FACES OF MASS SPECTROMETRY

Melody "Pepsi" Holmquist

Anne Brenner and Susannah C. Moore are science writers at Technica Editorial Services

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A Testament That It Is Possible

Melody "Pepsi" Holmquist is as bubbly in conversation as her nickname would imply. Her spirited nature shines through in her humorous recollection of the time she did not know a lab-wide joke about a colleague running over a cat. For Pepsi, this is just one example of the challenges brought by missing out on "ambient knowledge" as a deaf scientist working alongside hearing individuals.

Like both of her parents, Pepsi attended the National Technical Institute for the Deaf (NTID) as an undergraduate. However, unlike anyone else in her family, she pursued the sciences. Her next stop was graduate school at The Ohio State University, where her interest in mass spec blossomed in Vicki Wysocki's lab. The visuality of mass spec was of major interest to her, as well as the instruments used in the field.

In a full-circle moment for her career, Pepsi is now a visiting assistant professor in the department of science and mathematics at her alma mater, NTID. She is currently juggling the processes of setting up her own lab, applying for a tenure track position, and recently becoming a first-time mom.

As a deaf person working in mass spec, Pepsi did not necessarily set out to be a role model. However, as she has progressed in her career, the importance of seeing deaf people succeed in her field has made her more willing to embrace this role—it is possible!

****NOTE:** This interview was conducted in American Sign Language, with Andrew Holmquist acting as an interpreter.*

Your real name is Melody. How did the nickname "Pepsi" come about?

I grew up drinking the soft drink Pepsi—back when I was in high school, it cost maybe 35 cents. While I was playing sports, I had shin splints, so the doctor said, "You know, I think you're drinking too much pop." After that, I took it down a notch, but the name stuck. Even today, people call me "Pepsi" because I drink it all the time. I think that the name also originally came about because I was "cheerful, bubbly, and refreshing." Sometimes, people will be like, "Are you flat? Are you refreshing today?" So, it depends if it's a good day or bad day, but I like that nickname "Pepsi"—it matches me!

How did you get your start in mass spec?

Originally, I was not in the scientific field. I was involved in fine arts, I had a portfolio ready for college. None of my family members are scientists. My dad was a computer programmer, and my mom was a graphic designer, so I didn't think about going into science at first. But then, in college, I saw a person in the chemistry field, and I said, "You know, this really looks fun!" And it was better than my previous major. During grad school is when I started working directly with mass spec. Vicki Wysocki is a big name in the mass spec field, but when I started grad school, she had a small lab of about eight people. I was like, "Okay, well, I guess I'll try joining her lab." I didn't know mass spec well back then but I fell in love with it—I was hooked on the instruments. It was visually gratifying, and I'm a very visual person. You could see the peaks in real time. So, that's how I first got involved in the field.

What have been some of the challenges of being a deaf individual working in the mass spec field?

Have you ever heard the phrase "ambient knowledge"? It means knowledge that we get from around us. For example, you might get it through eavesdropping. Or maybe you pick up things from places like the radio. You hear things, and the knowledge that you gain from those things just sticks with you—you're subconsciously learning. For someone who can hear, this goes on throughout all of the years when you are growing up. But a deaf person doesn't have that, and you lose a lot of information.

To illustrate this loss, when I was doing an internship, they offered an interpreter and everything. It was a great experience and I did fairly well, but it still couldn't make up for some things. For instance, for the entire summer, I didn't know that my co-worker ran over a cat, and I had no idea that story was shared, which became a running joke. As a deaf individual, I miss little things like that, and it can contribute to the bigger picture later on. With mass spec, the research is continuing to grow, with new

Pepsi Holmquist teaching quantitative instrumental analysis to Lab Science Technology students at NTID. All people in the photo are deaf. From left to right: Lori Poole-Clement (lab technician), Madison Luke, Desmond Almanza, Talayeh Delis, Kiara Herrera, Coco Xu, Biverly Huff, Pepsi Holmquist, Lemmy Wathan, Katie Tietje, and Eva Tsompanidis. (Photo courtesy of Pepsi Holmquist.)

> *Many deaf people avoid entering STEM fields because of the nuances in scientific terminology (synthase vs. synthetase!) and knowledge, but I want to show that it is possible.*

knowledge to be gained frequently—sometimes even daily! So, I have to continue to read up on news and talk with people to catch up on what others might have just heard in the office to make up for the loss of ambient knowledge.

How did your education in grad school at The Ohio State University (OSU) influence your current research focuses?

In general, grad school changes a person—big time! It really tests who you are. Grad school itself has changed who I am. OSU specifically had a great mass spec program and a great program in general. It was really tough navigating in grad school—in fact, it was brutal. But people helped each other, and I felt that OSU helped me become more independent. And it challenged me, especially because I was the only deaf person in the biochemistry program. That was really eye-opening. I had to advocate for myself more to get things that people normally take for granted. I grew up never really feeling limited, because my parents did a great job empowering me. But when it came to grad school, I realized that I stood up more for myself. In order to do that, I needed to analyze what I did and didn't like. When I first went into OSU, I was really passive about what I needed. But by the end of my grad school studies, I knew myself better, and I understood the field better. I could better advocate for myself that way, which really helped me in progressing my career.

How did you decide to focus specifically on native mass spec and protein complexes?

It's funny, because my first exposure to mass spec was also, coincidently, my first exposure to native mass spec. I didn't really try any other kinds first—it was literally the first thing I tried, and I loved it. While I was in Vicki Wysocki's lab, she had maybe five instruments, and it was really fascinating to see protein in real time—you could actually see the complexes that were being made. Of course, later on, I learned about LCMS and other types of mass spec, and I realized that native mass spec was not as common as I thought. This was even more apparent when I moved to Rochester, because there's no academic institute around here that has native MS research.

In Rochester, what first led you to the National Technical Institute for the Deaf (NTID) at Rochester Institute of Technology?

For many years, NTID has been a pioneering college, educating and training deaf people into professionals. When NTID was established in 1965—which is viewed as fairly recent—it was considered radical to educate the deaf as their hearing peers. NTID has been instrumental in my success. My parents are both deaf, and they both graduated from NTID in the 1980s. After that, they were able to get decent jobs; as I mentioned before, my dad was a computer programmer, and my mom was a graphic designer. My parents never pressured me into going to NTID and following their footsteps; rather, they encouraged me to attend any university I wanted. But I chose NTID because they continue to have cutting-edge technology and a great network for the deaf.

I was mainstreamed in public school all of my life, and while I had many friends, it was lonely sometimes because of communication barriers or cultural differences. But when I went to NTID, I felt empowered, and I never felt deprived or isolated, because they really have everything. They have seminars that are interpreted, and for some seminars, I don't even have to request an interpreter in advance, because they automatically get interpreters for the keynote talks. I can actually behave like a normal person and walk into a seminar without worrying about whether there is an interpreter. Also, the deaf culture is enriched there; I have met so many educated deaf people and have learned from them. But interestingly enough, despite having a distinctly large population of deaf people, they actually don't have many deaf professors in chemistry. I only can count two of us—we need more.

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What kind of research projects are you working on now?

I am at this tough point of my career, trying to establish a lab! It's hard, but I'm paving my way slowly. No one seems to have the answer to setting up a lab other than just keep collaborating and applying for grants. I don't have any large grant yet. For now, I collaborate with other scientists in non-MS fields locally. Because I'm relatively new, I'm trying to apply for the tenure track position. Native mass spec is not common here, so I have to do a lot of small projects—there's a little bit here and a little bit there. Last summer, I went to OSU, and I ran a few projects that I brought back, but I don't want to keep going back and forth. So, I'm hoping to eventually set up a native mass spec center here or at least to establish research closely related to MS.

As a professor, and as a deaf individual, how have you been able to inspire students?

I honestly never intended to be a role model. But then I realized that it was important to be a role model for other people, because I needed one too. Other deaf people can actually see me and say, "Wow, this lady can do lots of things that most people can't do." Even when I was an undergraduate student, I thought that a PhD was impossible for me to get, and I didn't even consider it at first. I thought, "Okay, I'll just get my college degree, like my parents required me to do, and get a job and then be happy." But when you actually see someone else go through it, that's life-changing.

I'll also note that many deaf people avoid entering STEM fields because of the nuances in scientific terminology (synthase vs. synthetase!) and knowledge, but I want to show that it is possible. History shows that no one could run a mile in under four minutes for decades—but in 1954, Roger Bannister did it. Once the record was set, many more people broke the record within a year, because they saw that it was possible. I am hoping to do the same—be a physical testament that it is possible. Right this minute, there are not many deaf scientists. Someday, that may change. But for now, I will play a small but important part in that change, teaching other students at NTID.

What are some of your interests outside of the lab? You are a new mom—has that impacted those interests?

I did just have my first child a few months ago—a son, named Asher. Before I had a baby, I had a lot of outdoor hobbies like biking, kayaking, running, and canoeing. Before this past summer, when I had the baby, I figured, "Oh, you know, I can still do this stuff after I have a baby, right?" But no—I was sorely wrong!

Pepsi Holmquist with her husband Andrew and baby Asher out on a hike. (Photo courtesy of Pepsi Holmquist.)

Having a baby meant big changes, and it was really challenging for me, because those hobbies used to be a way for me to de-stress; I feel better when I'm outside. But now, when I'm with the baby, I can't de-stress by doing those things, and so I really admire mothers even more, especially mothers in the working field. I ask myself: How do they balance all of that? But it really does get better over time. When Asher was first born, I felt like I really couldn't do anything. But now that he's a little older—there's a big difference in a small amount of time—I can get a part of myself back. It's safer to bring the baby outside now, and I take him out on walks all the time. I know that once he's even a little older, I'll be able to get back to normal stuff I was doing before, which will be great, because I just love being outside! Only this time I can share that with my child, which is even better.

What advice do you have—either for those who are deaf or those with another disability—who are looking to make a mark in the scientific disciplines?

Many people try to be positive motivational speakers, saying, "You can do anything you set your mind to." But in reality, it's really tough—a career in science for a disabled person requires a tremendous amount of cooperation and support from the people around us, not just simply hard work. So, I feel conflicted trying to advise somebody. Once we find people who help us, we need to stay close to them. Navigating graduate school as a student is hard for anyone, so being a disabled student in grad school might be harder, but it is extremely rewarding. We know that working with people who have disabilities will be different. Some people do not cope well with that kind of difference because it requires some changes in the current scientific disciplines. However, we shouldn't shy away from that challenge. I would encourage them not to be afraid—be more patient!