

# Cosima Porteus

**C**osima Porteus is an Assistant Professor at the University of Toronto Scarborough, Canada. The Porteus lab aims to understand how aquatic animals sense and respond to environmental change in order to predict how anthropogenic factors affect their physiology and behaviour. Cosima was awarded the SEB's 2023 President's Medal for the Animal Section. She is an Associate Editor for *Conservation Physiology* journal.



before that and I decided marine and freshwater biology would be fun and interesting. I applied to the Marine and Freshwater Biology program at the University of Guelph, Canada and I started doing research after my 2nd year of university, working on freshwater mussels. I loved research so much that I never looked back.

*What is your lab working on currently?*

We are currently looking at how anthropogenic stressors affect the sensory systems of aquatic animals,

mostly fish and crabs. We focus on abiotic stressors such as ocean acidification, hypoxia and temperature, both on their own and in combination with one another. We look at multiple levels of biological organization to figure out the physiological mechanisms of how these stressors affect olfaction in these animals and how they might be affected by changes in their environment. We employ a variety of techniques including electrophysiology, behavioural assays, immunohistochemistry and histology, as well as molecular techniques.

*Tell us about your background. How did you first become interested in marine biology?*

One of my high school teachers had a lot to do with how I became interested in marine biology. I've always loved math and science, but it wasn't until high school biology, when my teacher got us to dissect squid and sharks instead of the typical rats or frogs, that I began to be very interested in marine biology. I really enjoyed dissections and the different body plans of these animals. I also remember watching a video of how male cuttlefish attract females, with the colour of the male changing on the side of the female making for a flashy display. I thought that was amazing! After high school, I initially wanted to go into physiotherapy but I needed a biology degree



Top left box: Cosima at Strawberry Point, British Columbia. Above: Animal collection site at a rocky beach, Eagle's Bay, British Columbia.

### What does a typical day look like for you?

My job is about 40% research, 40% teaching, and 20% service, but this is more of a yearly average. It varies a lot depending on the day and time of year. I plan my week on Sunday nights and make sure I block off times for particular tasks that I need to get done the following week such as giving students feedback, writing a grant, marking, preparing lectures, or revising a manuscript. I try to reserve my mornings for writing as this is when I am most focused. The afternoons are for lab work, any teaching related work/prep, and meetings. We have lab meetings once a week and these can vary quite a lot in content: sometimes we read papers and discuss them, or present our data and get feedback. At the moment we are working on improving our writing while at the same time writing something (manuscripts, thesis proposals, reviews, or project reports). We are using a book called *Writing Science* by Joshua Schimel, a book recommended by a colleague. I would recommend it to any scientist at any career stage, from early grad student to experienced scientist. It contains some powerful insights.

### What do you most enjoy about your work?

I am lucky to wake up every day excited about my job. I love everything about it from mentoring students and teaching classes, to writing grants (I really do!), lab work, and solving problems. I like how what I do is constantly changing. I've recently been able to

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have a bit more time to get back to doing lab work. I love being back in the lab: gathering data, making graphs and performing statistical analysis. I also enjoy seeing my students going through this process. I love exploring the findings and constantly discovering new and interesting patterns, leading us to further questions.

### What do you find most challenging?

I found starting a new lab during a pandemic especially challenging. Every aspect of this process has been affected from ordering equipment to recruiting students, construction of facilities, getting experimental animals and being able to travel to other places to conduct research. Even something as simple as ordering some beakers for my lab took months due to the glass being used to make the vials for the COVID vaccines, causing a glass shortage and therefore huge delays.

### What is your lab hoping to work on in the future?

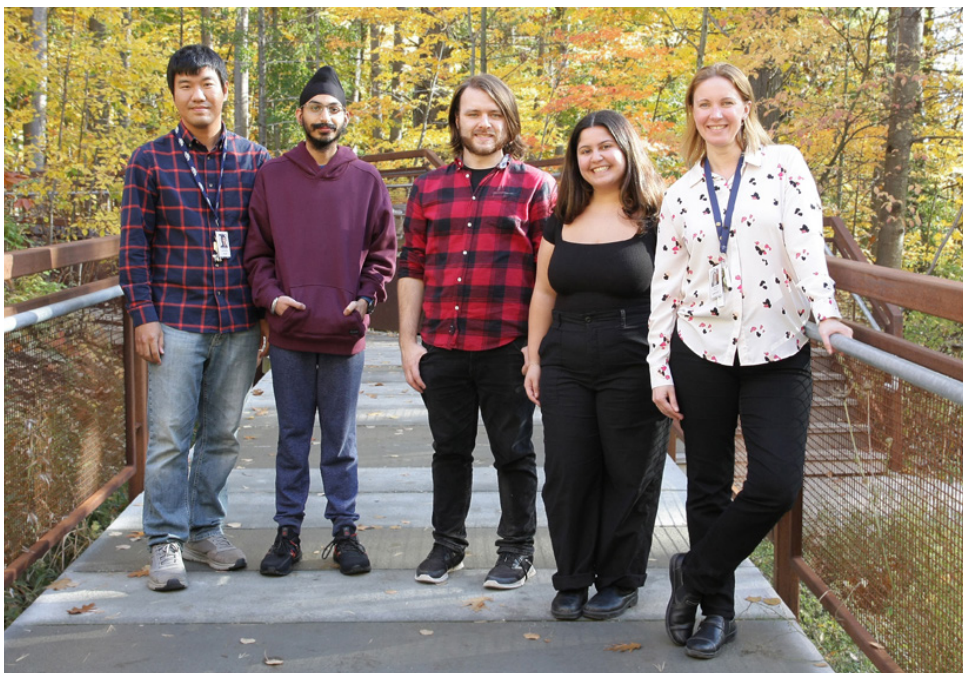
We are just starting some exciting new work on ageing and the role that hydrogen sulfide plays in the ageing process. Hydrogen sulfide is toxic at high concentrations but our cells produce it in small quantities in which it can be beneficial in many ways. We are determining if hydrogen sulfide can lead to improved health in later life in turquoise killifish. They are an ideal model organism because they are short lived but still show signs of ageing like humans and other vertebrates do. Also, their ageing is well characterized. I secured some funding and I have a student starting this work in the fall which I'm really excited about.

### What advice would you give to aspiring scientists in this area?

If academia is your end goal, then get involved! Get involved in your local grad school societies, or national and international societies, Outside JEB or other initiatives. This will help you widen your network, create opportunities, and help you develop into a more rounded academic.

### Who are your scientific heroes?

I look up to my peers, colleagues and mentors. They are my heroes and inspire me. I am part of a friendly and collegial scientific community, which is also intellectually stimulating.



Above: the Porteus group. Left to right: Dr. Gwangseok Rex Yoon, Deep Soor, Liam Tigert, Elissa Khodikian, Dr. Cosima Porteus.

### Selected Publications from SEB or affiliated journals.

Porteus CS, Pollack J, Tzaneva V, Kwong RWM, Kumai Y, Abdallah SJ, Zaccone G, Lauriano ER, Milsom WK, Perry SF. 2015. [A role for nitric oxide in the control of breathing in zebrafish \(\*Danio rerio\*\)](#). *Journal of Experimental Biology* 218, 3746–3753.

Porteus CS, Roggatz CC, Velez Z, Hardege JD, Hubbard PC. 2021. [Acidification can directly affect olfaction in marine organisms](#). *Journal of Experimental Biology* 224. jeb.237941.

Porteus CS, Wright PA, Milsom WK. 2014. [Characterisation of putative oxygen chemoreceptors in bowfin \(\*Amia calva\*\)](#). *Journal of Experimental Biology* 217, 1269–1277.