

FIRST PERSON

First person – Hannah Arbach

First Person is a series of interviews with the first authors of a selection of papers published in Journal of Cell Science, helping early-career researchers promote themselves alongside their papers. Hannah Arbach is the first author on 'Extreme nuclear branching in healthy epidermal cells of the *Xenopus* tail fin', published in Journal of Cell Science. Hannah is a PhD student in the lab of Andrea Wills at the University of Washington, Seattle, USA, investigating branched nuclear morphology in the fin of *Xenopus* tadpoles.

How would you explain the main findings of your paper in lay terms?

The nucleus is the cellular compartment that contains the genetic information of the cell. Normally, the nucleus is round or oval and there are only a few examples of healthy cells with very different shapes of the nucleus. Most frequently, these different shapes occur in disease states, so we were surprised to find a healthy population of cells that had very elaborately branched nuclei. We characterized these cells to show that they actively divide, and, apart from their nuclear shapes, behave like 'normal' cells. We also found that two types of cellular filaments, F-actin and Lamin B1, play a role in maintaining nuclear branches. We think these cells offer an exciting opportunity to study the differences between healthy cells and diseased cells that have non-round nuclei.

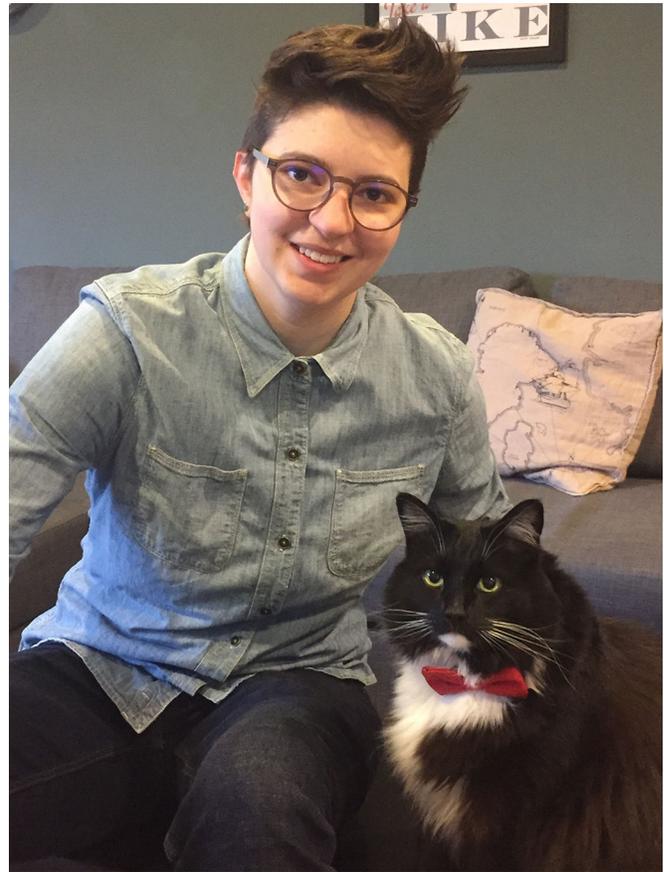
Were there any specific challenges associated with this project? If so, how did you overcome them?

The biggest challenge we overcame was optimizing the live-imaging conditions – especially for capturing mitosis. We absolutely wanted to capture mitosis from the beginning to end, and we were using histone markers to label chromatin during this period of the cell cycle; however, in doing so, we had no way of knowing *a priori* which cells were going to divide. We had to optimize the interval between frames to get the most information possible while giving enough time to catch a cell division. Other than that, I think it was just the challenge of being patient.

When doing the research, did you have a particular result or 'eureka' moment that has stuck with you?

I think this project will really stick with me for a while, because coming into this project, I had only done protein biochemistry research. I remember watching my first clutch of embryos undergo their first cleavage and I was hooked. Probably the most memorable experiment was the first time we tried the actin-disrupting latrunculin B and cytochalasin D treatments – it was just incredible! When I first saw that the nuclei were rounding after drug application, I ran to grab my group leader Andrea from her office, because I was half excited, half in disbelief. Andrea came and looked at the live tadpoles and we both had a moment of celebration.

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Hannah with her cat Norman

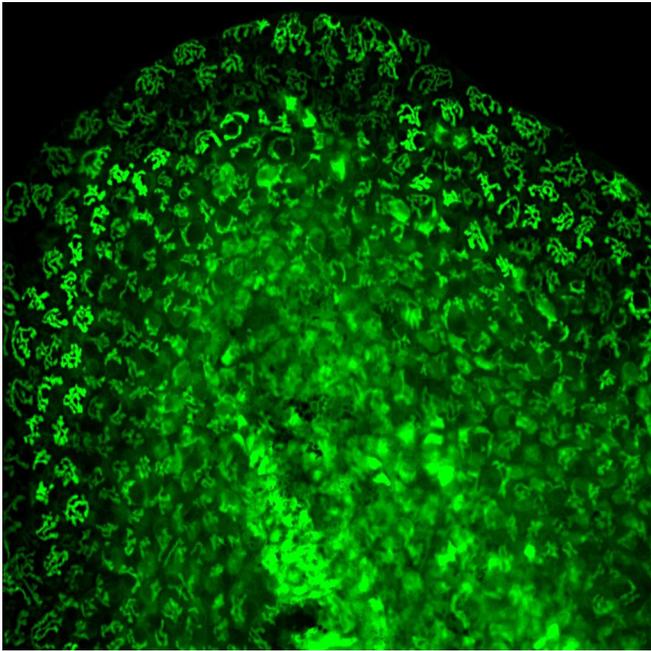
Why did you choose Journal of Cell Science for your paper?

We chose Journal of Cell Science because we wanted a high-quality journal that would reach a broad audience of cell biologists.

Have you had any significant mentors who have helped you beyond supervision in the lab? How was their guidance special?

Andrea Wills has been hugely supportive in all facets of science and life in general. The developmental biology and *Xenopus* communities have also been so encouraging. I took the advanced imaging course for *Xenopus* at the MBL last summer and all the course instructors, in particular Laura Anne Lowery and John Wallingford, have been so encouraging in pursuing this project and in boosting my confidence as a scientist in general. Seeing them always re-invigorates me to keep charging ahead; as John says: "quit worrying and just do science!"

[...] I realized that doing science – designing experiments, interpreting data, asking questions – was the best thing I could imagine doing.



GFP bearing a nuclear localization signal showing branched nuclei throughout the tail fin of a Nieuwkoop and Faber (NF) stage 41 *Xenopus tropicalis* tadpole.

What motivated you to pursue a career in science, and what have been the most interesting moments on the path that led you to where you are now?

I think I was lucky to grow up in an environment that was surrounded by science. My dad was a test pilot in the air force, so one of the places I lived as a kid was Edwards Air Force Base, which is an alternate space shuttle landing site. So, I got to watch a few space shuttle landings, and for a while, I really wanted to be an

astronaut. Then I had fabulous advanced placement chemistry and biology teachers in high school and wanted to go into medicine. I didn't consider research until I was an undergraduate at Mount Holyoke College, when my academic advisor Wei Chen encouraged me to try doing research. I started working in Kathryn McMenimen's lab, and the first summer I worked in her lab, I realized that doing science – designing experiments, interpreting data, asking questions – was the best thing I could imagine doing.

Who are your role models in science? Why?

I love reading papers from Elly Tanaka's group because they are always so careful and methodical. Amy Shyer is also a huge inspiration; her talks are always so clear, and I think she takes an interesting approach to her experiments – all while being an incredible person. Nadine Vastenhouw, Yixian Zheng and Jan Lammerding have all done some of my favorite work studying the nuclear lamina and genome organization. I also really admire the other graduate students in the lab with me: Anneke Kakebeen, Lauren Loh and Jeet Patel. They have infectious enthusiasm, ask intriguing questions, and present and interpret their data so wonderfully. I learn something new from all the discussions we have and they are amazing people.

What's next for you?

I'm starting the fourth year of my PhD and my immediate plans are to move into a more regeneration-based project. Then, looking at the slightly longer term, after I graduate I will be looking for a postdoc position.

Tell us something interesting about yourself that wouldn't be on your cv

I was a mascot in college!

Reference

Arbach, H. E., Harland-Dunaway, M., Chang, J. K. and Wills, A. E. (2018). Extreme nuclear branching in healthy epidermal cells of the *Xenopus* tail fin. *J. Cell Sci.* **131**, jcs217513.