

FACES OF  
MASS SPECTROMETRYJose  
Navarrete-Perea

Anne Brenner and J.D. Brookbank are science writers at Technica Editorial Services.

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## Embracing Change

Jose Navarrete-Perea first became interested in mass spectrometry while pursuing his PhD in immunology at the National Autonomous University of Mexico in Mexico City, where his research focused on infectious diseases.

While there, Jose decided he wanted to take a more technology-focused approach toward his studies. Jose began seeking opportunities for internship rotations and eventually accepted a position with Dr. Steven Gygi's lab in the Department of Cell Biology at Harvard Medical School. While working with this team—during the initial rotation and later as a postdoc, Jose gained valuable experience with mass spec instrumentation, particularly through his involvement with the Human Interactome Project.

After completing this rewarding experience, Jose accepted his current position with Merck, known as MSD, outside of the United States and Canada, where he now works as an early drug discovery researcher. Notably, this transition has allowed him to renew his prior interest in infectious diseases. In addition, he enjoys contributing to the entirety of the drug development process, from discovery to product delivery.

Jose notes that he is especially grateful for the impactful mentors who have helped him grow and progress. Because of this, Jose welcomes every opportunity to play a similar role for younger or newer researchers and colleagues in the early stages of their careers. In particular, he enjoys helping these professionals develop new skills and find their own identities as scientists.

**Did your interest in mass spec begin in Mexico City or here in the United States?**

It began in Mexico City when I was doing my PhD on infectious diseases. I was working with a parasitic infection called cysticercosis, which can be found in the muscles and brain. The hypothesis of my project was that the parasites in each tissue changed their protein expression, and those changes can be recognized by circulating antibodies. At the time, I was learning a lot of techniques, but I realized that those methods were not enough to get the resolution I needed at that time. As a PhD student, I was reading and trying to discover new things, so I started changing the types of references I was using. Rather than looking at only infectious diseases, I started thinking about the information from the point of view of technology as well. That is where and how my interest started.

**What first brought you to your current position with Merck?**

When I realized that mass spec was a valuable tool for helping me decipher my PhD, I knew I needed to find someone who could take me in for an internship rotation. I wrote a lot of emails to many different researchers around the world, and most of them either turned me down or did not reply at all. It was discouraging at first, because I felt like no one was giving me a chance. But I kept trying, and that is ultimately how I arrived at my position at Harvard Medical School. My move to Merck goes back to my interest and training in infectious diseases, particularly the parasitic infection I mentioned, cysticercosis. This illness is especially prevalent in developing countries because it is associated with poor hygiene, a lack of access to clean drinking water, and other similar conditions. The standard diagnostic tool for cysticercosis was imaging technologies such as MRIs, which are extremely expensive. This means patients in developing countries who are impacted by this disease are not diagnosed due to a lack of affordable testing. I was inspired by the absence of inexpensive medical tests to try to find antigens of cysticercosis to create low-cost diagnostic tests that can be available to all populations. In addition to access and affordability, I enjoy being able to see everything that happens between a scientific discovery, its translation into a product, and its delivery to the people in need. All these elements were contributing factors in my decision to make a career change. I will always consider myself so lucky to have amazing mentors helping me and supporting me in the career that I now have. That is the thing about this field: You cannot be afraid of change!



“Keep your circle close to you. This could be your friends, your colleagues/mentors, your family, or a mixture of them all, but keeping your loved ones close is always important.”

*Mentors are key figures on our careers—(left) Steven P. Gygi and (right) João A. Paulo helped me build the scientist I am today. (Photo Courtesy of José Navarrete-Perea.)*

### ***How did you develop a specific interest in mass spec as it relates to infectious disease?***

As I said before, while I was doing my training on infectious diseases, we really wanted to develop diagnostic tools that were economical and readily available to all populations and because we didn't have low-cost diagnostic tools at that time, I was trying to build on my expertise in developing tools in order to understand and advance our understanding of biological problems. So, I would say innovation and affordability were my main motivations.

### ***Is your work focusing on a particular area of study right now?***

I would not say there is any one specific area, but it is mostly in drug discovery, as well as the development and application of novel technologies for systematic studies of biological systems, in response to a given chemical perturbation. In terms of a particular field, I would say I am currently working in the application field.

### ***We understand you have been an ASMS member since 2017. How has being in ASMS helped you learn and grow as a researcher?***

I try to go to the ASMS annual conference as often as I can. It is my favorite conference to attend because mass spec has so many different applications, and you are able to look at all of them together in one place, while giving them different formats and places for showcasing them. You have the ability, for example, to see both the proteomics and metabolomics sides of things, along with chemical analysis. As a scientist, it is a rich environment that I love!

### ***We also understand that you have served a key role in the human interactome project. What does that entail?***

This is a very big multiannual project, and it was one of the very first projects I started working on as a research fellow. That was when I first learned the instrumentation part of mass spec—checking on samples and how they were acquired in the instrument. When something went wrong, we would have to fix it and get things running again. That was where I learned to do instrumentation in my career, because we were always processing tons of samples. It is also how I learned about isolating problems related to instrumentation—if there is a problem, is it because the sample can be improved? Or is it the mass spectrometer, or any other instrument on the workflow? These were questions I learned I had to ask. During that time, I had a great circle of people and mentors helping and supporting me, which was so important in developing my career.

### ***What achievements are you most proud of as a scientist?***

The opportunity to mentor younger or newer scientists who are still in the early part of their careers gives me the most pride as a scientist. Looking back on my own career, if I did not have mentors who believed in me when no one else did—I would not be where I am today. It is very rewarding to offer this mentorship back to the younger and newer folks, facilitating their learning and growth and to see them find their own identities as scientists. I love witnessing how their scientific training helps them in their day-to-day professional lives. It gives me great joy to know that I can be someone who helps make a positive change for them!





“Rejection certainly does not define what we do. A career is a mixture of different situations, both good and bad. If you face rejection, just keep going!”

My first half-marathon in Boston!  
(Photo Courtesy of José Navarrete-Perea.)

***How do you sustain your passion for learning and conducting experiments, especially during challenging times?***

To give a bit of personal background on this topic: When I was in high school, I was an avid chess player. From the competition side of the sport of chess, I understood how important motivation was, but also how important discipline was. And it is a discipline-- to keep trying. The same goes for working in science and conducting experiments. For me, in science, the passion element is always there—I really love being a scientist. You really need to enjoy and have passion for what you do, because the motivation ebbs and flows. We are all human, and we all have situations happening in our personal lives that might influence how and what we feel at the time. During those high school chess days, I learned that success is all about discipline, constancy, and just continuing to try.

***Outside of the lab, when you are not working, what do you like to do for fun or to relax?***

Seasonally, during the fall and winter, I really enjoy yoga. I prefer doing that during cold weather. As a scientist, I really enjoy the scientific and experimental aspects of baking, a hobby I do year-round. As is the case with most science projects, it is not error-free, but it is a learning process. If something does not look good or needs a different flavor, you experiment and make adjustments the next time you use that recipe. Running is another interest of mine—half marathons, for example. As I mentioned earlier, I enjoyed chess in high school, and it is something that I still enjoy. I especially like a particular format called “blitz chess,” where each game is very fast, lasting for only about five minutes.





*There is no place like home! From left to right: Maria Guadalupe Navarrete Perea (sister), María Petra Perea Medrano (mom), and José Navarrete-Perea chatting on a sunny day in Durango, Mexico. (Photo Courtesy of José Navarrete-Perea.)*

### ***Do you have opportunities to see friends and family in Mexico?***

Every time I visit Mexico; I always make it a point to make two stops. First, I always stop in Mexico City, because I made so many great friends there during my PhD studies. I am originally from a town called Durango, Mexico, where my parents still live, so I always also make time to stop there to visit them. I am very thankful to continue being able to visit with friends and family, and I also enjoy keeping up with them remotely through the various forms of technology that we have.

### ***What advice would you give to younger professionals beginning their careers in science?***

My main advice would be: Keep your circle close to you. This could be your friends, your colleagues/mentors, your family, or a mixture

of them all, but keeping your loved ones close is always important. We all need support at various levels, to different degrees, and in different situations, so as not to be isolated. Another piece of advice would be: Do not be afraid of rejection. In science, some experiments and hypotheses will work, and some will not, that is just how it is. If you do not try because you are afraid of being rejected, you might miss out. My mom once told me, "Every day you go to work, as long as you can keep the smile on your face that you had during your first day at work, you're going to be fine." Rejection certainly does not define what we do. A career is a mixture of different situations, both good and bad. If you face rejection, just keep going! You just need to maintain that passion and discipline no matter what.