



Anna Mattson, a chemistry major in her junior year at St. Olaf College, was one of two interns who worked this summer with INL scientist Leigh Martin in INL's Radiochemistry Lab.

## Interns get directly involved in cutting-edge research

By Casey O'Donnell, *INL Nuclear Science & Technology intern*

Every year, undergraduate and graduate students from around the world travel to Idaho Falls to intern in one of the nation's premier nuclear research institutions.

These interns at the U.S. Department of Energy's Idaho National Laboratory have the opportunity to conduct cutting-edge nuclear and chemical research with real-world applications. As one of the Department of Energy's 10 multiprogram national laboratories, INL performs research related to energy, national security, science and the environment. This summer, more than 200 students interned in INL programs in each of these areas.

Several interns engaged in hands-on laboratory research this summer, including Megan Petti and Anna Mattson. These two junior chemistry majors worked for Leigh Martin in INL's Radiochemistry Lab. Petti, a student at the University of Notre Dame, worked for Martin last summer as well. Mattson, who attends St. Olaf College, joined Martin's lab this summer after "hearing what a great mentor he was."

"Leigh went out of his way to make sure I had a fun, productive and safe summer," Mattson said. "He knew how to strike a balance between giving just enough guidance and just enough independence."

Petti and Mattson credit this balance with giving both of them unique, hands-on research experiences this summer. Petti's research explored ways to increase the fluorescence of europium, americium, and terbium. Under Martin's guidance, she managed to enact "formally forbidden transitions" in the metals that increased the fluorescence.

"This summer has made me certain that chemical research is something I really want to strive towards," Petti said. "My experiences have validated for me that I really enjoy chemistry."



**From left: Megan Petti, Huijin Zhang, Anna Mattson, Leigh Martin, Aaron Johnson (a post-doctoral fellow who worked with the interns).**

Mattson also credited her project with encouraging her to seriously consider grad school. This summer, she looked at ways to improve the fabrication and integrity of sol-gels, silicone-based glass precursors. Sol-gels have a number of applications, including nuclear forensics training exercises. The sol-gels Mattson worked on would offer forensic experts a way to improve the analysis of exploded glass-encapsulated radioactive materials, such as  $^{137}\text{Cs}$  sources, a type of radioactive dispersal device.

On a different end of the spectrum, Charles Sosa, a nuclear engineering doctoral student at the University of Michigan, had the opportunity to work on a nuclear safeguards project. Sosa spent his summer working for INL's Nuclear Nonproliferation Division under the mentorship of Sean Morrell. The international standing of this division is what drew Sosa to INL, where he could get directly involved with current, state-of-the-art research relevant to nuclear security.

Sosa's project was part of an effort to design a system that continuously monitors the movement of spent nuclear fuel assemblies at INL's Advanced Test Reactor spent fuel storage pool. Sosa helped to identify several necessary parameters that would allow the system to operate efficiently and effectively. He hopes to develop a collaborative thesis with INL as he continues to work on his Ph.D. at Michigan next year.

"I had a great experience working at INL this summer," Sosa said. "All of the employees I interacted with in the Nuclear Nonproliferation Division were supportive and professional. They were a pleasure to work with and learn from. They made my internship at INL a welcoming and very enjoyable experience."



**Huijin Zhang is a University of Idaho graduate student intern also working in Martin's Radiochemistry Lab.**

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