

Prem Gill

Polar Conservationist

**Royal
Geographical
Society**
with IBG

Advancing geography
and geographical learning



Job title: Polar Conservationist

Organisation: The Scott Polar Research Institute, the WWF and the British Antarctic Survey

Location: Cambridge, UK

How did you get to where you are now?

I grew up in Reading and have had a diverse career in Remote Sensing. I studied Marine Geography at Cardiff University and worked at Royal Boskalis Westminster N.V. as a hydrographic surveyor before embarking on my current career as a Polar Scientist. I am currently a PhD candidate at the Scott Polar Research Institute, University of Cambridge, leading the Seals from Space project with the World Wildlife Fund UK and the British Antarctic Survey. In addition to this, I have guest lectured on conservation technology at the University of Oxford, run workshops on immersive technology for conservation with Digital Catapult, hosted collaborations with the Alan Turing Institutes looking at AI and conservation, worked with the BBC on nature documentaries, and founded Polar Impact, a network to support and highlight ethnic minorities in polar research.

Was there anything particularly useful that helped you get into this role?

For my undergraduate degree, I completed a dissertation topic that required knowledge and skills beyond the scope of what was taught within my degree. The research looked at whether it was possible to develop tools to provide freely available maps of marine biodiversity hotspots based on satellite data, and therefore a cost-effective conservation management

tool for nations in the Global South. To achieve this, I had to teach myself a number of skills, including programming and big data analysis, and reach out to leading experts outside of my institute. As result, I applied to PhDs with evidence that I was already capable of designing and undertaking interesting research projects independently, and that I also already possessed a number of self-taught skills that are typically gained during the course of a PhD. Having this initiative and skillset meant that I was also able to conduct preliminary work on potential PhD projects and bring this research to the interview.

What you might do in a typical week?

I work for the University of Cambridge, the Scott Polar Research Institute, the British Antarctic Survey and the WWF. The two seals I focus on in my work are the crabeater seal and Weddell seal. These seals rely on sea ice for breeding - they are the most numerous species and are slightly easier to identify from space. We believe these two species inhabit different areas which I want to investigate and quantify. My work consists of taking satellite pictures of the polar regions from space and analysing them to count seal populations and map habitats. I am interested in seal numbers, reproduction, where they breed and if any of this is changing due to climate change. Ultimately, I am interested in understanding what drives seal habitat preference and the extent to which we can use remote sensing technology as a cost effective tool to confidently monitor ice seals. We do have the potential to study the population as a whole as the satellite covers most of Antarctica but because one single satellite image can cover vast expanses of seal-less ice, going through it manually can be very soul destroying! So, we focus on specific areas. I choose study sites which are showing signs of rapid climate change or by identifying unique habitats which are special and slightly different, such as Larsen Harbour, which is home to the only known colony of Weddell seals that breed on land rather than ice. Most of my focus is on the Antarctica Peninsula, the most rapidly warming region in Antarctica.

What skills and characteristics do you need for this role, apart from geographical knowledge?

Showing initiative is crucial to being an interdisciplinary Polar Scientist. Using state-of-the-art satellite imagery for monitoring polar wildlife in remote regions means that I'm often working at the forefront of multiple fields, where there is either a lack of knowledge or tools to answer my research questions. I therefore spend a lot of time building relationships with researchers in other institutes and fields, such as AI and computer science experts at the Alan Turing

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Institute, to help develop the tools I need. In this case, a machine-learning based tool to automatically count seals and map their sea ice habitats. Having confidence in your research and not being afraid to email those with the skills you require is fundamental to my work. Having wide research interests and being able to relate lessons and techniques from different fields to your own is also important.

How does geography feature in your work?

Remote sensing is a huge part of geography. Some form of GIS now features in most undergraduate courses and it is a growing area of employment for postgraduates, with companies such as ESRI or Ordnance Survey. Ultimately my work touches on a number of themes in geography both physical and human. For example, it looks to better understand how the presence of polar wildlife relates to the environment across time and space, how the results of this work influences conservation management and policy within Antarctica, and how we can provide accessible research tools to enable everyone to map wildlife in the remote polar regions and thus become geographers in their own right.

What do you enjoy most about your job?

I love all the satellite imagery and advanced technology in my research. Also recently I brought into the British Antarctic Survey (BAS) 10 under-represented or disadvantaged intern students to provide them an opportunity to develop unique skills on a polar research project associated with institutes such as WWF, BAS and Cambridge, and meet leading senior polar scientists. Two have gone on to write research proposals with BAS scientists and another four joined me to collaborate on a conservation project with a leading professor from the University of Cambridge's maths department. I am really interested in using my research as a platform to increase opportunities for Black, Asian and minority ethnic (BAME) and working-class persons in non-typical fields, such as polar science and conservation, at top institutes.

Do you get to travel for your role?

In 2019 I travelled to Antarctica to measure light reflection from seals! The expedition aim was to calculate the spectral signature of crabeater and Weddell seals. It was the first field project that I led, and it was a huge success, with four out of the seven Antarctic seal species surveyed. Once lockdown eases, this data will allow me to return to the laboratory and distinguish between seals and rocks with more confidence when studying aerial satellite imagery.

What are the opportunities for career progression?

As a Polar Scientist and PhD student, the world is your oyster with multiple areas you can pursue within both academia and industry. In five years' time I hope I will still be working closely with polar wildlife and state-of-the-art technology as a researcher, perhaps with a bit more experience in the field to enable me to one day lead my own expeditions, and continue to use

my research as a way to make change for conservation and social equity.

What advice would you give to someone wanting to go into this career?

What happens in the polar regions is not confined to the polar regions - they are very important areas to monitor as a change in their climate might lead to a change in the global climate. In these regions we are seeing the earliest and most rapid changes in the world — the Arctic and Antarctic are a 'canary in the coalmine' and anyone interested in a career in polar science should keep up to date with how these regions are evolving. Someone who is interested in working for the Scott Polar Institute or British Antarctic Survey should look to develop skills beyond what is taught within your undergraduate degree. There are opportunities out there — such as my workshop projects or through other researchers. It would be a good idea to monitor our vacancies page. Alternatively, you could volunteer to man the Port Lockroy post office! Read more on the UKAHT website.

I also highly recommend online courses and learning programming and other skills. The main thing is to not be afraid to email a scientist if you find their work fascinating and try conducting your own research project. Most often, all the data and software you need are freely available online, and you really only require a laptop to begin your research!

How do you maintain your knowledge and interest in geography outside of work?

I love grime music and have in fact mixed this pastime with my work — by producing seal grime music!

Why did you choose geography?

As a geographer, you will be working on issues on societal and scientific urgency. In addition to that, you will have access to a range of skillsets that span multiple fields to answer your problem, enabling you to bring together a range of experts to tackle issues. Geography not only gives you the power to understand and thus better protect society and nature, but also the choice to approach problems from a number of perspectives and experiences. In particular, I think you should choose geography as it is crucial to protecting our polar regions. I want you to be able to see a bottle of Omega-3 oil, sourced from Antarctic krill, in your local high street and begin to ask questions about how resources from Antarctica are within your hands, and realise just how closely you are connected to these seemingly remote regions. Then ask yourself how other parts of the world may be connected to what happens in the polar regions. Then, finally, I want you to look at who is appearing on TV to discuss issues of climate change and what policies should be implemented on our lives. If you do not see someone who looks like you or a variety of people, it may be even more crucial that you study geography to enable yourself to become a leader in research and policy. Without all sections of society involved in polar research, we will not be able to develop fully robust plans to adapt to climate change.