Pacific Northwest National Laboratory is pleased to offer a tailored summer school course that emphasizes the need for radiation detection in nuclear security. The course will provide students with a unique understanding of nuclear security challenges faced by operators in the field and expose students to the technical foundations, analysis, and insight that will be required by future leaders in technology development and applications relevant to nuclear security missions. The course will heavily emphasize laboratory and field demonstrations, including direct measurements of special nuclear material, and students will attend seminars given by top experts in nuclear security. Enrollment will be limited to approximately 16 students for this 2-week summer school that combines lectures, real-world technology demonstrations, and tours of operational facilities with relevance to nuclear security.

There is no charge for the course, but 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. Students are invited to deliver a 15-minute presentation on their thesis research and/or a topic related to the summer course theme.

This sixth installment of the summer school is funded by NNSA’s Office of Defense Nuclear Nonproliferation Research and Development.
Course Outline & Activities

Week 1 – Foundations
Lectures include
• Fundamentals of Radiation Detection
• Gamma-ray Spectroscopy
• Neutron Multiplicity Counting
• Nuclear Fuel & Enrichment
Activities include
• Test Track Measurements and Analysis
• Ultra-low Background Detection
• Portal Monitor Energy Windows

Week 2 – Applications
Lectures include
• Nuclear Safeguards
• Arms Control & Treaty Verification
• Interdiction & Emergency Response
• Machine Learning Applications (new in 2019)
Activities include
• Border Guard Training
• Framatome Fuel Fabrication Facility Tour
• Tour of Hanford B Reactor

Student Testimonials ...
“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.”

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

ELIGIBILITY
The course is designed for graduate students in science and engineering programs and interest in careers within the US national laboratory system or federal government agencies responsible for nuclear security. Experienced upper-level undergraduates will also be considered. Special consideration will be given to students whose research is funded by NNSA’s Office of Defense Nuclear Nonproliferation R&D, and students performing research in fields with potential nuclear security applications.

Only US citizens are eligible for this course.

INSTRUCTORS
Bob Runkle is a nuclear physicist and James Baciak is a nuclear engineer. Both have extensive research and instructional experience in nuclear security and nonproliferation.

ABOUT PNNL
Interdisciplinary teams at PNNL address many of America’s most pressing issues in energy, the environment, and national security through advances in basic and applied science. Founded in 1965, PNNL employs 4,400 staff and has an annual budget of nearly $1 billion. It is managed by Battelle for the U.S. Department of Energy’s Office of Science.