

With hard work and inspiration from Indiana Jones, anything is possible

By Jordan Stidham



Joshua Norfolk participated in the U.S. Department of Homeland Security Domestic Nuclear Detection Office Summer Internship Program because of his love of physics. His research compared X-ray inspection systems used for the detection of nuclear materials in imported cargo.

Millions of cargo containers enter the United States every year, each one being a potential channel for smuggling dangerous radiological/nuclear (R/N) materials. Passport Systems Inc. has developed a new cargo inspection system which features several technologies.

Joshua Norfolk, a junior majoring in physics at Penn State University, conducted research on a subsystem of these technologies.

For as long as Norfolk can remember, he had wanted to be like Indiana Jones, the protagonist in films about a fictional adventuring archaeologist who searches for treasure around the world. Norfolk set aside the Indiana Jones aspirations when he discovered physics.

“When I eventually took physics, I loved it, and I’ve stuck with it ever since. It [physics] gives me a wide range of opportunities upon graduation,” Norfolk recalled.

At Penn State University, Norfolk’s academic adviser disseminated information about a variety of internship opportunities, and the U.S. Department of Homeland Security (DHS) Domestic Nuclear Detection Office (DNDO) Summer Internship Program was one of them.

The DNDO Summer Internship Program provides opportunities for undergraduate and graduate students to participate in projects at federal research facilities across the United States. Participants address issues related to national security and nuclear detection to help DNDO meet its mission of preventing nuclear terrorism and training future generations of scientists.

During his internship with DNDO, Norfolk was mentored by Steve Glenn, Ph.D., at Lawrence Livermore National Laboratory (LLNL) in Livermore, California and carried out research within LLNL's Nondestructive Characterization Institute (NCI).

The purpose of Norfolk's research was to compare the use of a side view X-ray inspection system against the recently developed Passport top-down X-ray inspection system. The systems are meant to detect R/N material in cargo, which could be used in assembling nuclear weapons.

"I have always had an interest in nuclear research, and I liked the idea of working on the country's behalf for our defense," Norfolk said. He presented his research to a group of scientists who are characterizing the same Passport inspection system, and he presented a poster at the Penn State annual student poster symposium.

During his summer internship, Norfolk would spend his weekends travelling with the friends he made through the lab-operated intern Facebook and Google groups. He visited attractions in San Francisco and Santa Cruz, and enjoyed outdoor adventure activities such as white-water rafting and skydiving. He also visited Muir Woods National Monument, Marin Headlands, Half-Moon bay, Alamere Falls in Point Reyes National Seashore, Yosemite National Park, Sequoia National Park, Big Sur and Pinnacles National Park. "In reality, so much more went into my experience this summer than just the time I spent at the laboratory," Norfolk said.

Norfolk anticipates going to graduate school upon completion of his bachelor's degree and getting involved in experimental research to give him a more hands-on approach to his endeavors.

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