

Maaiké asked me to speak about what influenced me to choose an academic career, and what I had found to be helpful or unhelpful in making that decision (or indeed, what, in my experience, had influenced other young women to choose a career in mathematics).

My undergraduate studies began 50 years ago, and the question must arise about the relevance of my experience to young women today. In preparing my presentation I first reflected on a task I had two years ago, of commenting about whether, and (if so) how, we might view Ada Lovelace as a role model for women in Mathematics and Computer Science.

Ada Lovelace, the daughter of the poet Byron, was totally home-schooled in mathematics, and she became famous for the work she did, and wrote about, the analytical engine of Charles Babbage. She is sometimes called the first computer programmer. On the 200<sup>th</sup> anniversary of her birth, I spoke in a celebratory symposium for her in Oxford. I said then:

“What attracts us and influences us when we consider someone like Ada Lovelace is NOT simply confined to her life circumstances – even though her life story may seem wonderfully romantic and exciting. It involves also her passion for new discovery, new understanding of mathematics – her engagement with other mathematicians of the time.”

I also said: “We admire the way she grasped opportunities. For example, the way she optimized her access to top scientific teachers and colleagues.”

So I am hoping that some of the things I have to share may resonate with the aspirations and imagination, if not the experience, of some of you.

So how did I become a mathematician? I sometimes think it's a miracle. I was the first in my family to go to university. Both of my parents had to finish their education after 10 years at school, for various reasons – my father's father had died when Dad was 14; and my mother's father was unemployed after an extended illness during the Great Depression of the 1930s. This meant that I felt my education through to university level was an amazing privilege – I could never regard my education as a right.

I had no expectation of a job as a mathematician – indeed I had been told that there were none and, in fact I was told that “women did not pass”. I am so glad that it is completely different these days.

A summer Vacation Scholarship at the ANU between my 3<sup>rd</sup> and 4<sup>th</sup> undergraduate years sealed my ambition to do a PhD if at all possible;

A Commonwealth Scholarship to Oxford made a doctorate possible. There followed Post docs at the ANU and the University of Virginia in the US, and these helped me to become more independent in research. Then a short term lecturing position at the University of Western Australia gave me a chance to get some teaching experience – and that position was followed by a tenurable lectureship at UWA. All the way up to this stage it was never clear that I would gain a tenure-track academic position, and I was all the time trying to be psychologically prepared to change directions and train for something else, if I couldn't get a job. I just knew that if possible I wanted to stay in Mathematics.

My personal life had changed over this period. I married John Henstridge during my post doc at the ANU, and our two sons were born after I gained tenure. I am keenly aware that this is different from the pattern for many women – some of whom have caring responsibilities much earlier on in their

careers. In fact one of my current PhD students has had three babies during her PhD candidature. I am sure that she will finish, but I have needed to champion her cause in obtaining extra extensions and suspensions for her to allow her the space to be ready to come back to her studies.

To address the second part of my charge: what circumstances or measures have been found to be effective in attracting female students to research and high degrees. I will speak to **four issues, somewhat anecdotally**.

- **Role models:** I very recently had some discussion with (female) colleagues at UWA from engineering and mathematics about their experiences as students with having very few girls in their maths classes. The question we discussed was: What actually mattered to them? What made them feel included? They all mentioned how important it had been to have at least one woman lecture to them. And indeed for me, it was very important to have had two women as lectures. It overcame my initial terror at being the ONLY girl in my maths classes from second year onwards. Having Anne Street and Sheila Williams as lecturers at the University of Queensland let me know, somehow, that there was a place for women in the academic maths community.
- I also met Hannah Neumann in Canberra when I was a Vacation Scholar. Hannah was the first woman mathematician to become professor at an Australian University, and even as a young student I was aware of the warmth and respect for her which was evident in comments made about her teaching, her research, her treatment of staff and students. Later when, aged 35, I became the second woman maths professor in Australia, my ambition was to become a professor “like Hannah”. She definitely is my hero.

- **Making a decision:** Some 15 years into my postdoctoral career, I was having a very long coffee with a former honours student who was having trouble making a decision about whether to do a doctorate, and if so in what area. She was scared of making the wrong decision. . She had travelled all the way from Edinburgh to Oxford (where I was working on Sabbatical) to have this coffee meeting with me. I felt that doing a PhD was an ideal next step for her. She just had too many options. I advised her to pick the one she felt most drawn to – saying that this was not a final decision for the direction of her career. [She did accept the Edinburgh offer, and after some decades, marriage, and several children, she and her husband are now in Auckland and she has a tenured lectureship.]
- **Flexibility:** A couple of years after I became professor I was invited to speak with a women in maths group at the ANU. The group consisted of undergraduate and postgraduate students as well as some women staff. I asked them for some questions (ahead of the session), so that what I said would be relevant for them. Their first question was rather funny: “Why are all women mathematicians analysts?” [Since I am an algebraist.] It soon became clear that their life circumstances were vastly different from mine. Some were “mature-aged” students already with children. I had contact with a couple of those students later in their careers. One travelled to Warwick and did a PhD, and had a baby early in her career; another did her PhD degree in the US. We met up when I was invited for a weekend to the Mount Baldy Mathematics Conference – I stayed with her, her husband and her son, then a toddler. She is now an Associate Professor in Adelaide, and a champion of providing flexible

resources to support women to establish themselves within their careers as academic mathematicians.

- **Confidence:** This is a huge issue, hard to grasp in its entirety. So in case you have some comments or questions about this, I decided to finish with just anecdotes about confidence.

I remember a sunny morning in Brisbane, the first day of my second year as an undergraduate student at UQ. I spent around 30 minutes wandering around the campus before gaining enough courage to enter the lecture theatre: my two friends from first year had decided not to be in the advanced level second year maths stream, and I knew that therefore I would be the only girl in the class.

I remember giving many lectures in a research institute in Tehran. There were four women PhD students in the audience, but at morning coffee times I was always surrounded by the male staff and students. After a few days I asked to speak with the women participants. It was great. I asked what their parents thought about their doing a maths PhD; whether they hoped for a career using maths; if they were married and whether their husbands were supportive of their studies. I have met again two of the four students: one I met only at a maths conference in the south of Iran in 2015, the other is now a research collaborator of mine, and an Associate Professor in Hamedan, Iran.

**In closing** I wish all young people taking part in this forum the very best for the exciting career possibilities ahead of them - whether they choose careers in academia, school education, the government, or a company. Thank you for the invitation to speak.

Cheryl Praeger, 23 June 2017