

FY2022 Distinguished Faculty Advancement Awards

<u>Academic Institution</u>	<u>Amount Awarded</u>	<u>Title of Proposal</u>
Florida International University	\$599,290	Advancement of FIU Distinguished Faculty with Expertise in New High-Pressure and Temperature Resistant Materials for Nuclear Reactors
Georgia Institute of Technology	\$600,000	Nuclear Engineering Distinguished Faculty Advancement Program at the Georgia Institute of Technology
Rensselaer Polytechnic Institute	\$600,000	Distinguished Faculty Advancement Program at RPI
University of Michigan	\$600,000	Nuclear Engineering Faculty Development Program at the University of Michigan
University of Nevada - Las Vegas	\$600,000	Faculty Development Grant for Nuclear Engineering at UNLV
University of New Mexico	\$600,000	Distinguished Faculty Advancement Program in Nuclear Energy at UNM
University of Wisconsin - Madison	\$600,000	University of Wisconsin-Madison Distinguished Faculty Advancement
University of Wyoming	\$600,000	The NERC Faculty Scholars Program

Advancement of FIU Distinguished Faculty with Expertise in New High-Pressure and Temperature Resistant Materials for Nuclear Reactors

Executive Summary:

Objective: Facilitate the advancement of the early career professor Dr. Irina Chuvashova, with expertise in materials for nuclear reactors. Dr. Chuvashova will train, educate and mentor Ph.D. students and seek external funding. Radiochemistry Ph.D. graduates will support the nuclear industry, national labs, government, and academia. This grant complements FIU's currently active NRC grant for FIU Nuclear Fellowships.

Benefits: FIU's Ph.D. Radiochemistry track and its growing nuclear program are critical to supplying needed nuclear professionals to replace an aging workforce. The FIU Nuclear Fellowship program has created a critical mass of highly-motivated, qualified students with interest in nuclear & radiochemistry careers. FIU has hired 3 assistant professors the last 6 years, with research expertise in nuclear and radiochemistry. Dr. Chuvashova who joined FIU in Fall 2021 will teach undergrad and grad courses in radiochemistry/high-pressure chemistry, as well as in Physical Chemistry. The 50+ faculty/staff members associated with FIU's Interdisciplinary Nuclear Research Program will support the new faculty with resources to help ensure success. With >54,000 students, >85% student minority population (>65% Hispanic, > 13% African-American), and >\$237M in research expenditures, FIU is a public hispanic-serving Institution classified as an R1 Research University/Highest Research Activity, which has been recently designated as an emerging preeminent state research university by the state of Florida board of governors. A national leader in the education of hispanic-latino students, FIU is ranked 1st in the US in 2018-19 in awarding bachelor's and master's degrees to hispanic-latino students. FIU has been climbing steadily in national as well as global rankings. Of particular note, U.S. News & World Report ranks FIU as a Top 100 Public National University (#78 in latest rankings).

Relevance to NRC research areas of emphasis: Dr. Chuvashova's research interests are within 3 areas of interest to NRC: i) Advanced materials and manufacturing for nuclear applications. ii) Aging/degradation of nuclear plant systems, structures, and components. iii) Characterization, handling, fabrication, transportation, storage, or disposal of fresh and spent nuclear fuel for nuclear power plants (including the various advanced reactor designs that are currently under development).

Principal Investigator: Konstantinos Kavallieratos, kavallie@fiu.edu

Nuclear Engineering Distinguished Faculty Advancement Program at the Georgia Institute of Technology

Executive Summary:

The Nuclear and Radiological Engineering (NRE) Program at the Georgia Institute of Technology is proposing a Nuclear Engineering Faculty Development program to enhance resources available to our newly hired junior faculty to create a strong foundation in research, teaching, and service. The faculty development grant will be used to support a tenure-track faculty member to enhance the career path as a professor, researcher, and mentor in the department while promoting educational and research goals. The faculty development grant will aid in the retention of the faculty member by providing resources for new course development, research proposal support, professional society meetings participation, summer salary support, scientific publication, graduate student support, equipment, and other scholarly needs. The program will also provide the new faculty with the momentum to propel a research career in strategic directions that align with exciting academic opportunities in nuclear engineering. Finally, this program will enrich the new faculty's research portfolio to help attract a plurality of high-caliber graduate students while promoting diversity, equity, and inclusion. The overall intent of the proposed program is to assist in the development and retention of new faculty towards a sustainable, long-term academic career, and to support the envisioned workforce demands in the nuclear sector in nuclear engineering, particularly those linked more closely to the research experience nurtured in the next generation of nuclear professionals at Georgia Tech.

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

Distinguished Faculty Advancement Program at RPI

Executive Summary:

Objectives and Benefits:

The objective of this grant is to support a new faculty hire in the Nuclear Engineering program at Rensselaer Polytechnic Institute (RPI). The grant will help boost the startup package provided to the new faculty and will include a cost share provided by the university. A faculty search just started, and the new faculty will be hired to strategic research thrust areas that uniquely define RPI in the Nuclear Engineering community. The new faculty will enable growth and sustainability of the Nuclear Engineering program and help maintain a strong and large undergraduate and graduate Nuclear Engineering program at RPI.

Principal Investigator: Yaron Danon, danony@rpi.edu

Nuclear Engineering Faculty Development Program at the University of Michigan

Executive Summary:

The objective of this program is to provide up to four years of financial support to two new junior faculty members, ensuring success in their academic career at the University of Michigan. Faculty members selected for the grant will be in technical areas noted as critical to the Nuclear Regulatory Agency program objectives, which cover topics including advanced reactor design, uncertainty quantification, reactor safety analysis, artificial intelligence, spent fuel disposal, materials degradation in light water reactors, and materials for advanced reactors. For their teaching plans, the two faculty members will develop (or renovate) the curriculum by incorporating topics concerning modeling and simulation of advanced reactors, data analytics, advanced reactor licensing, and nuclear materials.

This program will benefit the junior faculty members by providing them critical financial support early in their academic careers, including: (1) summer support to prepare teaching materials and research grants, (2) support for graduate students early in the faculty members' academic careers, (3) support for supplies and research equipment critical for the faculty members' research, and (4) funds to travel to conferences to present papers and interact with colleagues. All of these items will contribute towards the success of the faculty members in becoming national technical leaders and to obtain tenure in Nuclear Engineering and Radiological Sciences at the University of Michigan.

Principal Investigator: Todd Allen, traumich@umich.edu

Faculty Development Grant for Nuclear Engineering at UNLV

Project Objectives and Benefits

The Mechanical Engineering Department at UNLV is searching for a new faculty member at the Assistant or Associate Professor level with a focus on Nuclear Engineering. This Distinguished Faculty Advancement Grant would provide additional startup funds for the new hire, complementing the support planned by the Mechanical Engineering Department, College of Engineering, and UNLV. These funds would help ensure that the new hire is successful in carrying out their plans for research scholarship, academic teaching excellence, and service to the academic and professional communities. We plan to hire a new faculty member with a strong multidisciplinary research record and expertise in nuclear engineering. Potential expertise areas of interest include but are not limited to computational modeling of radiation transport, nuclear criticality, reactors, radiation detection, remote radiation sensing, and nuclear thermal propulsion rockets. This new hire will replace a long-time faculty member who worked in this field and who recently retired. The ME department has had a long history of academic research and teaching excellence in the field of Nuclear Engineering. Our faculty and students interact with industry and government research labs at the local, regional, and national level. The PI and collaborating faculty will develop a mentoring and evaluation plan for the new hire that includes rubrics and metrics appropriate for the successful career development of a new faculty member.

Principal Investigator: Brendan O'Toole, brendan.otoole@unlv.edu

Distinguished Faculty Advancement Program in Nuclear Energy at UNM

Executive Summary:

Statement of the Project's Objectives & Benefits: The University of New Mexico (UNM), a Carnegie R1 University and a Minority Serving Institution, is pleased to submit this Distinguished Faculty Advancement Program proposal for a new probationary tenure-track faculty member hired in August 2022. A total of \$600,000 is being requested from the USNRC for four years. UNM will provide a cash matching of \$100,000 for the duration of the award. The primary objective of the UNM Nuclear Engineering Distinguished Faculty Advancement Program is to mentor and retain a tenure-track assistant professor in the area of nuclear materials and nuclear fusion technology hired in the Fall of 2022. He has the attributes of a faculty member who, at the end of a six-year probationary period, can obtain tenure and promotion to the rank of Associate Professor. The Program will allocate additional resources to him for (a) complementing the start-up package, (b) supporting new curriculum development in nuclear engineering, nuclear fusion technology, and nuclear materials, (c) developing laboratory facilities, and (d) supporting students working in his research team. UNM, the School of Engineering, and the Nuclear Engineering Department have various helpful resources available to support faculty in building and administering their research programs and improving their teaching. UNM also provides junior faculty with numerous programs to build stronger faculty skills, enhance career development, and troubleshoot and eliminate obstacles to faculty success.

Two committees, the Faculty Advancement Mentoring Committee and the Faculty Advancement Evaluation Committee, will work with the junior faculty and the PI for the success of the Program. The committees will meet with the junior faculty member and the PI twice a year to mentor the junior faculty member and evaluate the progress of the Program with the ultimate goal of helping him be promoted and tenured at the end of a six-year probationary period. The Distinguished Faculty Advancement Program at UNM will help retain the new faculty member by providing him with additional resources to build his research program. The Program will also complement the existing strengths of the UNM Nuclear Engineering Department and help grow its research footprint further.

Principal Investigator: Hyoung K. Lee, leehk@unm.edu

University of Wisconsin-Madison Distinguished Faculty Advancement

Executive Summary:

The proposed faculty development program consists of both research and curriculum development support, paired with a mentoring program for this junior nuclear engineering faculty member in the nuclear engineering program in the Department of Engineering Physics. The development of a robust faculty research and teaching program requires several elements that will be supported by this proposal. These elements include: 1) faculty summer salary support, 2) support for graduate students, 3) travel support for faculty and students to participate in technical symposia and research program development, 4) equipment for dedicated high performance computational capability, and 5) materials/supplies for additional computational capability for preparing/processing simulations. Our nuclear engineering program at the University of Wisconsin-Madison (UW-Madison) also augments faculty support with operation of common research equipment and/or access to key UW-Madison user facilities, such as the UW Nuclear Reactor Lab and the Center for High-Throughput Computing.

In our program, the mentor committee consisting of the Department Chair and key nuclear engineering faculty will work together with the assistant professor to assist them in their growth as a valuable member of the faculty and UW-Madison academic community. The faculty mentoring committee provides formative feedback to the assistant professor on their strengths and weaknesses in teaching, research and service and will suggest strategies and techniques for improvement if needed. It will also assist them in discovering opportunities and developing strategies for their growing research program. Finally, the faculty mentoring committee will serve as an advocate for the assistant professor to promote visibility nationally and internationally on their work as a nuclear engineering researcher and scholar.

Executive Summary: Paul Wilson, paul.wilson@wisc.edu

The NERC Faculty Scholars Program

Executive Summary:

Project Objectives and Benefits

TerraPower's selection of Kemmerer, Wyoming as the home for a next-generation "Natrium" nuclear power plant has generated a great deal of excitement across the state. Energy production and related extractive industries have long been a focus of Wyoming's economy, and the potential for nuclear energy to compensate for waning components of the state's energy portfolio has been embraced by a number of private and government entities. The development of a thriving nuclear industry within the state faces significant challenges, however, particularly with respect to the development of an appropriately trained workforce.

As the only institution in Wyoming which grants degrees at the bachelor's level and higher, the University of Wyoming (UW) plays a unique, critical role in educating the citizens of its state. UW is a land-grant, doctoral-level research university which serves ~12,000 students (drawn largely from a state population of fewer than 600,000). UW offers a wide variety of energy-focused degree programs and maintains a strong energy research portfolio, though nuclear fields have not been well-represented historically. It is critical that more nuclear-focused programs are developed at UW in order to provide students with the necessary research and training opportunities to engage with the state's emerging nuclear industry upon graduation.

To address this gap, the School of Energy Resources (SER) at UW recently established the Nuclear Energy Research Center (NERC), whose primary mission is to support the development of nationally competitive, nuclear-focused research programs across UW. As UW currently lacks traditional nuclear science/engineering departments, initial focus areas for NERC activities have been selected to build upon existing nuclear-relevant UW expertise: fuel cycle chemistry and separations, advanced materials, administrative regulation, and environmental justice.

In this proposal, we outline a plan to recruit and develop the next generation of nuclear expertise at UW: the NERC Faculty Scholars Program. Through this program, we will offer supplements to start-up packages and fellowships to attract exceptional pre-tenured faculty with nuclear-focused research and teaching interests to UW. The PIs will integrate the selected NERC Faculty Scholars into their growing research collaborations with Idaho National Lab and national nuclear energy programs. Faculty candidates will be selected on the basis of prior accomplishments, the quality of their proposed research and teaching plans, and the alignment of these plans with NERC goals. Candidate selection and professional development activities will be managed by the PIs with administrative support from SER. Program success will be evaluated through key research metrics (nuclear-focused publications, external grants), teaching outcomes (courses developed, teaching evaluations), and post-graduation student placement.

Principal Investigator: Caleb M. Hill, caleb.hill@uwyo.edu