Stacy Sherrod

Kristin Elise Phillips, Health and Science writer at the University of Texas at Austin

April 2019

Diagraming a Resourceful Core

It took some time to convince Stacy Sherrod—currently Executive Director of the Center for Innovative Technology (CIT) at Vanderbilt University—that she should be interviewed for the 'Faces of Mass Spectrometry' series. But after a few minutes of desultory conversation, she switched gears and said something that you'd expect from someone who drives to work a different way each day.

"Let's do it!"

Sherrod's voice exudes self-possessed warmth with a cadence that reflects her Texan roots. She grew up in a small town downwind of oil refineries and hurricanes, where much of the turf for America's lawns is produced. After graduating with a chemistry degree from Sam Houston State University (2003), she convinced David Russell, her graduate school advisor, to let her arrive early, at the beginning of summer, to try her hand at research. She knew that Texas A&M was not only the farthest that she lived from home but that there would also be a shift in research expectations. And she wanted to be prepared.

By her early 30's, Stacy Sherrod had completed two postdocs and had a mandate from her Vanderbilt colleague John McLean: to build and direct a new mass spectrometry facility to support the university's diverse scientific community. Since 2014, she has been a Research Assistant Professor in Chemistry and built the CIT by assembling a team of complementary experts, developing a public face and communications strategy, and discovering the best strategies for a plethora of research projects. The results: about two dozen publications stemming from research in the center in the few years since its inception.

"I really enjoy being part of a large research team. In the CIT, we work together to try to solve problems that scientists in other fields bring to us. That's our jam, right there."

What is your favorite research project?

Ooh, let me think about it. In grad school, I developed a method using silver nanoparticles specifically for MALDI mass spectrometry imaging. [Sherrod, S.D., *et al., Anal. Chem*., **80**, 6796–6799 (2008)]. I think people cite this not because it was novel but because it was a method that allowed for cholesterol to be analyzed via mass spectrometry imaging. Knowing that "Oh, people are interested in this!" is always fun to see.

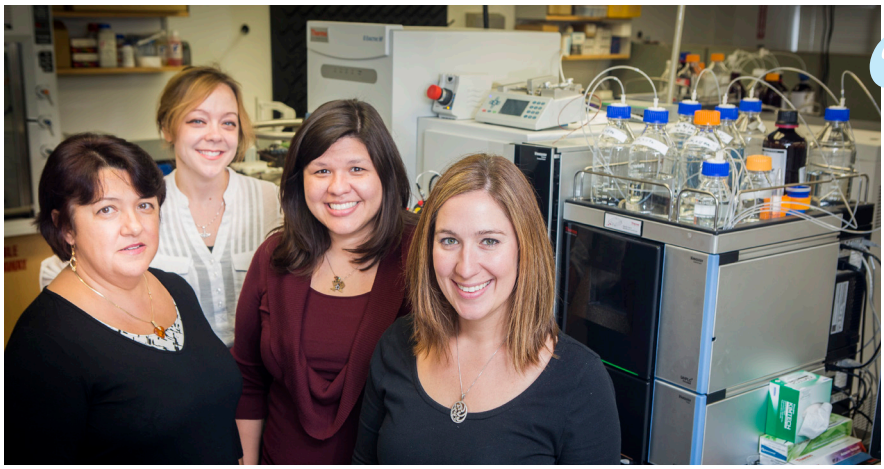
How did you get your start in science?

It was my high school chemistry teacher, Mrs. Yarbray—who I still keep in contact with—who was passionate about science and challenged me. It was the first time where I said, "hey, I like this class – it's fun!" I'm from a small town near Pasadena, Texas—aka Stinkadena—known for its smelly air from chemical plants on the Houston Ship waterways. My dad was an electrician/instrumentation engineer at one of these plants. He was always very technical and hands-on. When I was getting my chemistry degree, he took me to his workplace. And, I kid you not: there was a whole lab FULL of GC-MS instrumentation. They were everywhere! I didn't realize how much I had in common with him until then.

I was the first member of my family to go to graduate school. I applied on a whim—well, let's be real—my roommate (and good friend!) was applying [laugh], so I thought I would apply also. Maybe I should just say that "I was encouraged by a friend!" And guess what? I got in! During that time, I had narrowed my interest to analytical chemistry, and Texas A&M was closest to my comfort level. It felt like home.

How did you get started at CIT?

When I came to Vanderbilt, I was hired as a postdoc. Actually, I did two postdocs. First, under Prof. Dan Liebler, we used shotgun proteomic analyses to study different types of cancer. In particular, I optimized a



"I really enjoy being part of a large research team. In the CIT, we work together to try to solve problems…"

Center for Innovative Technology team members. (left to right) Simona G. Codreanu, Randi L. Gant-Branum, Stacy D. Sherrod and Alexandra C. Schrimpe-Rutledge

phosphotyrosine enrichment method for subsequent MS analysis using internal reference peptides for quantification [Sherrod, S.D., *et al., J. Proteome Res*., **11**, 3467-3479 (2012)]. During that time, I realized that staring at and trying to understand biological pathways and their role in different types of cancer was not for me. I am an analytical chemist interested in providing high-quality data with the necessary controls.

During my following postdoc, I learned photolithography, how to work in a clean room, and how to build and fabricate rotary planar peristaltic micropumps (RPPMs), valves (RPVs) and microfluidic devices/organ-on-chip devices. I realized that I'm a 'fill-in-the-gap' person. If I see a need, I will learn the methods and other steps needed to meet deadlines. I also realized that the lab needed someone to assess the RPPMs and RPVs that were being fabricated. So, I worked with other team members in the Vanderbilt Institute for Integrative Biosystems Research and Education (VIIBRE), mainly engineers, to develop a quality control manual and testing on all devices prior to delivery to customers. After a few years working in VIIBRE, I was recruited by John McLean to establish the CIT.

What are you working on right now?

Ooh, so many hard questions. Maybe I should have prepared more! Recently, the CIT has had a few manuscripts accepted with data that we generated before my maternity leave with my second child, which was in 2015!

One project that was fun was a multidisciplinary project in collaboration with other chemistry, physics, and biomedical engineering faculty where we built, tested, and performed experiments on organ-on-chip systems [Wikswo, J.P., *et al., IEEE Trans. Biomed. Eng*., **60**, 682 – 690 (2013)]. We tested the effects of nerve agents on young and old neurons that were used to form the blood brain barrier in the NeuroVascular Unit (NVU), a blood brain barrier organ-on-chip. We performed both dose and time dependent studies with the devices and analyzed the secretome of small molecules from both vascular and brain sides of these devices. To bring it home a little more: Let's say, there's some chemical that gets into our drinking supply. How does that affect children and adults, and how do we mitigate the exposure or effects of exposure?

In another recent project, we worked with faculty in biochemistry to optimize a unified multi-omic sample preparation method to study the mechanism of action of Zn on NRF2 antioxidant and NF-κB [Gutierrez, D.B., *et al., J. Proteome Res*., **17**, 3396-3408 (2018)]. These are the projects that I enjoy: they are larger than me, and provide the metabolomics and small molecule analysis for the team.

What have you found challenging?

Hmm. Challenge. [pause] I guess I would say that, academically, grad school was the most challenging for me. During this time, I grew the most scientifically, lost confidence, and then gained my confidence back. My creativity, values, and scientific knowledge were tested and shaped during this time. I did A LOT of growing, and it was hard. I mean, what did I expect? I applied to grad school because my friend did! I had no idea what I was getting myself into, but I was willing to learn and ready to take on a challenge. I still am! Right now, I'm a mother of two young daughters. I'm not sure I believe in work-life balance!

What do you do outside of the lab?

My husband is also in the sciences, and we have two young daughters. Our jobs keep us pretty busy, but I'm a low prep adventure-type person. Exploring different places is fun. Our backyard backs up into an agricultural center. We 'hop' the fence, spend time on the trails, watch the horses, and see what the master gardeners are growing. And this past summer, we would choose a state park that is within a few hours, get up, drive, and hike. That's the nice thing about work too; I'm not doing the same thing every day. I have meetings—so many meetings—but they are about different projects, building relationships with our collaborators and pushing science forward.