engineering, and Health Physics programs and to serve as ambassadors to potential students and society at large. All of the funded students from previous grants were either employed by the nuclear industry or are still pursuing higher education in disciplines related to nuclear engineering or radiation sciences.

Principal Investigator: Seungjin Kim, seungjin@purdue.edu

Texas Nuclear Engineering Graduate Fellowship Program

Executive Summary:

The Department of Nuclear Engineering at Texas A&M University (TAMU) offers one of the top ranked graduate programs in the nation. As our graduates have found increasing professional success with government, industry, national laboratories, and academia, the number of highly qualified and talented students that apply to join our program continues to increase. In the purview of mass retirements in nuclear professions, as well as limited funding opportunities to support the human capital pipeline at the university level to replace the human capital deficit, admissions remain limited despite attracting a talented candidate pool. The Department of Nuclear Engineering at TAMU proposes to establish five Texas A&M Nuclear Engineering Graduate Fellowships as three 2-year graduate fellowships for Ph.D. students, and two 1-year fellowships for M.S. students. The fellowships will cover tuition, fees, stipends, and textbook/ supplies. The fellowship program has an integrated structure that promotes the fellowship recipients' academic and professional success from recruitment to employment in the nuclear sector. The following components will be combined into an efficient and effective program for supporting the human capital pipeline and innovation at TAMU: (1) Recruiting program, (2) Fellowship recipient selection process, (3) Retention program, and (4) Employment program. The Fellowship program will attract top-ranked graduate applicants to our department, while promoting participation of under-represented groups and minorities, and will foster innovation in student education and research leading to successful employment in the nuclear sector.

Principal Investigator: Shaheen A. Dewji, sdewji@tamu.edu

Enhancing Engineering Graduate Students Research Experiences at Universidad del Turabo

Executive Summary:

Project Statement: The goal of the Fellowship Program is to provide engineering students the necessary means to have research-based experiences at the University and at National Laboratories. Currently, most of UT graduate students are full time workers that perform research during their spare time. This circumstance limits the scope and significance of their research experience. By providing graduate students with stipends and tuition assistance while actively pursuing the graduate degree, their focus can be steered to research activities; therefore, their academic performance should increase and more opportunities should arise for them.

Project Objectives: (1) Provide research experiences in nuclear related fields to three (3) engineering graduate students each project year, for a minimum of six (6) students in a 4-year project period. **(2)** Offer UT graduate students training and practical experiences in nuclear engineering and sciences through summer internships at National Laboratories such as Sandia National Laboratory, specifically in NRC-related research areas within these laboratories. **(3)** Increase the employment possibilities of graduate engineering students in R&D fields.

Principal Investigator: Amaury Malave, ajmalave@suagm.edu

MU Graduate Fellowship Program in Current and Advanced Nuclear Fuels and Materials Analysis

Executive Summary:

The MU Fellowship Program in Current and Advanced Nuclear Fuels and Materials Analysis directly responds to nationally identified needs to attract the best and brightest undergraduates into doctoral programs of high priority for the current and future nuclear industry. Emphasizing the recruitment of students from diverse backgrounds, funds are requested to support three doctoral Fellowships annually over a four-year period of support. Students selected by MU and approved by the NRC for Fellowship support will follow a plan of study for their respective degree programs -- primarily in Chemistry, Chemical Engineering, or Mechanical Engineering – and conduct doctoral investigations focusing on one of three main areas: **Nuclear Fuel and Core Physics Design and Evaluation**; **Nuclear Material Cross Section Data Development**; or **Experimental Nuclear Materials Evaluation**. Utilizing the unique analytic, experimental, and computational resources available at the University of Missouri Research Reactor (*MURR*) and with our collaborating national laboratories (*ANL, INL*), Fellows will have unique opportunities for obtaining experimental data and performing computationally-intensive multiphysics analyses to support their doctoral research. Following graduation, Fellows will be well-positioned for careers with regulatory agencies, national laboratories, and architect/engineering companies involved in the design and optimization of accident tolerant fuels and advanced reactor systems.

Principal Investigator: J. David Robertson, RobertsonJo@missouri.edu

Nuclear Engineering Doctoral Fellowship Program at UNLV

Executive Summary:

We propose to establish the Nuclear Engineering Doctoral Fellowship Program at University of Nevada, Las Vegas (UNLV), a Minority Serving Institution. The project's *objective* is to support Fellowships for the development of a nuclear engineering workforce with doctoral degrees capable of supporting the design, construction, operation, and regulation of nuclear facilities and the safe handling of nuclear materials. Our goal is to fund and graduate *three Ph.D. Fellows* over four years. The program will strive to recruit students in Nevada and nationally engaging underrepresented groups into the nuclear engineering professional community benefiting the nuclear sector broadly for both the near term and the long term.

Principal Investigator: William Culbreth, william.culbreth@unlv.edu

Establishing a Applied Nuclear Fellowship at the Nuclear Science Laboratory (NSL) at the University of Notre Dame (ND)

Executive Summary:

Statement: We propose to establish four 2-year "Applied Nuclear Fellowships" for graduate students within the Nuclear Science Laboratory (NSL) at the University of Notre Dame (ND). These fellowships will be available to senior (i.e. post-candidacy) graduate students that have shown a clear interest in applied nuclear physics or in accelerator-based physics projects with broader applications beyond the traditional excellence in "fundamental research" currently associated with the NSL. The purpose of this proposal is to establish a strong source of funding for graduate students with a clear interest in applied nuclear physics parallel to the current sources of external funding of the NSL and its graduate program which primarily supports its primary mission of fundamental nuclear physics.

Principal Investigator: Philippe Collon, pcollon@nd.edu

UPRM Graduate Fellowship Program in Nuclear Reactors Thermohydraulics and Neutron Moderation

Objectives and Benefits:
The principal objective of this proposal is to sponsor two PhD students and three MS students in the UPRM Mechanical Engineering programs, conducting research in core nuclear related areas.

This proposal will contribute to the new (January 2016) PhD program in Mechanical Engineering at the University of Puerto Rico – Mayaguez. The graduate research thesis will relate to two important current topics of the nuclear science and technology community: (i) experimental and numerical studies of heat and mass transfer on active fuel assemblies, with focus on bubble formation, growth and departure, and (ii) the fabrication and use of nanoparticles as an improved alternative to neutron moderation by dissolved boric acid.

The doctoral students funded by this program will spend six months in the Nuclear Engineering Department at NCSU (host of the first university nuclear engineering educational curriculum in the US). During their stay at NCSU, doctoral students will enroll in two graduate level nuclear engineering courses to complement their education with unique offerings. With this project UPRM will be able to grant its two first PhD degrees with thesis work related to core nuclear engineering areas. Furthermore, the MS student will engage into further pursuing a doctoral degree at one of the leading Nuclear Engineering programs in the nation.

Principal Investigator: Silvina Cancelos, silvina.cancelos@upr.edu

Sustainable Pipeline of Educational Excellence for Nuclear Engineering Graduate Students at the University of Tennessee

Executive Summary:

The Department of Nuclear Engineering at the University of Tennessee-Knoxville (UTK) seeks to award the equivalent of seven (7) one-year fellowships targeted to maintain a sustainable pipeline of nuclear engineering graduate students. This fellowship program will focus upon identifying, recruiting, retaining, and graduating the most promising students on the basis of academic excellence and potential for future success within the nuclear industry. A key goal of this proposal is to support our existing departmental infrastructure to help sustain the educational excellence of all UTK graduate nuclear engineering students. The sustainability feature of this program is built within the ability to combine our strong, growing and diverse research portfolios and external sponsorship alongside the support from the US NRC to develop coherent and well-defined paths for the educational success of our graduate students. Furthermore, this fellowship program targets to strengthen our pipeline of talented US students and graduates while taking advantage of our improving track record in recruiting, retaining, and graduating talented and qualified students from our increasingly diverse pool that also includes individuals from historically underrepresented groups in nuclear engineering.

Principal Investigator: G. Ivan Maldonado, Ivan.Maldonado@utk.edu

University of Texas Nuclear Education Fellowship Program

Executive Summary:

We will establish two NRC fellowship lines over the four year performance period. One line will support three MS students up to two years while the other will support two MS/PhD students up to three years. We plan to utilize the fellowships to expand our applicant pool by advertising in venues such as the American Nuclear Society, national and student conferences 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 (TREX), 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

LEAN – A Novel Approach to Facilitate Graduate Student Success in Nuclear Science and Engineering

Executive Summary:

This project is intended to create NRC Fellowship opportunities to our UTEP graduates to become successful in the topical area of Nuclear Materials. The compelling need for creating such NRC fellowship opportunities at UTEP is as follows. To secure the emerging energy needs of the nation in a safe manner, the scientific and engineering community is challenged to design, develop and maintain the next-generation of nuclear reactors. However, the US nuclear industry is currently facing a concern with the missing generation of workforce. While the US nuclear workforce is aging rapidly, the graduate student enrollment in traditional Nuclear Science and Engineering disciplines in universities is also rapidly declining. Future workforce development in nuclear industry is, therefore, facing critical challenges at this time. Another critical concern of the US nuclear energy workforce is its limited ethnic diversity. In this context, with more than 85% underrepresented minority student body at UTEP, our team proposes a unique approach to promote education, training and provide opportunities to our students. Specifically, the proposed project is intended to chart a unique pathway, which is abbreviated as **LEAN**, through active **L**earning, **E**xperience **a**nd **N**etworking to the professional success of underrepresented groups in Nuclear Science and Engineering related fields. The proposed LEAN pathway involves: (a) **L**earning – by means of course work at UTEP, (b) **E**xperiencing at partnering national laboratories and/or industry **A**nd (c) **N**etworking by means of professional exposure and workshops specifically designated towards Nuclear Science and Engineering. These fellowships will be offered 2-5 graduate (PhD/MS) students a means to follow the proposed LEAN theme while the success is evaluated based on tracking the transition from classroom to all the way to professional success through career achievement in the relevant field

Principal Investigator: Ramana V. Chintalapalle, rvchintalapalle@utep.edu

Expansion of Nuclear Education at the University of Utah

Executive Summary:

Project Objectives and Benefits:
• Develop early career scientists and engineers for successful careers in nuclear engineering and related fields through multidisciplinary education, training, and research.
• Provide multidisciplinary training for Nuclear Engineering Students in multiple NRC Areas of Interest including: Fuels and Neutronics, Consequence and Emergency Preparedness, Radiation Protection Analysis and Radiochemistry, Materials Engineering, and Electrical Engineering.
• Perform research in areas critical to nuclear development including radiation detection, radiation transport simulations, accident tolerant fuels, radiochemistry, and radiobiology.

Principal Investigator: Michael Barber, barber@civil.utah.edu

University of Wisconsin-Madison Graduate Fellowship Program in Nuclear Engineering

Executive Summary;

The Nuclear Engineering and Engineering Physics Program (NEEP) in 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 (NE), 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. The fellowship program will continue to recruit and enroll top-notch, diverse students from all 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 NEEP 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 NE program from majority institutions, from our traditional minority-serving institutional partners through the GERS program and the South Carolina State University program with whom we have an articulation agreement.

Principal Investigator: Douglass Henderson, dlhender@wisc.edu

Graduate Fellowship Program To Support Nuclear Engineering Research At Utah State University

Executive Summary:

Utah State University's (USU's) graduate fellowship program will expand its nuclear capability and expertise by supporting two graduate students per year in nuclear-related areas of study. This will be accomplished through two primary objectives: (1) Expand USU's nuclear research capacity by cultivating research opportunities for highly qualified graduate students with expertise relevant to nuclear energy systems; and (2) Promote career development and job placement for these student participants in nuclear-related positions through networking opportunities and direct research experience. The fellowship program builds on the successes of recent NRC faculty development programs and takes advantage of USU's unique relationship as the nearest PhD-granting institution in mechanical engineering to Idaho National Lab. The fellowships will build additional capacity within USU's nuclear research program, thus strengthening and expanding USU's nuclear research and future workforce to new levels.

Principal Investigator: Ryan Berke, ryan.berke@usu.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 Blacksburg and National Capital Region (NCR) 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 (from the VT-NEP that is housed within the Mechanical Engineering Department, will be responsible for planning, directing and executing of this proposal.

This fellowship program will enable VT-NEP to recruit and educate highly qualified nuclear engineers and scientists. These graduates will contribute to the US nuclear educational institutions, private organizations, and government agencies and labs.

This proposal seeks $400k to offer two fellowships per year over four years. Additionally, the proposed program will benefit from the services of two staff members at the two aforementioned campuses.

Principal Investigator: Alireza Haghighat, haghighat@vt.edu