

DISTINGUISHED
STAFF FELLOWS
AT ORNL



Jason Nattress

Alvin M. Weinberg Fellow

Where and when did you earn your PhD?

I received my PhD in nuclear engineering from University of Michigan–Ann Arbor in 2018.

What was the subject of your dissertation?

My doctoral research examined how spectroscopic neutron and photon radiography and delayed neutron signatures could be combined to accurately identify special nuclear material. It provided a process map for determining whether an unknown material is benign or a nuclear weapon.

What was your dissertation's major contribution to your field?

My work represented the first instance in which a low-energy, nuclear reaction–based active interrogation source was used to perform dual-mode, multiple-energy transmission radiography. I demonstrated that using neutron and photon transmission radiography in combination achieves higher sensitivity to changes in elemental compositions across the periodic table compared with using the two methods individually.

Who is your ORNL mentor and where are you working on campus?

My mentor is Paul Hausladen, Advanced Radiation Detection, Imaging, Data Science, and Applications group leader and Distinguished Staff Scientist in the Physics Division.



What will your fellowship research focus on?

My fellowship research focuses on developing neutron spectroscopy techniques for a combined fast-neutron/gamma-ray radiography system that can distinguish between high Z materials and produce 3D tomographic images.

What is your project's expected contribution to your field?

My project is expected to provide useful new material identification/inspection techniques to improve scanning times for ocean-going cargo containers.

What are your research interests?

My research interests include detection techniques for nuclear security and nonproliferation, the development of novel neutron detectors, nuclear cross-section measurements, and neutron spectroscopy.

What led you to science and your specific discipline?

Growing up, I had an affinity for math and science but took perhaps a nontraditional route after high school and enlisted in the military as my grandfather had done. I served on the USS Alaska, a member of the Ohio class of nuclear submarines, supervising the vessel's nuclear plant operations, operating the steam and electrical plants, and working on propulsion plant electrical equipment. Being on a nuclear submarine pushed me into nuclear science and generated a deep interest in nuclear deterrents, nonproliferation and security.

What did you do before coming to ORNL?

Before coming to ORNL, I was in graduate school and had worked for a diversified energy company in New Jersey for about 2 years.

Could you share an interesting fact or two about yourself?

During graduate school, I was fortunate enough to travel to a lot of different places, and one of my last stops was National Tsing Hua University. I used the cyclotron there to accelerate high-energy protons into a natural carbon target and then measured the photon yield and radiation dose from the reaction.

