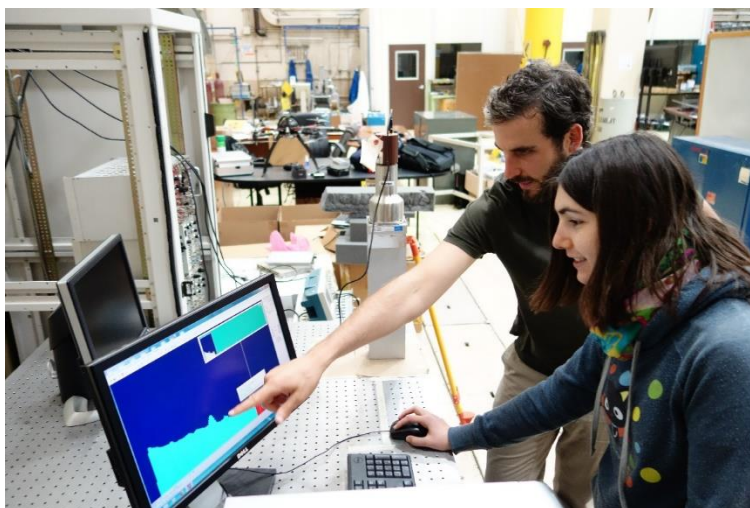


## DNDO intern gains hands-on experience in nuclear detection

**By Jordan Stidham**



*Julia Speicher had the opportunity to improve methods used in the detection of nuclear materials while participating in the U.S. Department of Homeland Security Domestic Nuclear Detection Office Summer Internship Program. Speicher and graduate student, Matthew Marshall, at left, review measurements.*

The view of the night sky with its shining stars and constellations is magnificent. The vast expanse of velvety darkness seems terrifying, yet inviting. At least it feels this way to Julia Speicher, a physics major, who as a child kept calendars with pictures of distant galaxies hanging on her wall.

Speicher chose to study physics because she was always fond of astrophysics. “I find the idea of finding something new highly compelling,” she said, speaking of her motivation to pursue a science, technology, engineering and mathematics (STEM) career.

Recently, Speicher accepted an internship with the U.S. Department of Homeland Security (DHS) Domestic Nuclear Detection Office (DNDO) Summer Internship Program.

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.

For her internship, Speicher was assigned to the Mobile Urban Radiation Search (MURS) project at Lawrence Berkeley National Laboratory (LBNL). The MURS system utilizes a car equipped with various sensors to detect radiation in its environment.

Sodium iodide (NaI) scintillation detectors, which are sensitive to gamma radiation, respond when gamma radiation emits from materials.

The purpose of Speicher's research was to better understand NaI scintillation detectors so testing scenarios can be simulated more effectively, leading to improved performance of the MURS system.

Speicher analyzed different aspects of the NaI scintillation detector during her ten-week internship, under the mentorship of Reynold Cooper, Ph.D.

Speicher significantly improved her research and programming skills, gained hands-on experience with specialized detection equipment and was introduced to multiple methods to verify her findings. She also gained experience utilizing various software, including applications like LaTeX and Overleaf.

In addition, Speicher deepened her understanding of radioactivity and learned how to use simulations to do experiments. "Creating and running my own simulations are aspects I truly enjoyed; I would never have encountered it during my course-work," she said.

Above all, this opportunity gave Speicher a primary focus. As she entered her fourth year at the University of California, Los Angeles (UCLA), she steered her efforts toward high-energy astrophysics.

Speicher's research contributed to an article titled "Simulation and Validation of the Mobile Urban Radiation Search (MURS) Gamma-Ray Detector Response," published in the journal Nuclear Instruments and Methods in Physics Research Section A.

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