

## ECR SPOTLIGHT

# ECR Spotlight – Madison Bradley-Cronkwright

ECR Spotlight is a series of interviews with early-career authors from a selection of papers published in *Journal of Experimental Biology* and aims to promote not only the diversity of early-career researchers (ECRs) working in experimental biology but also the huge variety of animals and physiological systems that are essential for the 'comparative' approach. Madison Bradley-Cronkwright is an author on 'Impact of hindlimb length variation on jumping dynamics in the Longshanks mouse', published in *JEB*. Madison conducted the research described in this article while a master's student in Dr Susanne Cote and Dr Campbell Rolian's lab at the University of Calgary, Canada. She is now a PhD candidate in the lab of Dr Doug Boyer at Duke University, USA, investigating how different levels of biological variation, like morphology and performance, interact and evolve.

### How did you become interested in biology?

I spent a lot of time outside as a kid trying to emulate my favorite TV personality, John Acorn (a naturalist who starred in a local TV show in Alberta during the 90s). My grandma took notice and gave me a couple introductory identification books. I used my field guides to attempt to identify the wildflowers, bugs and birds I'd come across. I was lucky enough to live outside of a city, so there was lots of land to cover on my imagined expeditions.

### Describe your scientific journey and your current research focus

Straight out of high school, I went into a biology degree at the University of Calgary, Canada. It wasn't until I started taking biological anthropology courses that I really became excited about what I was learning. There was just so much to investigate within the evolutionary stories of ourselves and our primate relatives. Without really knowing what I was getting into, I went to a field school in Costa Rica and studied the ranging behavior of the three species of monkey that lived around us. The next field school I went to, this time on Vancouver Island in Canada, I was introduced to comparative biomechanics and to conducting independent research (my project involved garter snake locomotion).

When I graduated from my undergraduate program, I took a hiatus from school. While I tried to decide my next steps, I worked as a rafting guide for a company that takes middle-school and high-school students on day-long science field trips along the Bow River in Calgary. Although I was unsure of whether I belonged in academia, I decided to try a master's at the University of Calgary (my master's thesis is the foundation of my recent publication). Here, I was exposed to the complexities of evolutionary theory and how it pertains to functional morphology and biomechanics. In addition to my lab-based research, I took opportunities that arose to do field work on Rusinga Island in Kenya, in the backcountry of the Rocky Mountains, in the badlands of Wyoming, USA, and in Iceland's Westfjords.

I'm now a PhD candidate at Duke University and here I work with multiple species of lemurs at the Duke Lemur Center. The main goal of my dissertation is to conduct a thorough investigation of how



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multiple species of lemurs evolved morphology that allows them to generate and deliver the power for their exceptional leaps.

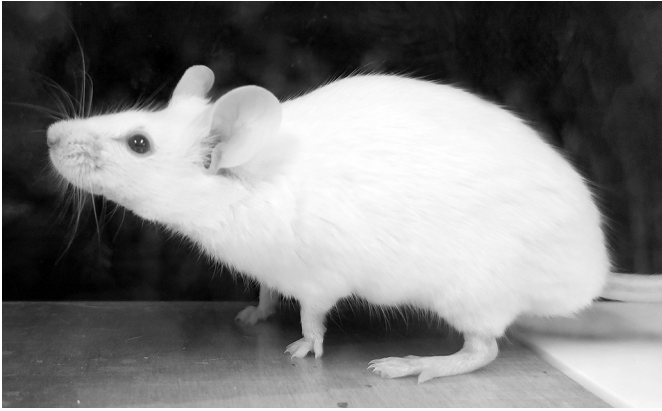
### How would you explain the main findings of your paper to a member of the public?

Long legs are a morphological staple of species that jump. When trying to understand how long hindlimbs evolved, only studying specialized jumping species can be limiting because they are the final product of the process you hope to describe. To better understand what advantages long legs give individuals within a population (which is where natural selection plays out), we used laboratory mice. Some mice were the product of 22 generations of selective breeding for longer hindlimb bones, while others were the product of 22 generations of random breeding from the same ancestral population with more 'typical' hindlimbs. Despite laboratory mice not being particularly great jumpers, we found that with their long legs, the Longshanks mice were able to use less force applied over a longer time when taking off for a jump. This points to how hindlimbs could benefit a population with more generalized locomotor tendencies if selection for jumping behaviors was applied.

### What do you enjoy most about research, and why?

I enjoy the puzzle and the pursuit of something new. As a researcher, I have the chance to produce knowledge, instead of just consuming it. To me, there are so many opportunities to be inventive. I enjoy the creativity that's required to conceive an interesting question, the methods to test it, and to interpret what you found. I would argue that scientists get to be, in part, storytellers. Data can't verbalize their own interpretation, so as a researcher you

Madison Bradley-Cronkwright's contact details: Department of Evolutionary Anthropology, Duke University, Durham, NC 27708, USA.  
E-mail: madison.bradley@duke.edu



**A Longshanks mouse pausing on the force plate prior to data collection.**

have to translate them into a narrative that can be shared and interrogated.

**What is the hardest challenge you have faced in the course of your research and how did you overcome it?**

A challenge I've faced in research is learning how to be in academics. I didn't come from a family with an academic

background, and there are a lot of steps (both explicit and implicit) to making a career out of research. Without many clear examples to follow, I've spent a lot of time struggling to navigate the academic space. Eventually, I was fortunate to find and be helped by a great mentor, which demystified a lot of the process. While I can't say I've completely overcome it, I am less daunted.

**Do you have a top tip for others just starting out at your career stage?**

Spend time with the literature and be widely read. Read older literature, seminal papers, literature from other fields, papers that present unfamiliar concepts or methods. While there's always this sense of urgency and pressure to move quickly through projects, I think it's worth slowing down occasionally to be able to consolidate a broader range of concepts. It's hard to predict where you'll find some kernel of information that spurs your own ideas or helps you make a connection that shifts your thinking. Stagnating within a narrow range of literature limits the novel connections you will be able to make.

**Reference**

Bradley-Cronkwright, M., Moore, S., Hou, L., Cote, S. and Rolian, C. (2024). Impact of hindlimb length variation on jumping dynamics in the Longshanks mouse. *J. Exp. Biol.* **227**, jeb246808. doi:10.1242/jeb.246808