FACES OF MASS SPECTROMETRY / *Maryam Goudarzi*

ASMS

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One Person, One Voice

Maryam Goudarzi speaks with candor when reflecting on some of the hurdles she faced entering the field of mass spectrometry, and she regards her early work in mass spectrometry as an excellent example for learning and mentorship. In fact, opportunities stemming from mentorship have been a frequent theme throughout her career.

Maryam's introduction to metabolomics was equally shaped by mentorship and determination to expand her horizons. Upon graduation, Dr. Lance Liotta, co-director of the Center for Applied Proteomics and Molecular Medicine at George Mason University introduced her to the laboratory of Dr. Albert Fornace at Georgetown University specializing in metabolomics. At the time, she was new to metabolomics. Regardless of the learning curve, she took on the challenge and embraced the field of metabolomics.

One of the major focal points of Maryam's work has been an effort toward improving data accuracy and data analysis tools in untargeted metabolomics—something she describes as being "a beast onto itself."

Maryam has treasured being able to positively influence the careers of those she has mentored, through her work with the Womxn in Metabolomics (Womix) committee, and through

her most recent position at SCIEX. However, Maryam emphasizes that it's important for scientists to build a wide network of influences. In her view, it's crucial for early-career scientists to learn from a range of mentors, both in academia and in industry. "Ask as many people as you possibly can for their input," she advises, because "I'm one person, one voice, and one set of experiences."

How did you get your start in mass spec?

When I joined the lab of Dr. Timothy Born at George Mason University (GMU) to pursue my PhD, we had access to mass spectrometers. I knew I wanted to gain experience on a mass spec, and I got lucky at that time. That's because two brilliant scientists, Dr. Liotta and Dr. Petricoin moved their labs to GMU and set up the Center for Applied Proteomics and Molecular Medicine. With that, of course, came several mass specs, including one I could use for my project. This provided me with an excellent opportunity to learn as well as access to great mentors in the application of mass spectrometry.

When, and how, did you decide to focus specifically on metabolomics?

When I graduated with my PhD, Dr. Liotta introduced me to the lab of Dr. Fornace at Georgetown University, which focused on metabolomics. I had no idea what metabolomics was, but understood that it was mass spec-based. So, I took on the challenge to learn a new application of mass spec, including new software and workflows.

How has taking a mentorship role with students provided rewarding experiences?

My involvement in various mentorship programs spans across my professional career from Georgetown University to Cleveland Clinic Lerner Research Institute and now at SCIEX. As a research faculty, I mentored postdocs and students who would visit us from other graduate programs. Talking to them about mass spec and giving lectures on metabolomics have always been rewarding to me. But the most rewarding experience has taken place since we formed Womxn in Metabolomics, or WomiX. As part of Womix, we offer a mentorship program, where you can sign up as a mentee or mentor. I signed up as both and currently have three mentees. It has been especially rewarding to help them with job searches and interview skills. At SCIEX, I have been fortunate to be part of a greater network of scientists with a shared mission of strengthening the partnership between academia and industry and creating more opportunities for early-careers.

Jackpot- a shared project with mom resulted in 30 limes on our 7-year-old tree

> *You can always find associations and places that are looking for mentors. I have been fortunate to be part of a greater network of scientists with a shared mission of strengthening the partnership between academia and industry and creating more opportunities for early careers.*

How did you first get involved in the WomiX committee?

Back in 2017, I heard about the North American chapter of the Metabolomic Society. This became the Metabolomics Association of North America, or MANA, and I was their inaugural vice president. As we were getting started, I had thought about creating something within MANA for women in the metabolomics, but I had not acted on it. It wasn't until our very first conference in Atlanta in 2019 when another colleague brought up the idea and this conversation became the spark that ultimately led to the establishment of WomiX with great support from MANA board of directors. We now have regular monthly meetings, where we discuss various activities based on the interest of our members.

Could you tell us about your work aimed toward accumulating a critical mass of metabolomics data and improving data coherency?

The bulk of my work has been on gathering untargeted metabolomics data, which is a beast onto itself. You can easily accumulate metabolomics data—if you do one LCMS-based metabolomics study, you have enough data to stay busy with for the rest of the year. The question is the quality of the data and how you treat the data, especially if you take into account the downstream studies, that might link into the original study you ran five years ago. I think it was Dr. Gary Patti, who said that "untargeted" metabolomics does not mean "unplanned." The key is inviting metabolomics experts to study planning early enough to ensure proper implementation of QA/QC measures, adequate sample sizes, compatible sample collection/storage/preparation, and limiting confounding technical variations. Often enough, the

experts in the receiving metabolomics service core facilities are not involved in the planning stages of the studies, which makes biological interpretation of the data challenging.

What projects are you working on now?

High confidence compound ID is the main bottleneck in untargeted metabolomic studies. To address this, I am focusing on MS/MS spectral quality with improved spectral specificity and sensitivity. The ultimate goal is to achieve accurate compound IDs for metabolites and lipids via the novel Electron Activated Dissociation (EAD) capability. EAD provides additional diagnostic fragments that help identify metabolites with isomeric specificity (positional and cis-trans isomers) that otherwise would be unattainable via CID. This may fast-track biomarker discovery to biomarker validation in fewer injections.

What are your interests outside of the lab?

I have an active six-year-old son, who defines how I get to spend my weekends. He's now tall enough to ride certain rollercoasters, like the Magnum XL at Cedar Point, which is 205 ft tall and travels at 72 mph. I, on the other hand, am absolutely terrified of rollercoasters. When I have time to myself, I enjoy gardening with my mom. We planted herbs and vegetables this summer including ghost peppers. We also have a 7-year-old lime tree that we've managed to keep alive in Cleveland.

What is your advice for someone who wants to enter your research field?

The best piece of advice I can give is find yourself the right mentors and sponsors and be your own biggest advocate. I often tell my mentees to find a network of mentors because I'm one person, one voice, and one set of experiences. The mentees need a diverse collection of experiences from mentors in various sectors. This encourages them to step outside their comfort zones to consider unique opportunities that otherwise would be lost. Another advice I can give is that once you make a career choice, stay committed and give it time. Don't run away from challenges. Set a plan for yourself, and every year evaluate your trajectory. Your career may take many different turns, so just roll with it. In each turn, embrace your strengths, because that's what's going to define what your next opportunity is going to be—and network, network, network!