FACES OF MASS SPECTROMETRY / Michal Sharon

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Pushing What's Possible

Michal Sharon studied three-dimensional structure determination of protein complexes using multidimensional NMR while earning her PhD at the Weizmann Institute of Science in Rehovot, Israel, but she soon shifted her focus to the field of mass spec. Structural biology had always fascinated Michal, and she was drawn to mass spec because it enabled her to study this topic in innovative new ways. Michal did her postdoctoral work at the University of Cambridge, working in Carol Robinson's lab and focusing on the emerging approach of native mass spec. Michal's time spent at Cambridge was influential for a number of reasons, in part because it helped her gain the confidence to become a group leader and develop her own research program. After finishing her postdoctoral work, Michal returned to the Weizmann Institute, where she now works as Full Professor and principal investigator.

Michal is deeply involved in the mass spectrometry community. She regularly attends international conferences and has helped train students in numerous international workshops and schools. Michal is also the president of Afik in Academia, which is a national forum of women professors in Israel. She notes that working to advance the organization's mission of promoting gender equality in academia has become a key motivating factor in her professional journey. In this piece, Michal talks more about what this cause means to her, recounts the thrill of scientific discovery, and emphasizes the importance of celebrating one's achievements.

Did your interest in mass spec begin before or after your postdoc research with Carol Robinson?

My interest in mass spectrometry began after my PhD and quite unexpectedly. During my doctoral research, I worked in structural biology using NMR, solving the 3D structure of an HIV-1 peptide bound to an antibody. At that time, I was not aware of the rapid advances taking place in mass spectrometry, nor of the emerging native MS approach. I had fully planned to continue in NMR for my postdoctoral training and had already started exploring opportunities in that direction. I was also at a stage in life where personal considerations were important, I already had two children at the time, and my third was later born during our years in Cambridge. The turning point came through a conversation with Prof. Amnon Horovitz, a principal investigator in a neighboring lab at the Weizmann Institute. When I shared my postdoctoral plans with him, he had just returned from a conference and told me about a researcher named Carol Robinson and a mass spectrometry method that he described as "amazing." He strongly encouraged me to contact her. I did, and that decision completely changed the direction of my scientific career. What makes this story especially meaningful to me is that when I later returned to the Weizmann Institute as a PI, Amnon and I began collaborating.

How did you first come to your current position at Weizmann Institute of Science?

This happened through a path that began during my postdoctoral work in Carol Robinson's lab. I joined Carol's group with a fellowship jointly supported by the Israel Science Foundation and the Weizmann Institute. The fellowship included a commitment, I was expected to return to Weizmann afterward and take on a role within a research facility. During my time in Carol's lab, she gave me something very important: confidence. She encouraged me to look beyond that predefined track and to seriously consider building my own independent research program as a group leader. With her support, I applied for several independent fellowships while I was still in Cambridge, and I was fortunate to receive them. At that point, I contacted the Weizmann Institute and explained that while I was deeply grateful for the original fellowship support, I did not want to return under the terms of the facility position. The Institute agreed to release me from that arrangement but made it clear that if I wanted to join as a PI, I would need to apply through the regular competitive process, like any other candidate. That's how I ultimately joined Weizmann as a principal investigator.

When did you decide to focus specifically on mass spec for molecular biology?

Structural biology has always attracted me. That is the motif connecting my MSc, PhD, and postdoc. Although I switched tools from NMR to mass spectrometry, my core motivation stayed the same. I am fascinated by how structure shapes function, along with how function can be tuned and regulated and how specificity is achieved, especially in dynamic protein assemblies. Mass spec

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With Prof. Dame Carol Robinson, my inspiring mentor during my postdoc years. At the Weizmann Institute, 2016. (Photo courtesy of Michal Sharon.)

became the lens that let me keep asking those questions in a new and powerful way. Then, when I joined Carol's lab, native MS was still in its infancy, so it really felt like we were inventing things as we went. We were constantly developing new methods, testing ideas, and pushing what was possible, often on instruments that were essentially prototypes. It was a very exciting time, and I wanted to be part of building those advances and helping move the field forward.

Can you describe a moment of surprise or discovery that you've experienced as a scientist?

One of the most surprising and exciting moments in my scientific career was the discovery of CSNAP. The COP9 signalosome, CSN, is a highly conserved complex that has been studied for more than two decades. It was considered textbook knowledge that CSN is made up of eight subunits, CSN1 through CSN8. When we applied a mass spectrometry approach we had developed, we repeatedly saw a consistent signal. Our first reaction was that it must be a contaminant. But the same charge state series kept appearing again and again. Eventually, we realized we were looking at a small, 6.2 kDa protein that is actually an integral part of the complex but had escaped detection by conventional methods simply because of its small size. We named it CSNAP, for CSN Acidic Protein. We then validated that CSNAP is a stoichiometric subunit of the CSN complex. What makes this discovery meaningful to me is that it highlighted a broader point: that small, overlooked proteins can be true integral subunits of large assemblies. That moment captured what I love about science: the humility of realizing that accepted models can still be incomplete and the thrill of finding something that genuinely shifts the field.

Tell us about your interactions with the international mass spectrometry community?

My interactions with the international mass spectrometry community have been both scientific and community driven. I regularly attend major international meetings, and over the years these meetings have been important not only for sharing science, but also for building long-term collaborations. From 2013 to 2016, I served as President of the Israeli Mass Spectrometry Society. During that time, we reshaped our meetings and built joint events with international societies, including the American, German, Dutch, and Swiss MS communities. On a more personal level, about seven years ago, during a mass spectrometry meeting, a small group of us, as women in the field, started a WhatsApp group. At first, it was just those of us attending that meeting, but gradually we added more members. Today, it has grown into a group of female professors and senior mass spectrometrists who share advice, support one another, celebrate achievements, and navigate challenges together. It has become a warm community that I really value.

Outside of lab-based skills, what are some strengths you cultivate for members of your research group?

Science can be incredibly rewarding, but it can also be tough. Experiments fail, papers get rejected, and grants do not always work out, and it is easy to get stuck focusing on the setbacks. Because of that, I really insist on celebrating successes in my group. I do not want good things to just disappear into the everyday rush. We have a cake when a paper is submitted, and another one when it is accepted. We celebrate fellowships, awards, and other milestones. It sounds simple, but it really helps. It builds

“...we bring together women from across Israel, across institutions, and across disciplines. That creates a real platform for change and also a sense that you are not doing this alone.”

Still climbing. Still exploring. Still curious, a day out with the lab. From bottom right to left: Yegor Leushkin, Dr. Maria Fuzesi-Levi, Dr. Keren Sasson, Prof. Michal Sharon, Naama Katzir, and Shriya Srivastava. Top row, right to left: Dr. Debasmita Ghosh, Dr. Gili Ben-Nissan, Daniel Zachor, and Dr. Katharina Zittlau. (Photo courtesy of Michal Sharon.)

confidence, keeps motivation up, and reminds everyone that progress is happening, even when the path is bumpy.

Tell us about your efforts to promote gender equality in academia.

I'm the president of Afik in Academia, the national forum of women professors in Israel. Afik's mission is simple, but ambitious: to achieve real gender equality at all academic levels in Israel. We represent more than 1,000 women professors, around 70% of female professors across universities and colleges, so when we speak, it is a strong collective voice. This cause has become one of my deepest passions and a strong driving force in my professional life. We work to influence policymakers and academic leadership, and at the same time we try to give women researchers tools, support, and a network that helps them move forward, especially toward leadership and management roles. One of Afik's strengths is that we bring together women from across Israel, across institutions, and across disciplines. That creates a real platform for change and also a sense that you are not doing this alone.

Apart from your career, have you done any interesting sightseeing in Israel?

Just last week, our group went on a short trip to the south. We began in the anemone fields at peak bloom, a powerful reminder of how calming and grounding nature can be. We shared a wonderful picnic, time together, and a chance to breathe outside the lab. Later, we visited the Nova festival memorial site. The Nova music festival was an outdoor peace festival near the Gaza border that was attacked on October 7, 2023, and many young people were killed there. We held a short remembrance ceremony as a group. It was quiet and deeply moving, difficult but important. It brought us back to the human reality that surrounds our daily work and reminded us how fragile and precious life is. The day was full of contrasts: beauty and loss, togetherness and reflection. It reminded me how much community matters, and how coming back to meaningful work, side by side, can itself be a form of resilience.