



I Never Met Maryam Mirzakhani, but I Knew Her So Well

I did not know Maryam Mirzakhani, the first and only woman to win a Fields Medal in mathematics. She died earlier this month, claimed at age 40 by breast cancer. Had she lived, we would finally have met in person this summer at the 2017 meeting of the Pacific Rim Mathematical Association, or PRIMA, where we were both scheduled to give talks.

Our paths never crossed. And yet, we had things in common, so many that my heart aches and her loss invades me.

I speak not just for myself but for so many other women. Like Maryam, we too, are mathematicians and scientists. We are mothers. We are immigrants. We are resilient. And we are committed to making this a better world.

We are in love with the idea of inspiring the next generation, especially little girls, our own little girls, and those whose environment oppresses and diminishes them with the whisper “you cannot be...”.

A few months ago, I received an invitation to give a plenary talk at PRIMA. I heard that Maryam was also scheduled to speak. I was so excited by the prospect of finally meeting her! The fact that this would happen in Mexico, my native country, in one of my favorite cities, was the cherry on the cake.

Knowing how large these conferences are and how quickly the time passes, I decided to write to her to introduce myself and find a time to meet in the beautiful city of Oaxaca.

I did not get to send that message. PRIMA starts next month; Maryam will not be there. The schedule includes 14 plenary talks, four by female speakers, including Maryam. If we are three out of thirteen, that will only be 23 percent, less than one quarter. Unfortunately, this is not atypical in math conferences.

It is the scarce researchers like Maryam who have been pushing the numbers up, decimal by decimal. Why? Because we must. In the process, we see transformation that fills us with joy. That is the fuel that keeps us moving forward.

While strolling in San Francisco earlier this summer, I went into Dog Eared Books on Castro Street. Near the exit I browsed through a bin of postcards: landscapes, birds, botanicals, art reproductions, photographs and images from the Women in Science collection by Rachel Ignotofsky: There Maryam was, almost flying, drawing with two hands, topological spaces all around. I took her picture home, along with another woman in science, Net-

tie Stevens, and a portrait of Mexican painter Frida Kahlo painted by her husband Diego Rivera.

Nettie was a geneticist who identified the Y chromosome, found that it pairs with X, and that sex is determined by the presence or absence of chromosome Y. Frida was an intersection of passion, talent, color, and suffering. Maryam was the only woman to ever receive the Fields Medal, often thought of as the Nobel Prize of Mathematics. The cards have been on my bedside table since I got them, with Maryam's visible on top of the small pile. I will keep them near, as a reminder to be the best person I can possibly be. A reminder also that we never know where or when the path will end.

Nettie, I just learned, died of breast cancer in 1912 at age 50. She had earned her PhD just nine years earlier, and had only recently been offered a research professorship. Maryam was diagnosed with breast cancer at age 37, and died three years later, on July 14, 2017. My cancer was found a few months after my 40th birthday. This summer marks five years from the end of treatment. I am very fortunate and look up to these powerful women.

I never met Maryam, but I knew her well.

Let's take a short detour in time, a flashback: I am recovering from surgery and will go through chemotherapy, when I am offered a chance to teach children, showing them that math is fun. Half of the children are girls. “It is important, I will do it.”

Going through radiotherapy, I am mentoring graduate students, writing reports and peer-reviews, and preparing for an upcoming plenary talk at the SIAM Life Science Meeting. “It is important, I will go.” But the brain was foggy and the inner voice treacherous: *you will never be able to go back, why even try?* And as the body ached and the destructive inner voice gained strength I received that email from the White House announcing that I had been selected to receive a 2012 Presidential Early Career Award. Get up and stop this nonsense! This is your path and you will not stop. Just put one foot ahead of the other, and keep going.

The invitations and requests keep coming: Can you come? Can you do it? We really really want you. Can you come? Yes. Yes. Yes... Sometimes the answer goes late as we try to juggle things around to make it happen. It pains us when the answer must be a no. Pushing through pain and fatigue, through fear and uncertainty. Never passing an opportunity to inspire, because there are too many women, and too many minorities who have dropped their dream for lack of role models, for their need of affirmation. Our voices need to be heard.

And so I will continue to honor Maryam with my actions. At the PRIMA meeting, I will give the best possible plenary

talk. I will also honor her during the public lecture. I will speak in the public square, find ways to dress math in the colors and imagery that will attract children and curious teenagers, look to inspire them, and to help their parents see that there is always a way up.

Despite the poverty and the violence, despite the politicians, there is another way and sometimes all it takes is to know that the path exists and that someone like Maryam has already traversed it. We must see ourselves and our own inner strength as a reflection of hers.

Rest In Peace Maryam Mirzakhani, may your light continue to shine and inspire everyone to be what they want, despite what others may say or think.

—*Mariel Vazquez*¹
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EDITOR'S NOTE. We are planning a Maryam Mirzakhani memorial for a future issue of *Notices*.

Hayman's List

In 1967, Walter K. Hayman (Imperial College) published a slim volume entitled *Research Problems in Function Theory*. Walter has over 200 publications to his name, including five textbooks and a definitive proof of the asymptotic Bieberbach conjecture. He has received honorary degrees from universities in four countries, and he co-founded the British Mathematical Olympiad in 1967 with his wife Margaret Hayman. At the age of 91, Walter is almost the oldest member of the London Mathematical Society and has been a Fellow of the Royal Society for over sixty years. He has published a very colourful autobiography entitled *My Life and Functions*¹.

Research Problems in Function Theory contains 141 conjectures in seven areas of function theory, including meromorphic functions, Nevanlinna theory, and functions in the unit disk. One problem, commonly known as the Sendov conjecture, has since led to the publication of over 80 research papers:

Problem 4.5: Let $P(z)$ be a polynomial whose zeros z_1, z_2, \dots, z_n lie in $|z| \leq 1$. Is it true that $P'(z)$ always has a zero in $|z - z_1| \leq 1$?

An asymptotic version of the conjecture has been proved.

There have been six updates of Hayman's List over the years, each detailing progress on existing problems, as well as adding new ones. This year, for the fiftieth anniversary of the publication of the original book, Walter and I are hoping to publish an update to the list and request your

help in finding known solutions, particularly those that do not refer to the original title or its updates. We will also be looking for suitable new problems for the list. Please email such information to me at the address below.

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In Support of Piper Harron

As a mathematician who is a white woman, it was very challenging to read Piper Harron's May 11, 2017, AMS blog post, "Get Out the Way."¹ However, I'm also a tenured faculty member at a regional public university where very few of my students look like me. So it's important to me to remember that discomfort with what I'm hearing from people of color means I should listen harder and sit with the discomfort for a while.

Harron wrote, "Not to alarm you, but I probably want you to quit your job, or at least take a demotion. Statistically speaking, you are probably taking up room that should go to someone else. If you are a white cis male (meaning you identify as male and you were assigned male at birth) you almost certainly should resign from your position of power. That's right, please quit." The mildest criticism Harron received in response to that proposal is understandable, and many reasonable people have said it or may think it: *She wrote something so outrageous that she deserves the backlash.* I'm writing this letter because I think it's worthwhile to ask the reasonable people in our community who have that response to listen harder and sit with this for a while.

Context: As you know, fewer than 1% of tenured math professors at US doctorate-granting universities are black women.² One percent are black men. Most of us agree it's a huge problem, it's complex, and the causes of it reach far into every aspect of American education and culture. Harron wrote her essay in that context.

Harron's essay, starting with an obvious solution to the problem and going from there, presents a solution that isn't going to happen. This bears repeating, since the alt-right media have gotten so worked up about this, and their reaction is bringing attention to Harron into the mainstream press. **It's not ever going to happen.** So let's look at the suggestion as a rhetorical device. It reminded me of Supreme Court Justice Ruth Bader Ginsburg's response when asked how many women needed to be on the Supreme Court for her to think there were enough. She answered, "Nine." In a similar way, Harron's essay was pretty amazing at forcing me to examine my perspective and assumptions about this system that I was trained in and now work in that was created and is run mostly by white men. Turning it upside down like she did stunned me, in a good way.

Vazquez1: Vazquez has provided a Spanish version of this letter at www.smm.org.mx/maryam.pho.

Lingham1: Reviewed by David Drasin in the May 2015 *Notices* www.ams.org/notices/201505/rnoti-p517.pdf.

Wrinkle1: blogs.ams.org/inclusionexclusion/2017/05/11/get-out-the-way.

Wrinkle2: Conference Board of Mathematical Sciences (CBMS) Survey Reports 2010, Table F.5.

Harron doesn't serve on search committees. She isn't a chair of a major research university's math department. She isn't a dean or a provost, making any final hiring decisions. She isn't even on the tenure track yet. Her essay doesn't represent the AMS or the AWM [Association for Women in Mathematics] or Black Lives Matter or any organization. (I understand that as an AMS blog, it carries more weight than her personal blog, but she still does not represent the AMS.) Nonetheless, she is getting an avalanche of disturbing mail, saying horrible things about her and even about her young children. Her department and her university are getting demands that she be fired. Followers of breitbart.com and similar websites are harassing her. The fact that white people freaked out at this level about Harron's essay shows us how dangerous it is for her to even rhetorically challenge our supremacy, even in an area like mathematics. The backlash has been almost as educational for me as the essay was. I encourage all to read the blog entry in its entirety, beyond the first paragraph quoted above.

Thanks for your attention.

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**We invite readers to submit letters to the editor to notices-letters@ams.org and post commentary on the Notices webpage www.ams.org/journals/notices.*

Response from the AMS Executive Director

The AMS currently hosts ten blogs on its website at blogs.ams.org. AMS blogs have an editor and/or editorial board comprised of mathematicians. These blogs offer an opportunity for writers to share their experiences, opinions, and ideas. The opinions expressed in AMS blog postings are the views of the writers and do not necessarily reflect the views of the Society.

In February 2017 the inclusion/exclusion blog was introduced, with a mission of bringing attention to “issues pertaining to marginalized and underrepresented groups in mathematics.” The AMS is aware of the controversy surrounding the blog post discussed in Nancy Wrinkle's letter. We acknowledge that there is a difference of opinion as to whether or not an AMS blog was the appropriate venue for this particular post. Blog posts can be thought-provoking and challenging, and the AMS supports the use of its blogs to raise difficult topics that are important to the mathematical community. Inevitably, opinions differ about what content is respectful and what is offensive, and the AMS appreciates the efforts of its blog editors to navigate this difficult terrain.

—Catherine A. Roberts
 AMS Executive Director

ERRATUM: For the August feature title on “How the Green Light was Given for Gravitational Wave Search,” in some places “Search” was erroneously replaced by “Research.” *Notices* regrets the error.