

Their Brilliant Careers: Student Experiences at Synchrotron Light Sources

by Kate Sadowski

Synchrotron research isn't just ideal for exploring natural materials such as soils, plants, and particulates, says University of Delaware soil chemist Don Sparks. It's also ideal for fostering the explorations and development of young scientists.

"It provides a key learning experience," says Sparks, who helped pioneer the use of synchrotron-based techniques in environmental chemistry two decades ago, "and a top selling point when students graduate and head into the job market."

He should know. Under his mentorship, graduate students and postdocs frequently travel to synchrotrons around the country and the world, and today 24 of his former group members continue to conduct research at synchrotron facilities on four continents.

One of them is SSSA member Jen Seiter, who works as a research physical scientist with the U.S. Army Corps of Engineers at the Engineer Research and Development Center in Vicksburg, MS.

"As a former member of Dr. Sparks' research group, I was privileged to travel to Brookhaven, Argonne, and Lawrence-Berkeley National Laboratories, and today I conduct environmental research using the skill set I developed there," she says. "I am very grateful to have a stable and exciting job doing exactly what I was trained to do."

University of Delaware alumnus Ryan Tappero agrees that the synchrotron research he did as a graduate student was very influential in his career. "I gained valuable experience and made important contacts that ultimately influenced my decision to pursue a career at a synchrotron facility at a national laboratory," he says. He now works as a beamline scientist at Brookhaven National Laboratory.

Meanwhile, current University of Delaware doctoral candidate and SSSA, CSSA, and ASA member Matt Siebecker is studying metal sequestration in soils and has used both the National Synchrotron Light Source at Brookhaven and the Stanford Synchrotron Radiation Laboratory for his work. Not only is synchrotron light an indispensable part of his research, he says, but having the chance to work at national labs has really opened his eyes to a larger world of science, as these facilities draw scientists from a vast array of fields.

"When I came to [the University of Delaware] in 2007, I hadn't really done a whole lot of research. I didn't know what types of instruments and techniques were out there," he says. "But Dr. Sparks has done a lot of great



Shannon Carter and Matt Siebecker are two graduate students at the University of Delaware who have benefited from using the synchrotron at the Brookhaven National Laboratory.

research and has been able to help us get time at these national labs. This allows his students to learn some of the advanced techniques that are available and apply them to their research."

Yet another member of Sparks' research group, Shannon Carter, has used the synchrotron at Brookhaven National Lab to determine the species and distribution of metals and metalloids associated with particulate matter emitted from poultry houses. Her goal is to understand whether metals such as arsenic and copper in the particulates could pose health risks to workers who breathe them in—making it crucial to know the metals' exact form.

Working at Brookhaven, she says, is intense: Scientists collect data around the clock, and experiments take an unusual amount of planning because if they get messed up, there isn't time usually for do-overs. But synchrotron research is also rewarding. And while it is specialized, performing it doesn't require any special prior experience or knowledge.

"I come from a biology background," Carter says. "When I joined the group, I didn't know anything about synchrotron spectroscopy. Now I'm comfortable using a couple of different applications. Micro-X-ray fluorescent mapping, for example, provides detailed maps of elemental distribution and association in natural systems."

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