

Summer School

Radiation Detection for Nuclear Security

June 20–30, 2023

Pacific Northwest National Laboratory's (PNNL's) summer school course offers a unique hands-on experience that explores how radiation detectors are used in national security missions. The course provides an understanding of challenges in the field and exposes students to the technical foundations, analysis, and insights required to lead technology development and applications in nuclear security.

The two-week course on PNNL's campus* in Richland, Washington, features seminars with top nuclear security experts, tours of operational facilities, and hands-on instruction with detection equipment and methods. Students are also invited to share a short presentation on their thesis research and/or a topic related to the summer course theme.

“The PNNL tours were among the best part of the course. Aside from the fact that they were a lot of fun and interesting, they allowed us to see what current technology specs were at, what requirements were being looked into, and what the current concerns of research in the field are.”

Former Student

Enrollment is limited to approximately 16 students. There is no charge for the course; however, students are responsible for transportation to and from the class, meals, and lodging. Information on local airports, rental agencies, public transportation, and available lodging will be provided.



ATTEND THIS TWO-WEEK, HANDS-ON SUMMER SCHOOL TO EXPLORE:

1

Nuclear security missions and their real-world constraints

2

Interface of technology, policy, and operations

3

Contributions of radiation detectors

**We intend to provide an in-person experience at our Richland, Washington, campus; however, this is subject to change as we continue to assess and adjust our response to the COVID-19 pandemic according to state and federal guidance.*

COURSE OUTLINE AND ACTIVITIES

Week 1 – Foundations

Lectures include:

Fundamentals of Radiation Detection
Gamma-ray Spectroscopy
Neutron Detection
Charged Particle Detection
Nuclear Fuel and Enrichment

Activities include:

Radiation Portal Monitor Measurements and Analysis
Ultra-low Background Detection
Portal Monitor Energy Windows

Week 2 – Applications

Lectures include:

Nuclear Safeguards
Arms Control and Treaty Verification
Interdiction and Emergency Response
Nuclear Forensics
Machine Learning Applications

Activities include:

Border Guard Training
Framatome Fuel Fabrication Facility Tour
Tour of Hanford B Reactor
Tour of Radiochemistry Laboratories

ELIGIBILITY

The course is for science and engineering graduate students who are interested in careers at a national laboratory or U.S. government agency responsible for nuclear security, which will likely require security clearance eligibility (e.g., U.S. citizens). Experienced upper-level undergraduates will also be considered. Students must be enrolled in a graduate degree program in a field relevant to radiation detection, including nuclear engineering, nuclear physics, nuclear chemistry, or high-energy physics. Priority will be given to students whose research is funded by the National Nuclear Security Administration's Office of Defense Nuclear Nonproliferation Research and Development and to those closest to graduating.

“Having done so much with the theory and simulation side of nuclear detection, it was amazing to see the practical applications.”

Former Student

INSTRUCTORS

Key course leaders include Bob Runkle (PNNL), Mitch Woodring (PNNL), Ben McDonald (PNNL), and Professor James Baciak (University of Florida). Other PNNL subject matter experts help lead various tours, activities, and special lectures. The instructors have extensive research and instructional experience in nuclear security and nonproliferation. External guest lecturers typically include leaders from federal government agencies, such as the Department of Homeland Security, National Nuclear Security Agency, and the Defense Threat Reduction Agency.



ABOUT PNNL

PNNL is a center for scientific discovery in chemistry, data analytics, and Earth science and for technological innovation in sustainable energy and national security. Managed by Battelle for the Department of Energy's Office of Science, PNNL employs 5,000 scientists, engineers, and professionals and has an annual budget of \$1.1 billion.

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LEARN MORE AND APPLY

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APPLY BY MARCH 31, 2023

www.pnnl.gov/radsummerschool