FACES OF MASS SPECTROMETRY / Yan Wang

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The Trail to Success

Yan Wang is Director of the Mass Spec Facility at the National Institute of Dental and Craniofacial Research (NIDCR), National Institutes of Health (NIH). She became interested in mass spectrometry while earning her PhD in medicinal chemistry at the University of Illinois Chicago, where she was a member of Richard van Breemen's research group. During grad school, Yan's studies focused on quantitative analysis of small molecule nutraceuticals, and she considered pursuing a career in the biopharmaceutical field. However, in response to some personal and professional developments at the time of her graduation, Yan's career path changed direction. As a result, Yan started her career in core facilities right after grad school, accepting an opportunity to work in the mass spectrometry facility at the University of Illinois Chicago. In that position, she transitioned into proteomics research, which prepared her for her next position, to establish a proteomics core facility at University of Maryland, College Park. Then, 11 years later, she moved to the neighboring NIH to establish a new mass spectrometry facility for NIDCR.

Yan has nearly 25 years' experience in this type of role. She finds this job rewarding for a variety of reasons, but some of her favorite perks are that she gets to stay with her passion in advanced mass spec technology and use her expertise to help advance biomedical research. The position allows her to learn about numerous exciting biological stories and be part of them, while helping researchers carry their projects forward.

Yan has been a member of ASMS for over 25 years and has co-authored over 50 journal publications. Notably, Yan has served as co-chair and Treasurer of the Washington-Baltimore Mass Spectrometry Discussion Group (WBMSDG) and co-chair of the NIH Proteomics Interest Group. She values her experience with these groups because it has helped her develop confidence in herself and learn more about the business side of being a scientist.

For young scientists or those who are just beginning their careers, Yan emphasizes the importance of understanding one's own interests, developing a personalized definition of success, and striving to achieve that success on one's own terms.

These comments reflect my research and professional experience and may not reflect the views of the NIH, HHS or the U.S. Government.

Did your interest in mass spec begin with your undergraduate and master's degree studies in China, or with your PhD with Richard van Breemen?

Back in China in the 1990s, I was a chemistry major, and I only knew about electron impact ionization. Mass spec was considered one of the least helpful analytical techniques. It was during the first year of my PhD program at UIC when I first started to see all the applications of modern mass spectrometry, and I got hooked.

How did you come to your current position at National Institutes of Health?

IWell, that entailed a lot of coincidences. The whole time I was in grad school, I was thinking of going into biopharma. But then, six months before I finished graduate school, I had my first baby. Then, at the time I was looking for a job, biopharma was freezing their hiring. Meanwhile, the mass spectrometry laboratory at University of Illinois Chicago was expanding a lot, was more than triplicating the number of instruments that they had, and was looking for someone to manage them. The result of those three developments—all of which took place around the same time— completely shifted my career path. Instead of getting into biopharma, I started my career in core facilities right after grad school. At that time, proteomics was taking off in the field, and my focus transitioned from small molecule quantification to proteomics. Several years later, when my husband took a job with the FDA in Maryland, UMD was establishing a new proteomics core. My experience made me the perfect fit for that position. Then, 11 years later, NIDCR (part of NIH) decided to establish a mass spec lab, and I was looking for something more exciting at the time. So here I am.

You don't have to be famous to experience true success – it should be based on how you define it!

Three generations of mass spectrometrists at the ASMS conference in Baltimore in June, 2025. On the lefthand side is my thesis advisor, Richard van Breemen (professor of medicinal chemistry, Oregon State University). In the middle is Richard's thesis advisor, Catherine Fenselau (professor emerita, University of Maryland, College Park). I worked closely with Richard in my first job, then with Catherine in my second job. (Photo courtesy of Yan Wang.)

What led you to first begin focusing on proteomics?

To some degree, you could say I was pushed into it. Back in 2001 or 2002, when I was first starting out, proteomics as an application was maturing, with instruments that were able to do data-dependent acquisition. Also, software made bulk data acquisition and processing possible. Early adapters were seeing potential, but not many core labs had the capacity to help them. As someone with a strong mass spec and chromatography background, and as a new kid on the block, I was pushed into this new area. As a matter of fact, it took me quite a while to get used to the natural uncertainty of proteomics (as opposed to small molecule quantification). For the first several years, I was looking for opportunities to get back to small molecules. Now, I hesitate to take a small molecule project instead.

We understand that you have been an MS core facility director for almost 20 years. What has that role entailed?

Most of the time and effort goes to talking with researchers to come up with a research plan. Then, I help them get their samples ready for analysis, set up LC-MS/MS analysis, process the data, send a report, and discuss it with the collaborator to see if follow-up is needed. When a project is ready for publication, there's help with writing and sending data to repositories. Then there's method optimization, staying up to date with technology development, and deciding when a new technology is mature enough to be incorporated into the core. The instruments need to stay at optimum operation, so there's routine maintenance, service calls, and preventative maintenance. There's also a lot of record-keeping and periodic reporting, along with budget control and billing tasks. In addition, there's funding for instrument upgrades when the time comes. And when secure funding is in place, there's picking the right instrument to update to. In summary, it's a combination of science, technology, and management.

What is something you find rewarding about working as an MS facility director?

My favorite aspect is getting to know everyone's story and being part of it. Everyone coming to you will tell you their biological story: what they're working on, why it's important, why it's exciting, and how they need your help. Then you "translate" what they need biologically into the "proteomics language," help them come up with an action plan, and carry through to deliver the results. This really suits my personality well. I enjoy learning about all of these stories but don't really care to focus on any one of them for a long time. Then, I love mass spectrometry and get excited with all of the new developments. However, I lean more toward using the newest technology rather than developing it. My role as a core director creates a perfect niche for that.

If you do not have bubbling ideas that you are itching to work on, but you enjoy collecting new technology and applying it to meaningful research, this is the track for you.

Moraine Lake during our family trip to Banff National Park in 2022 before the kids moved out for college (Catherine) and graduate school (David). From left to right are my husband, Xin Fang, and children, David and Catherine Fang, and I'm on the right. (Photo courtesy of Yan Wang.)

We also understand that you have been a member of ASMS for 25 years. What have you learned from being involved in ASMS?

The first couple of years that I went to ASMS, I was a grad student. At that time, it wasn't nearly as large as it is today, so I had the chance to get to know lots of my fellow graduate students there, and we would get together at hospitality suites. These days, many of those same people I met back then are famous professors! So, I really grew up professionally in ASMS, and over the years, it has become a home for me. Every year at the annual conference, I catch up with old friends and make new ones. One thing unique in my career is: I spent a decade with my thesis advisor, Dr. Richard van Breemen, as a graduate student and then as a colleague. Afterward, I spent another decade working closely with his thesis advisor, Dr. Catherine Fenselau, whom I half-jokingly call my "academic grandmother." The three of us have a small tradition of having lunch together at ASMS every year.

How have your roles as Treasurer of the Washington-Baltimore MSDG and co-chair of the NIH Proteomics Interest Group helped you grow as a scientist?

For a long time, I shied away from serving in any committee. Then, I suppose I experienced a mid-career crisis and started to look for ways to grow. I started with the Proteomics Research Group of the Association of Biomolecular Resource Facilities (ABRF), where I served as a member and chair for five years. That's when I realized that being a participant in a society is great, but volunteering in that society brings your sense of belonging to a whole new level. Once I started, I soon got involved with WBMSDG and the Chinese American Society for Mass Spectrometry (CASMS). The NIH Proteomics Interest Group started soon after I moved to the NIH. These roles really helped me understand the whole non-profit world and the business side of being a scientist, which I didn't know much about beforehand. Also, organizing programs

for WBMSDG and ProtIG involves inviting and hosting a lot of speakers. Most importantly, this process has really helped me to develop confidence in myself and realize that I have a voice. You get to work with all of these scientists with big names, which might be intimidating at first—but you come to understand that they're really just like you!

When you are outside of the lab, do your interests include traveling to see your family?

I didn't visit my family in China much when my kids were young. Instead, I encouraged my parents and in-laws, who retired around that time, to come to the United States so they could get to spend more quality time with them while they were still growing up. Now that my kids are adults and my parents are aging, I plan to visit them at least annually. Aside from my day job as a scientist, the other job I take very seriously is being a mom. Watching my kids grow is the most rewarding thing in my life. I enjoy cooking for my family and going with them to national parks (Figure 2). Two other big passions of mine are traveling and hiking. I grew up in the western mountain area in China, and I always still enjoy going into the mountains. Once my nest became empty, I joined a couple of local hiking groups and started taking hikes of eight to twelve miles with them. This has become my Saturday routine, and I've made a lot of friends in the process. This past April, I went on a hiking trip to South America (Figure 3) with some of those friends! We spent seventeen days going from Iguazu to Patagonia. On the longest day, we hiked twenty miles to Mount Fitz Roy. I doubt I'll ever break that record.

What is your career advice for younger scientists who might be interested in working as an MS facility director?

I want them to know that it's definitely more rewarding than they might think! If you do not have bubbling ideas that you are itching to work on, but you enjoy collecting new technology and applying it to meaningful research, this is the track for you. For any young scientist, I want to emphasize the importance of understanding yourself better. You should create your own meaning for what a fulfilling life is. Making a big impact and getting famous is glorious, but for me, it's more important to find the right balance between career, family, and your own mental and physical health. In today's world, with social media, we see one friend publishing a high impact paper, while another one had a child who made this milestone achievement, and yet another one had this perfect vacation. If you are not careful, it's so easy to feel like a loser. You need to constantly remind yourself that there's only a certain amount of time available, and our brains have limited processing power. Another piece of advice is to try to be more outgoing—you can't be afraid to talk to people in this business if you want to succeed. At the same time, though, it's important to understand that you don't have to be famous to experience true success—it should be based on how you define it!

In the Chilean Patagonia this past April. I went with a group of hiking friends and spent a week there. (Photo courtesy of Yan Wang.)