

My responses to questions for a guest blog post for Science GRL, Glasgow (2019)

My name is Natalie Robinson. I'm a marine physicist working at New Zealand's National Institute of Water and Atmospheric Research (NIWA). This means that I study physical processes that occur in the ocean, and I'm privileged to be able to locate most of my work in Antarctica. I study the connection that the ocean facilitates between ice shelves (glacial ice that has flowed off the land and out over the ocean to form massive floating sheets of ice) and sea ice (ice that forms from ocean water, effectively doubling the size of Antarctica every winter). I frequently encounter water that is 'supercooled' (i.e. it's cold enough that it should have frozen yet remains liquid) and contains millions of suspended ice crystals. So, figuring out how to make meaningful observations in this challenging environment, as well as what they mean in the context of a changing climate, has become a speciality of mine.

What made you get in to science in general? Your area of science?

I was a kid who enjoyed questioning stuff. To the point where I frequently didn't believe things adults told me until I'd either asked enough questions to satisfy my disbelief or found out the answers for myself. However, I was polite, quiet and hardworking, so this attitude never got me into trouble. In fact, it was encouraged by my science teacher at school, who had a unique perspective on teaching science and developing curiosity among his students.

My experience at high school made me want to continue with Physics at university, despite not knowing what it would lead to. Having completed an honours degree in physics and mathematics, I then fortuitously came across an opportunity to use those skills in an area that was, at the time, completely foreign to me: Marine physics, with the added bonus of working in Antarctica. I jumped at the opportunity and my curiosity was sparked. I went on to complete a PhD in a similar field.

However, the first of my three babies arrived during the PhD, which meant that, for several years, I was not available for Antarctic field work. So, I was fortunate to be able to take up a laboratory-based PostDoc position that allowed me to investigate connections between my Antarctic work and volcanic eruptions, underwater kelp (seaweed) forests, and deep-sea mining operations.

Now that my kids are a little older, I've been able to return to Antarctica annually to pursue new areas of research, and this looks set to continue for a few years yet.

Do you have a science hero/ine? (Who & why)?

I have been extremely fortunate to count a very large number of New Zealand's most high-profile and prolific environmental scientists as supervisors, mentors and colleagues over several years. However, in terms of personal experience, it's hard to look past Professor Pat Langhorne, who was one of my PhD supervisors and who remains a principal colleague. She came to New Zealand to join our Antarctic programme after she was unable to travel south with the British programme because she is a woman. Having made this foreign country her home, she has built a world-class research group, conducted over 25 Antarctic field seasons, supervised many graduate students and raised a family. In recognition of her service to Antarctic science has just been awarded the Antarctic medal. So, she is very highly regarded in the community yet remains approachable, responsive and very encouraging of younger scientists. She is very generous and makes an excellent role model.

On a bad day, what inspires you to keep going?

My number one driver is understanding the future climate that my children will have to live with. We have been seeing the response of the climate system to our use of fossil fuels, and I know that these changes will continue to accelerate throughout my lifetime. So, I'm motivated to do my small part to bring as much certainty to our understanding of future climates as possible, so that we, and our children, are in the best possible position to manage environmental, political and social changes that will come.

I feel highly privileged to be involved in Antarctic science – not only is it a fantastic place to do field science, but we're making new discoveries all the time, and we're rapidly improving our understanding of how Antarctica drives our climate system. But I'm also aware of just how much we have yet to find out about how it operates and how its likely to change – it's really hard and expensive to directly observe processes when they're covered with so much ice. So, every single data point is hard-won and incredibly valuable. As a consequence, Antarctic work naturally promotes international collaboration and sharing of information to a degree that really lives up to its treaty designation as “a natural reserve, devoted to peace and science.”¹

Do you have a favourite science fact?

93% of the additional heat now stored in our climate system resulting from anthropogenic climate change has gone into the ocean. If instead, that heat had all gone into the atmosphere, Earth's climate would already be too hot for human habitation. So, the oceans have so far saved us from ourselves. But even they are showing signs of significant change. And changes to the ocean, although they happen gradually, stick around for a lot longer than changes in the ocean. So, we have already committed ourselves to hundreds of years of future warming – even if our reliance on fossil fuels were to end today.

What is/which are the best part(s) of being a scientist?

The obvious perk of being able to travel to Antarctica on a regular basis

Being able to make brand new discoveries every time I travel to Antarctica

Encouraging and empowering kids to help determine their own fate, especially as it relates to our reliance on a changing climate.

What does a scientist do in their spare time?

Contrary to popular perception, scientists are often highly creative. This makes a lot of sense to me, since, although more formalised, science has a lot in common with art. For myself, my 'spare' time is mostly taken up with my three children. However, I try to keep up a regular regime of running and yoga, with other interests (such as circus performance, salsa dancing, handcrafts, classical piano and choral singing) interspersed as and when I find the time.

¹ Antarctic Treaty, Article 2, Environmental Protocol