

| VALERIE MIZRAHI |



TOP THREE AWARDS

- Christophe Mérieux Prize, Christophe and Rodolphe Mérieux Foundation and Institut de France, 2013
- National Order of Mapungubwe (Silver), 2007
- UNESCO-L'Oréal Award for Women in Science (Africa & Arab States Region), 2000

DEFINING MOMENT

The most fulfilling moments of the last decade for me were my daughters' graduations. Nothing that I've done professionally gets close to that – not the papers I've published nor the awards I've received.

WHAT PEOPLE DO NOT KNOW

When I got appointed to lead the Institute of Infectious Disease and Molecular Medicine at UCT, I had limited business administration skills. I was going to take a course in financial management at Wits, but I ran out of time. So before coming to Cape Town, I spent a weekend with my father learning how to read a balance sheet.

THE SHAPE-SHIFTER

Professor Valerie Mizrahi isn't sure where her home really is. She was born and raised in Zimbabwe, and studied in South Africa. She spent the lion's share of her active research career at the University of the Witwatersrand (Wits) in Johannesburg, but since 2011, she has led the Institute of Infectious Disease and Molecular Medicine at the University of Cape Town (UCT). Her passport says she is Italian, but she has never lived in that country.

"I don't really know what I can call 'home'. I know from a country point of view I'm absolutely South African. But I'm not sure that Cape Town is my home. The energy and the people of Joburg remind me more of Harare, where I grew up. I'm not sure that I'm fully accepted as a South African. I speak English a little differently from the locals, and my knowledge of Afrikaans, isiXhosa and isiZulu is rudimentary," she says.

She is happier identifying herself simply as a scientist. But even in this most permanent aspect of life she has shifted shapes many times. "I've walked an interesting path, from chemistry to biochemistry, genetics and microbiology. Scientifically, I'm a tuberculosis researcher, and my calling is that of a basic scientist. But now I'm leading an institute of infectious disease and molecular medicine, and I don't have a clinical background."

Walking the path has taken guts, or as Mizrahi with her Jewish ancestry might call it, "chutzpah". Fiercely independent, she forged her own way in research, becoming one of the first South African scientists to tackle the growing threat of tuberculosis at the level of basic science. She has played a leading role in the fight against the scourge, which fuelled by HIV and drug resistance, has emerged as one of the biggest current threats to global health.

EARLY LIFE AND EDUCATION

Mizrahi was born in Harare in modern day Zimbabwe in 1958. Her grandparents had fled Europe before the war, and her father was a chemical engineer trained at the University of Cape Town. She went to a school for privileged girls, where she discovered a fondness and aptitude for the

natural sciences. It was a natural choice to study something scientific after her A-levels.

She considered going to university in the UK or Israel. But during her last year of A-levels she fell gravely ill. She wrote her finals in hospital and realised that going overseas might be problematic. South Africa was much closer, and so she ended up studying chemistry and mathematics at UCT. She followed up her undergraduate degree (awarded with distinction) with an Honours degree and a PhD in chemistry, both at UCT. The lack of women in the faculty didn't deter her interest in becoming an academic herself. She didn't even notice it, she says, and she felt that the male professors treated her just like everyone else. What did bother her, however, was the racial segregation in South Africa. Her time as a student at UCT included a political awakening, and by the time she was a postgraduate she was angry about the *status quo* in the country, and like many of her classmates and friends, she wanted to get away.

From 1983 to 1986 she found work as a postdoctoral fellow at Pennsylvania State University in the USA. The postdoc wasn't in chemistry, but in biology. The change of subjects didn't faze Mizrahi, even though she hadn't even studied biology at school. "I had a certain recklessness and adventurous spirit, and at that time there was nothing wrong with changing your field," she says. It was tough being up against Ivy League graduates, she admits, but after six months she had found her stride.

After her postdoc she returned to South Africa for a spell, working for the Council for Scientific and Industrial Research in Johannesburg. Then once more she went abroad, this time to work at the drug company, SmithKline & French's R&D hub in Philadelphia. However, this time she hit a glitch: her husband, Basil Sher, couldn't get a visa to join her. After spending a year away from home, she decided to return to Johannesburg. Also, she knew she wanted children, and she wanted her children to grow up close to their grandparents, who by that time had also moved to South Africa.

RESEARCH AT WITS

Mizrahi returned to South Africa in 1989, where she took up a position at the South African Institute for Medical Research (SAIMR), an institute with

close links to Wits, where she established the Molecular Biology Unit. Her only question was what would she work on with her team?

In the US she had worked on HIV drug discovery, but she could not easily see how to remain competitive in this field from South Africa. From her position in the SAIMR, she recognised that tuberculosis (TB) was this lurking problem in South Africa that not many people were talking about. Yet it was there, in the mines and in the hospitals. She started reading about the bacterium that causes the disease, and became fascinated by it. It seemed a worthy foe.

Mizrahi went to visit Paul van Helden at Stellenbosch University and the late Lafras Steyn at UCT, who were among the few South Africans working on TB at the time. They were using molecular diagnostic technologies and genetic analysis to study the TB epidemic in the country. But that wasn't what Mizrahi wanted to do. A basic scientist to the core, she wanted to understand the bacterium itself. As TB became a bigger research focus worldwide, her unit was in a great place to benefit.

However, it wasn't all plain sailing. In the early 1990s, she wrote an application to the Wellcome Trust for the very first round of the UK charity's senior fellowship scheme for South Africa. Her proposal on TB made it to the final round, which involved going to London for a face-to-face interview. Seven months pregnant with her second child, Mizrahi flew to London. But the interview committee savaged her. In hindsight, she thinks this was partly because her proposal wasn't good enough, but also because she had decided to move fields.

She didn't get the fellowship, and returned to South Africa with her tail between her legs. But the experience taught her a valuable lesson: failure is not the end. "It was a fantastic learning experience for me because I went back to the drawing board, thought more deeply about the questions I wanted to address, and soon, the funding began to flow." She began working on drug discovery, and managed to get international funding to build the institute's first biosafety level 3 lab, which led to even more opportunities opening up.

As one of their key research questions, Mizrahi and her team tried to understand how the tuberculosis bug could persist in an infected individual for decades before reactivating to cause disease. "I wanted to understand the survival and subversion tactics of this formidable human pathogen," she says. A team led by Stewart Cole, then at the Pasteur Institute in Paris, was sequencing the genome of the bacterium at the time, and her lab was ready to start working on analysing the sequencing data as they became available.

The highlights of this work were published in an article titled DNA Repair in Mycobacterium Tuberculosis: What have We Learned from the Genome Sequence? in 1998 in the eminent journal *Molecular Microbiology*. It was one of the first papers to follow on from the *Nature* paper publishing the TB genome sequence, and it had come out of a small, relatively under-resourced lab in South Africa.

"It was one of my best papers," Mizrahi says, proudly. "It was just such fun. I was unfazed by the fact that we were dealing with inadequate tools. We made an exciting discovery that set the stage for a lot of work, not only for my own lab, but internationally." The work had a link to TB drug resistance – a growing threat worldwide – since understanding how the TB bug fights its host's defence mechanisms on a molecular level, which is also where mutations causing resistance arise.

Over time Mizrahi's research team and influence grew as many accolades testify

MOVE TO CAPE TOWN

Mizrahi could easily have remained at Wits until her retirement as the queen of her fiefdom with a string of accolades to her name. But resting on her laurels is simply not her style. From 2008, Mizrahi served as the Chair of the international scientific committee of UCT's Institute of Infectious Disease and Molecular Medicine (IDM). She had followed the institute's growth over the years, and was impressed by the way it brought people from across the basic, clinical and public health sciences together, in one place.

When the Director of the institute, Greg Hussey, decided to step down, he approached Mizrahi to see if she would consider applying for the position. She thought about it. She had just gone through a divorce, and her one daughter was about to study at UCT. "Wits and the National Health Laboratory Service had provided the environment for me to become the scholar I am today, but change is good. What was I going to do for the next 15 years of my life?" And so, she says, the "same madness" that had driven her to go overseas in her early 20s once more took root.

She agreed to travel to Cape Town for an interview. When she told her colleagues at Wits about it, she couldn't shake the feeling that she was betraying them. Nevertheless, when she was offered the job she took it, and with the support of her colleagues at Wits, she set off on a new adventure. The job at UCT was overwhelming, to say the least. The IDM is the largest postgraduate research entity at the university, with more than 500 faculty, staff and students. Its researchers raise R350 million in grants in a year.

Not coming from a clinical research background, Mizrahi was suddenly in charge of a large research enterprise with a major clinical component. She had a lot to learn, including the specific challenges of clinical and community-based research. However, her biggest challenge was learning how to delegate. At Wits she had effectively been her own boss, and as head of a smaller unit she could influence the culture by imposing her values in a way that is far more difficult to do in a large, multidisciplinary institute.

"My first year was a baptism of fire. I had never been comfortable asking others for help. So I went for professional coaching. UCT has a fantastic system in house for supporting senior leadership through coaching," she says. Another sacrifice she had to make in her post was being at the very forefront of her own field of research. Having stepped up to a leadership role with major administrative and managerial responsibilities, she feels that her own research has taken a bit of a knock. "I expected it would happen," she says. But, she is enormously proud of the way in which some of her former trainees are now leading certain research programmes which she had initiated.

She tries to be sanguine about losing some of her cutting-edge expertise in her field. She reasons that perhaps it is just part of moving into a more senior role. "Is that not what leadership is? Making space for great young people to exercise the privileges that I had when I was younger."

She doesn't know how long she will stay in the post, but she doesn't think she will retire as the Director of IDM. "I do think leaders need to step down after ten years at the helm," she says. As for where she will go and what she will do, she isn't sure. Her one daughter is studying in Canada, her other daughter remains in Cape Town. She enjoys a slightly better work-life balance in Cape Town than she did in her earlier years as an academic. "I see movies, walk on the beachfront, I go to spend the Jewish holidays in Joburg with my family."

Looking back, she is pleased with her choices. In South Africa, she has had more flexibility and freedom to follow her heart. She feels that her relative impact has been greater here than it might have been abroad. "I've been an 'academic entrepreneur' here. I've been given opportunities and have taken them," she says. She uses her international influence to send bright young students overseas to get the sort of training and exposure that she got when she was their age. By mentoring young academics, she feels that she is having an impact on the future. "I think I have shifted some shapes here," she says with a smile.

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A. Academy of Science of South Africa (ASSAf) Publications

C. ASSAf Policymakers' Booklets

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Academy of Science of South Africa

Academy of Science of South Africa (ASSAf), (2017). Legends of South African Science.

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