

## Calorimeter for Nuclear Energy Teaching and Research

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**Program:** General Scientific Infrastructure

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### ABSTRACT:

The project objective is to improve the technical capability of the Washington State University (WSU) Department of Chemistry in the field of nuclear science, allowing for enhancement of WSU's capacity to attract and teach high quality students. *The specific aim of this project is to purchase and setup a new calorimeter for thermodynamic data determination with radioisotopes, in liquid phases and at solid/liquid interfaces.*

Radiochemistry is one of the flagship academic programs at WSU, administratively located in the Chemistry Department. Six (6) faculty members of the Department of Chemistry are involved in different aspects of nuclear sciences, including environmental radiochemistry, separation, nuclear forensics, radiopharmacology, and computational chemistry. In addition to academic radiochemistry program, WSU is home to the Nuclear Radiation Center (WSU-NRC), which features a 1 MW TRIGA-fueled research reactor and associated radiochemistry laboratory space. In addition to the collaborations fostered between the WSU Department of Chemistry and WSU NRC, a Nuclear Sciences Certificate was reformulated in 2015 and a Nuclear Sciences and Technology Center was recently founded at WSU. The WSU nuclear program in R&D and education match the WSU new research focus themes of "Energy" and "Security". WSU nuclear science program within the Department of Chemistry has shown a considerable growth in the last decade. Out of the 50+ students currently integrated in the radiochemistry program, 30+ are currently conducting experimental work requiring both analytical and radioanalytical equipment.

Although the program currently features adequate radioanalytical instrumentation, there is no calorimeter to perform work with radioactive materials in liquid and at solid/liquid interfaces, for radioisotope thermodynamic data acquisition. A new calorimeter that can be used with radioisotopes will improve the WSU radiochemistry R&D and teaching capabilities, with state-of-the art technology similar to that found in institutions that constitute potential future employers. *Upon completion of the project, WSU will have acquired equipment to conduct nuclear-related R&D work and educate students of multiple research laboratories at WSU, supporting NE's goal of facilitate the transfer of knowledge from an aging nuclear workforce to the next generation of workers.*