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CONVERSATION

Early-career researchers: an interview with Cosima Porteus

Cosima Porteus is a Postdoctoral Fellow at the University of Exeter, UK, where she studies how fish sense, interact with and respond to their environment. She received her Bachelor's degree in Marine and Freshwater Biology from the University of Guelph, Canada, in 2004 before completing her Master's degree in Integrative Biology in 2006 at the same institution with Don Stevens and Pat Wright. After completing a PhD with Bill Milsom at the University of British Columbia, Canada, in 2012, Porteus joined Rod Wilson at the University of Exeter, UK, for a postdoctoral fellowship.

Where were you born and where did you grow up?

I was born in Timişoara, Romania. It's the second or third largest city in the country. I grew up there on a university campus in the early 1980s, before the Berlin Wall came down in Germany. At that time, Romania was a communist country under the ruling of Nicolae Ceauşescu and I remember lining up to get food and milk with my family. Food was distributed per person, so the more family you took with you, the more you could get; it was the only way to show how many people were in your family to get enough. It sounds very strange now, but to me it was normal. When I was about eight, I was figure skating competitively and I was away training in a different part of the country with my coach when the Romanian revolution began in my city, very close to where I lived. It was very scary, because I was quite far from home. There were shootings and protests at home, but we were only getting broken information. We ended up staying away longer than expected; there was so much unrest that we couldn't get back, which was quite scary. But that was over in a matter of weeks and then suddenly Romania was no longer communist.

Why did you move to Canada?

After the revolution, the economy in Romania really crashed. There was very high inflation and both of my parents had multiple jobs to try to make enough money for us to get by. They were both computer engineers and, at that time, Canada was looking for highly skilled workers. My parents' English was fairly good, so they decided to emigrate to Canada to give me and my brother a better chance. Both of them had interviews in English and they did quite well, because of their jobs. In all, the process happened quite quickly and, within a year or so, we had the visas. We left just before my 14th birthday. It was hard leaving family and friends behind, but I really enjoyed my new life right away. Unfortunately, my dad couldn't adjust to life in Canada, so my parents separated within the first year of moving and my dad returned to Romania.

What was arriving in a Canadian school like?

I was finishing Grade 7 when we left Romania but I went into Grade 9 in Canada. I had to pass a few tests in maths and English. My knowledge of science and maths was good enough to be in Grade 9 but my English was not as good. I attended English as a Second Language (ESL) summer school classes and I think I picked up the language fairly quickly during that first summer, playing with children and listening to English on the television.

How do you think this experience has shaped your personality?

I think it has made me less attached to places and I think that perhaps that is not a bad thing, because scientists are expected to move around. I seem to move every 5 or 6 years; it's been like that ever since I moved to Canada. I get more attached to people than places. I still have lots of contacts in Romania, family and two or three good friends that I keep in touch with and see regularly. I think it also made me very determined, partly because I'm a little bit like my mother; I don't let much get in the way of what I want to achieve. I work hard so the knockbacks don't really affect me as much.

How did your passion for science develop after you arrived in Canada?

I always loved science and I had some amazing teachers. One, Miss Roháček, was passionate about marine biology. We ended up dissecting sharks and squid and watching amazing videos, like the mating display of the cuttlefish. That really ignited my interest and

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passion for marine biology. Initially I wanted to combine my love of science with my love of sport and figure skating, so I decided to become a physiotherapist to help athletes work through injuries. I needed to have a Bachelor's degree in any science, so I looked at different programs and the Marine and Freshwater Biology program offered by the University of Guelph, Canada, really interested me.

Why did you change your mind about physiotherapy?

After my second year at Guelph, I applied for an Undergraduate Summer Research Assistant fellowship, which is a summer job where you get involved with research at your university. My project was trying to restore endangered species of mussels to native rivers with Gerry Mackie and his research assistant, Kelly McNichols. I loved working with them because the project involved fieldwork, where we did surveys on 36 different species of mussels in three different watersheds. We also brought some females back into the lab and tried to raise some of their young to see the life cycle. I learned a lot of different techniques. In addition, we caught fish, because freshwater mussels are parasitic for part of their lives. Female mussels release fertilized eggs onto the gills of fish, but each mussel needs a specific species of fish, so we were trying to figure out which mussels required which fish, because that would tell us whether the mussels were declining because the fish were declining, or for other reasons. I remained involved with the project until the end of my undergraduate degree. Once I started doing research, I completely forgot about physiotherapy. I had found my passion and that was it.

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How did you decide what to do after your undergraduate degree?

During my third year, I took some animal physiology courses. I specifically remember being taught by Don Stevens and Pat Wright. I approached Pat to do a fourth year project and I looked at the effects of low oxygen on the development of trout embryos, because I loved ecology and conservation biology. But I was also interested in how the body works and I wanted to pursue physiology to find out what suited me better. After that I decided that I wanted to stay for a further 2 years to continue the project and do a Master's degree. I had the option to switch to a PhD after the first year, but by then I had decided that I wanted to study something else, so I chose to finish my Master's and started looking for other places to go. I knew that it was important to get different experiences from different labs, so I emailed a few people and one of them was Bill Milsom at the University of British Columbia (UBC), Canada. I had not met him before, but everyone that I talked to spoke very highly of him and said what a great supervisor he was. He emailed me back and told me that he would be giving a talk not far from Guelph, so I went, we had a chat and he was very keen for me to join his lab.

What was moving to UBC like?

Incredible in many ways. I had studied how hypoxia and low oxygen affect the development of fish during my Master's, but I wanted to learn more about how fish sense changes in oxygen in their environment, which is one of Bill's areas of expertise. When I arrived, I was surrounded by great graduate students and people like Jeff Richards, Colin Brauner and Trish Schulte, so it was an amazing place to be. Everyone was open and helpful and whenever you had questions you could just go ask. I remember being a bit daunted and losing some of my initial confidence when I arrived. However, I learned a great deal and had the opportunity to travel to conferences. I also went to Brazil with Bill on a couple of research trips; it was amazing. In the end, I was in Vancouver for 6 years. It seems like a long time for a PhD degree, but it was the average for the department at the time. I worked on several species – the main one was bowfin, which is an air-breathing fish – but I also worked on trout, goldfish and zebrafish, looking at how they sense oxygen in their environment and the mechanisms that help them to do that.

At what point did you start to think about your next move and what factors did you consider?

I met my husband, Tom, and we got married during my PhD. He is British and he works for the Game and Wildlife Conservancy Trust (GWCT), a non-profit organisation in Britain, which was paying his salary while he was doing his PhD at UBC. After that, he had to return to England to work at GWCT as part of his contract, so I knew that we were going to move to somewhere in the south of England. I began looking for opportunities about 1.5–2 years before the end of my PhD. One name kept cropping up, which was Rod Wilson. I had met some of his postdocs and PhD students at conferences and talked to them about what he was like as a supervisor. I then chatted with him during a Society for Experimental Biology Annual Conference and I emailed him to arrange a lab visit when I was staying with my husband's family in the UK. I already knew that I wanted to apply for fellowships and we eventually came up with a project looking at the effects of carbon dioxide, or ocean acidification, on fish. I applied for three fellowships and to my surprise I was awarded two – a Royal Society Newton Fellowship and an AXA Postdoctoral Fellowship. I ended up accepting the Royal Society Fellowship, and AXA agreed to give me the research money, but not the salary, associated with the fellowship, so I was in a great position. Being able to use both fellowships gave me the resources to do a much more in-depth analysis.

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What would you say has had the most formative influences on you?

I've been so fortunate throughout my career to have amazing mentors. Early on, Don Stevens taught me to write scientific papers and Pat Wright taught me the early research skills necessary for a career in science. I was also awarded a JEB Travelling Fellowship during my Master's degree to visit Jeff Goldberg's lab at the University of Alberta, Canada, to learn a new microelectrode technique for measuring oxygen in the boundary layers of animals. Getting the JEB Fellowship was really important early on in my career. Since then I have learned so much from Bill and Rod. Bill always makes time for students and you never feel inadequate or ignorant when you ask him a question. At the same time, he fosters you to think and work independently, but he is always there when you need a hand. Rod is just genuinely excited about all aspects of science. Every conversation with him is very engaging and he always manages to stump me with good questions whenever we have a discussion. I think the most important thing that I learned from Rod was how to write grants and how to pitch my science to different audiences when I was applying for my fellowships. He read them, gave me feedback and he always made me change the wording a little here and there. Through that I learned the

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importance of making things clear and putting things into simpler terms.

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What will the next stage in your career be?

I have been looking for jobs for the last 4 years and I have only considered places where my husband could work too. Also, we have a small child, so we decided that it would be ideal to be close to family, which was another limitation. I mostly applied for jobs in the UK and in Canada, because Tom could emigrate to Canada as a spouse and I have settled status in the UK because I have been here for 5 years. I have spent a lot of evenings applying and preparing for interviews; it has been relentless. Most of my evenings have been spent looking through university websites, learning about other researchers and their work. Initially I started getting long-listed, but I started getting short-listed and invited for interviews when I published a high-impact article in Nature Climate Change. At the end of last year I applied for an Assistant Professor position in the Department of Biological Sciences at the University of Toronto Scarborough (UTSC); they were looking for a comparative animal physiologist specifically. It was my first interview in Canada and I thoroughly enjoyed the experience, but I was the first interviewee and I knew that I was up against strong competition. I tried not to get my hopes up, but as the interview went on I realized I was a good fit for the department. After a 2 month wait I got the call while I was at work and was offered the job. Once I read the written offer, I consulted with a couple of trusted colleagues to determine how my offer compared with those from other top universities in Canada. I quickly got up to speed on how to negotiate a job offer and made a list of three to four things that either needed clarifying or had to be in place for me to be successful in my new position. This is my dream job and I can't wait to start my own lab in summer 2020 at UTSC.

What has your experience been of finding funding for your research?

My husband and I are equal breadwinners and we have a family to support, so there was pressure to keep applying for funding. Initially I had the 2-year Royal Society fellowship, but I started applying for other funding about a year into that and was awarded an NSERC postdoctoral fellowship, which meant that I was fairly independent for about the first 4 years of my postdoc. It's tough because the longer-term fellowships are very competitive and I was applying for them at the same time that I was applying for jobs. I always had at least one application submitted at any time. I was also involved in writing grants where I was the named postdoc. It seems that the number of years that people spend as a postdoc before getting a permanent position is increasing, even from a few years ago. People at this career stage are having to spend more time in short-contract positions, forcing them to move around more, putting pressure on their personal life and contributing to mental health problems. Also, I think that I was perceived by funding referees and some hiring committees as more junior than I actually was, because experience seems to be measured in years post PhD. In the UK, PhDs only take 3 to 4 years, but I had a 2-year Master's degree and a 6-year PhD, so I had a lot more research experience. But it also worked in my favour, because I have more publications and I have been able to get independent funding, so it has been a double-edged sword.

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How do you manage to juggle conferences with a small child?

I definitely go to fewer than I used to since I've had my son, William, but I have an incredibly supportive husband who takes on the parenting role full-time when I go away. I tried to take William to a conference once, but that didn't work out so well. I took him to a poster session and he vomited all over me; that was the end of the session for me. Also, conferences aren't just about the talks; socializing in the evening is also important. I feel that I can do that when I'm alone, but if my family is with me I would probably prefer not to go out. I feel that it's too hard to balance, so I've learned that it's better for me to go away for 3 or 4 days on my own. I've seen a lot more childcare being provided at conferences recently and there are rooms for new moms where they can feed their children. I think that we're becoming more supportive of young parents as a community, but for me I need to go to a conference and focus on just being there.

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How could the peer-review system be improved for early career researchers?

I think I started peer-reviewing sometime during my PhD, probably after I'd written one or two review articles on a certain topic. Once or twice my mentors invited me to participate in the peer review process. They specifically asked the journal whether they could include my opinion, because I was more of an expert at the time than they were. I think a lot more journals could allow senior colleagues to include a more junior colleague in a combined review of a paper. I think it is very valuable for a PhD student to be involved in the process and get the experience. Journals could suggest it as an idea in their correspondence when they ask senior colleagues to review papers.

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Do you use social media at all for outreach?

I use it sporadically, but I find it's a great community for scientists; I use it to communicate with other researchers. Social media is a great place to find out about new papers, jobs and other issues related to academia; for example, other people's experiences of job searches. Sometimes you can find solutions for problems on social media, so I think it's great. I have put a 1-minute movie that I made about my work, which I tried to make accessible to everyone, on Twitter and Facebook. It has been quite well received. Social media is also helpful when you are not able to attend a conference; you can hear about things that are happening from far away, so I think it's invaluable.

Cosima Porteus was interviewed by Kathryn Knight. The interview has been edited and condensed with the interviewee's approval.