

CONVERSATION

Early-career researchers: an interview with Erika Eliason

Erika Eliason is an Assistant Professor at University of California, Santa Barbara, USA, where she studies ecological and evolutionary physiology. She received her Bachelor's degree at Simon Fraser University, Canada, in 2003 before completing her MSc and PhD with Tony Farrell at the University of British Columbia, Canada. She then completed postdocs with Frank Seebacher at the University of Sydney, Steve Cooke at Carleton University, Canada, and Scott Hinch at the University of British Columbia, Canada. Erika gave the Cameron Award Lecture at the annual Canadian Society of Zoologists meeting in 2013.

Can you tell us about how you discovered your passion for science?

I was brought up in British Columbia, Canada, so I spent my entire childhood wandering out in the woods, discovering nature, looking at rocks, fishing. My family loves camping, hiking, animals and spending time outside, so I grew up discovering the natural world around me, being messy and dirty. It was through science fairs in school that I realised 'maybe I'm pretty good at this'. Although my parents are not scientists, they definitely encouraged me to read and to discover and learn about the world around me. They owned a contracting company, so I can drive an excavator – there's a fun fact about Erika – and I grew up renovating homes. My parents built the foundation for my high school, my dad builds roads and bridges. We lived on a hobby farm and we had excavators and bulldozers in the back yard, so my friends would come over and we would dig holes; my parents left the keys in the ignition, they didn't mind us driving them. They wanted us to learn to be self-sufficient, to trust ourselves, to be able to function in the world. Independence is extremely important to them.

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How did you select where to do your undergraduate degree and what to study?

I was good at sports and biology in high school, so I thought that I wanted to do a kinesiology degree with the intention of going on to medical school. I decided to go to Simon Fraser University (SFU) for the very practical reason that it is a good university, it is highly rated and I was able to stay home through my undergraduate degree. That way, I could save money and still go to one of the best universities in Canada. But when I got there I discovered that kinesiology wasn't for me. I thought it was boring memorising muscles and bones; however, I had loved my biology classes at high school, so I switched to biology and never looked back.

Erika Eliason works in Ecology, Evolution and Marine Biology at University of California, Santa Barbara, CA 93106-9620, USA.
Email: eliason@ucsb.edu



I paid my way through university: I worked as a waitress and in the first couple of summers I worked on an assembly line sorting trees. But then, after my third year, I got the opportunity to work in a research lab studying the mountain pine beetle and it was awesome. That was when everything changed. My eyes were opened to how amazing research was. I worked with a couple of really incredible and enthusiastic graduate students, Stuart Campbell and Deepa Pureswaran in John Borden's lab, who took me under their wing and trained me; they wanted me to become an expert scientist. We spent the whole summer driving 12 hours into the bush of British Columbia to set up traps and do the carefully designed experiments. I learned all the basics of replication, controls and randomisation. I was not just a cog in the wheel; they really wanted me to be an excellent scientist.

Then I went on an exchange in Fiji. That was right after the 2000 coup, so it was an interesting experience; there weren't many tourists there. I was able to do a lot of outreach and worked with non-governmental organisations (NGOs) while also doing some research working with marine protected areas (MPAs), which NGOs were trying to help Fijian villagers set up on their local reefs. Three MPAs had been set up 1 year before my exchange. My project was to evaluate the impact of those reserves on marine biodiversity with local villagers. I took children from the villages and we ran transects. We were able to show clearly that inside the MPAs there was way more biodiversity compared with outside; the effects were profound. The experience helped me to decide to forget medical school and to go into research. That was when I started to apply for Master's degrees. At the time, I was taking a fantastic Animal Physiology Laboratory course with Tony Farrell and so I decided to join his lab.

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What did you study for your Master's degree and PhD?

For my Master's degree, I studied digestion in rainbow trout. I really loved this project because I got to do surgery and I learned a lot of respirometry and other amazing techniques. But, I also discovered that I really need to do field work to be happy; that was the big thing that my Master's degree taught me. Tony was an extremely supportive supervisor and he said that I could do whatever I wanted for my PhD, so I decided that I wanted to do a project in the field on migrating adult salmon to look at their thermal tolerances.

Salmon have a fascinating life history; they go back to the place where they were born, resulting in many reproductively isolated populations. They were the perfect model to answer the questions that I was trying to ask about the mechanisms of thermal tolerance and physiological local adaptation. Fraser River salmon are encountering really warm temperatures as climate change is driving river temperatures higher; they are in big trouble. It was this perfect storm of a basic research question coupled with a conservation problem that was ideal for what I wanted to figure out. The challenge was that we only had one chance per year to collect data. The salmon return every summer to the Fraser River in British Columbia to perform their up-river migration. Millions of fish return at the same time each year. We hired First Nation fishers who helped us to catch a whole bunch of fish, then we had to transport them back to the lab by truck, but we didn't know which population they were from. We had to collect their DNA to figure out which fish belonged to which river tributary, then we put them all into a tank, but from the moment we caught them they were actively deteriorating, because they die after they spawn. We only had a maximum 6 week window if we were lucky – often only 4 – to do all the work, so it was incredibly intense. If anything went wrong that was it, you would have to wait until the next year.

Also, I got married in the middle of my first field season. Then, midway through my third field season, we moved to Seattle because my husband took a job with Microsoft, so I began commuting between Seattle and Vancouver during the last part of my PhD. In addition, I didn't know the Fraser River study was going to work until it worked, so I have an unpublished back-up PhD thesis that I haven't finished yet on Atlantic Salmon. We were really worried after the second field season because there was a catastrophically high death rate, so it was our contingency plan in case the Fraser River study didn't work.

What did you do after your PhD?

That was when life got really difficult. We wanted to have a family, so we decided that once I had finished my PhD research we were going to try: I was pregnant at my thesis defence. Then I started a postdoc at University of British Columbia, Canada (UBC). Scott Hinch had hired me to work through the fall, wrapping up some salmon work. He paid me to train some of his other graduate students and I had been awarded an NSERC postdoc fellowship, which you can take anywhere or you can postpone for maternity leave. I was planning to postpone the fellowship, take my maternity leave and everything was going to be great, but then tragedy struck. We had a late-term loss; we lost our baby. That was absolutely devastating. It is something that no one talks about and I think that is

a big problem; you are trying to lay plans, you are trying to do science and have kids and you forget that there are a lot of mishaps that can happen.

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How did you recover from such a terrible experience?

My husband, Paul, quit his job and we went to Australia. I went to Frank Seebacher's lab in Sydney and he welcomed me with open arms. He was really wonderful to take me in under those circumstances. But then, after 6 months, we were pregnant again. It was wonderful but we needed to flee very rapidly home to Canada because we had no health care in Australia. I think one of the take-home messages from all these experiences is to embrace the flexibility of the postdoc years, but be aware of the pitfalls. I had to get back to Canada because I had complications – I was high risk – but we had a wonderful healthy little boy, Garret, the following April.

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How did the pregnancy affect your research?

I could do very little field or lab research during the pregnancy because of the difficulties that I experienced. Also, after my son was born I was supposed to give the Cameron Award lecture at the Canadian Society of Zoologists (CSZ) annual meeting in Guelph in 2013, but I only just made it because I was in and out of the hospital due to some post-delivery hurdles. Before I had my children, I had this impression that I was going to be able to work all the way up to 8 months and 3 weeks, that I would be able to do all of this science and then I would take my maternity leave and then probably I would still work a bit on the side while I was on leave. I thought that it would hardly slow me down, but it was totally not that way and I think that is not uncommon.

How did you keep your career going after experiencing all of these setbacks?

I had amazing postdoc mentors; Steve Cooke from Carleton and Scott Hinch from UBC hired me repeatedly. I supervised, or helped supervise, their students and I was heavily involved in their research programmes, going into the field to teach and mentor. That really helped to keep my career going, because I was always involved in their research, teaching their students to write papers, analyse data, take blood samples, do surgery and tie sutures. Tony Farrell has also been so supportive throughout it all; he gave me open access to all his equipment and lab space, whenever I needed it. I think that the immense trust of my mentors and their faith in my abilities sustained me during my postdoc years. Steve even arranged for my husband and first child to be on site with me in the Bahamas while I was doing fieldwork for 6 weeks. And Paul is a fantastically supportive husband; he took leave from his job to go into the field. Also, my parents and my in-laws were a huge help; they play a massive role in my kids' lives; they take on a massive amount of care and baby sitting. I had almost a 5 year block of time between my PhD and my faculty job, but you can't really say that I spent 5 years as a postdoc. I spent 75% of that time either pregnant or on maternity leave, so it was kind of a crazy time!

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How did your faculty position search go?

I was really selective; I only applied to places that I wanted to go to. I did not believe in applying to every single job opportunity possible. I think I only applied to 10 places. I was pregnant with our second child when I was negotiating and deciding whether or not I wanted the University of California, Santa Barbara, USA (UCSB), marine physiology job. In the end, I accepted the offer, but I told them that I wanted to delay by a year so that I could take maternity leave in Canada, with the result that I had a 3 year old and a 10 month old when I started in Santa Barbara.

Tell us about your experience of setting up your first lab.

It has been fun, but it was very different from Canada. For example, recruiting graduate students is very formal in the US. In Canada, you just shake hands and someone joins the lab, whereas here, the students have to apply well in advance and they have to take the Graduate Record Examinations (GREs). I have a great group of graduate students. Setting up the lab has been slow, which is to be expected; they are renovating new space for me, which should be ready soon. When I arrived at UCSB I was already familiar with spending a large start-up grant because Tony was recruited to UBC from SFU when I was a graduate student. I had helped him to buy a lot of equipment so I'm very comfortable talking to vendors, setting up new accounts, designing aquatic facilities.

What do you look for in the people that you are recruiting?

My number one favourite question is, 'Tell me about a time when you failed and how you recovered from that'. I look for resilience, for creativity and intelligence; I like to see how students think and solve problems. So much of science is about things going wrong, failing epically, and I think you have to be able to pick yourself up and figure out what went wrong, how to fix it and make a new plan. I want to know how they will turn failure into opportunity.

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Have you been involved in science outreach and how has that helped your career?

People still contact me about those Outside JEB articles that I wrote; I loved doing them. I think that writing helped me in a couple of ways. It kept me up to date with the literature, so it helped me on a professional level, but it also improved my ability to communicate science to a more general audience and improved my writing skills. I also did a lot of science outreach. I coordinated a programme called

the 'Let's Talk Science Partnership Program' when I was a graduate student at UBC, reaching thousands of at-risk kids in schools. I trained tons of graduate students how to communicate science to kids. There was a long time when I thought I was much better at doing outreach than doing science.

What do you see as the main challenges for women in science?

Having kids is a big challenge; access to affordable childcare at universities and during meetings is a big problem. I once went to a conference in Vancouver and I had to pump milk in the toilets; there wasn't even a fridge for me to put the milk in. The lack of family-friendly policies is also a major barrier for women. I found my biggest issue during my postdoc years was access to networking opportunities, especially as I couldn't go to conferences. During grad school, I felt that I had this shiny career, I was on a trajectory. I went to the same conferences every year, I was making contacts. But then I dropped off the face of the Earth; I was not able to network at all. Now I am popping up again, 5 years later, people are looking at me and hopefully recognising me and I am trying to re-establish those contacts and networks.

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How could not-for-profit organisations like The Company of Biologists better support early-career researchers?

I would ask that organisations like The Company of Biologists offer funds to support graduate student or postdoc parents to be able to attend a conference. For example, I had to pay all of my expenses out of my own pocket to go to the CSZ in Montreal in 2014 because I was between positions and I didn't have a supervisor or an affiliation any more. The other issue is that childcare is rarely available at conferences. I almost brought my mom to a couple of conferences to take care of Garret because there was no childcare. In the end, I left him with her and cut the conferences short, which meant I lost networking opportunities. The funds could go towards supporting flights for an additional care provider, or towards helping to pay for childcare at the conference, if available.

If you were marooned on a desert island and could only take one paper with you, what would it be?

I'd bring Platt (1964), 'Strong Inference' in *Science* (146, 347-353), where he advocates systematically applying the scientific method in order to produce rapid progress in science. If I'm going to rebuild civilisation on my desert island, it's probably a good idea to have the scientific method down pat. Though a smarter answer would be some sort of a field guide on edible local plants so I didn't starve to death. I'm pretty hopeless at identifying plants.

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