

The Faculty Member: Livia Schiavinato Eberlin

HEALTH, CHEMISTRY, Q&A, RESEARCH

Assistant professor of chemistry. Interviewed by Kristin Phillips.

What inspires your work right now?

I love asking clinicians, “What is your main problem when treating patients?” My collaborator at Baylor College of Medicine mentioned one type of thyroid cancer that is very difficult to diagnose through a biopsy. Do you know what they do? They schedule a surgery, remove part of the thyroid, and *then* are able to say, “Oh, it’s benign.” It is crazy that some patients have to do hormone replacement therapy for the rest of their lives because there is no technology that can tell preoperatively whether a tumor is malignant. So we are developing a new approach to analyze and diagnose a biopsy tissue sample before surgery by recognizing patterns of molecules.

Can you tell us more about the method you have developed to detect cancer?

I develop methods for direct tissue imaging, called ambient ionization mass spectrometry techniques. We look for an abundance of metabolites, or end products of biological processes, that are going on in cells right now. A very aggressive tumor, for example, leads to a pattern of hundreds of dysregulated molecules that we can capture from a tissue in real time. And then – just like Facebook can recognize a pattern and tag your face in a picture – we use computational methods to recognize molecular patterns and provide a diagnosis.



Credit: Wyatt McSpadden

How did you discover this technique?

When I started research in mass spectrometry as an undergraduate in Brazil, people hadn’t thought about using this basic technology for rapid cancer diagnosis or inter-operative use. I had an opportunity to do this applied research as a Ph.D. student at Purdue University, developing desorption electrospray ionization (DESI) for tissue imaging. The process is simple: you give a solid sample a little shower of charged solvent droplets and then analyze the extracted molecules in the mass spectrometer. I used DESI to see if we could distinguish normal from cancerous tissue, and we got excellent accuracy. Since then, I’ve been continuously improving this line of technology, and now we are working with thyroid, ovarian and breast cancers, as well as endometriosis.

What are you passionate about outside of the lab?

I try to be really wise with my time. My husband and my two little daughters, are really my priority. I love being with them. Social justice is also something I have always been passionate about. I tell my students that our research is addressing a need that is very significant. But people have other needs that are easier to address. For example, our lab has been volunteering at the Central Texas Food Bank. People are hungry, and you don’t need mass spectrometry for that.



Learn More

Press release: [Chemist Receives CPRIT Award for Tool to Recognize Thyroid Cancer \(Nov. 22, 2016\)](#)

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