

## IN MEMORIAM: MARYAM MIRZAKHANI

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Maryam Mirzakhani was much more for me than her public persona—a phenomenal mathematician, an icon for women in science, and source of pride for her country. It is still hard to come to terms with what happened and to write about her in a way that reconciles my personal memories with the image she acquired on the world stage.

Maryam was born in Tehran in 1977. Her childhood years, as for others of her generation, were difficult and turbulent times—the aftermath of the Islamic revolution, and the war with Iraq which lasted eight years. Maryam was not particularly interested in mathematics as a child (although she noticed that she could solve the homework problems of her older siblings quite easily). Her passion was reading novels, and her dream was to become a writer.

Things changed when she moved on to middle school. The situation in Iran became somewhat more favorable when the war was over. A specialized *Farzaneگان* middle school for girls gifted in mathematics was opened in Tehran, and Maryam enrolled. She was initially taken aback by the steep jump in difficulty. Her first year was not great. But she persevered and realized that she could make fast progress when she made an effort. By the time she moved on to high school, she was a formidable problem solver and started training with her friend Roya Beheshti for the Math Olympiad. Maryam’s historic results at the IMO are well known now—a Gold Medal in Hong Kong in 1994 and a Gold Medal with a perfect score in Toronto in 1995.

I did not meet Maryam until 2004 in Boston. By that time she was a star in her field, finishing her PhD thesis at Harvard, in which she solved several major problems concerning dynamics on hyperbolic surfaces. However, you would not know that by meeting her at a house party. She was an example of low-key demeanor, friendly and inquisitive but perhaps hiding her true achievements so as not to overwhelm people around her.

Although she had to overcome many obstacles to get to the place she was at, what I would hear from her was primarily how grateful she was for the support of her family in Iran, her teachers at Sharif University, and how she was received and supported at Harvard when she came there in 1999. Her nature was to see everything in a positive light and not to dwell on the difficulties. She was in fact struggling with irritating health issues, especially chronic back pain, long before her serious illness; but she always tried to put a positive spin on everything.

What struck me about her was that she did not think too highly of herself and always saw everything in a broader context. The first book she gave me was *Lust for Life*, about the life of Vincent Van Gogh. Maryam said it exemplified her excitement about work and life in general. Her great strength was an internal focus on what she wanted to achieve, not worrying about others’ opinions, and

simply enjoying the process of thinking and understanding. I believe she saw her occupation as an area of art rather than science. She was not very much moved by applications to the real world, and she had her own way of understanding the abstract spaces of surfaces that form the backdrop of her work. She also lacked any interest in worldly fame and awards. I think even conferences were not a very high priority for her. She preferred close contact with a small number of collaborators and the quiet hours of ruminating with a pen and a large sheet of paper, large enough for problems of the magnitude she was working on.

After graduation she moved to Princeton for an assistant professor position, and I also moved there for a postdoc in 2006. Looking back, our years in Princeton were happy and simple—living in junior faculty housing, going swimming, biking or walking in the woods, and working. We got married in 2008, at the top of a mountain in New Hampshire with a total attendance of six. We moved to California in 2009, with great jobs and what seemed like a perfect situation in life. Our daughter Anahita was born in 2011.

Maryam often said that it is hard to appreciate when everything goes well. Happiness and success depends on many moving pieces falling into place, a lot of effort and a bit of luck, and you can tell yourself many times that you should be grateful, yet it is a natural feeling that things must have happened this way and will remain like this—until life tells you otherwise. Maryam was the first woman in history to receive the Fields Medal in 2014. But her joy was already marred by a diagnosis that she received one year earlier. What followed was a nightmare of clinging to hope after hope, all of them crushed one by one. Maryam still worked as much as she was able, but towards the end she was concerned about Anahita's future more than anything else. She wanted to see her go to school and she was there on Anahita's first day. She passed away surrounded by family, two weeks after Anahita's 6th birthday.

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