

FIRST PERSON

First person – Destiny Davis

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. Destiny Davis is first author on 'Callose deposition is essential for the completion of cytokinesis in the unicellular alga *Penium margaritaceum*', published in JCS. Destiny conducted the research described in this article while a PhD student in Georgia Drakakaki's lab at University of California, Davis, CA, USA. She is now a postdoc in the lab of Jenny Mortimer at the Joint BioEnergy Institute (JBEI), Emeryville, CA, USA, where she is endlessly fascinated by the inner workings of the plant cell related to the cell wall.

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

Callose is a polysaccharide with unique elastic properties that is important for several processes in the plant. During cell division, when the plant cell builds a new cell wall between daughter cells, callose is deposited at the cell plate (the intermediate structure to the cell wall). We think this helps to stabilize the delicate cell plate structure before it matures into a cell wall. Before our study, callose at the cell plate had only ever been seen in multicellular plant species. Our study shows that callose is also essential for cell division in the unicellular alga, *Penium margaritaceum*. Although more work is needed to characterize cytokinetic callose deposition in dividing *Penium* cells, we think its presence in this alga provides insight into the role callose may have played in the evolution of terrestrial plant life.

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

Identifying and confirming callose in dividing *Penium* cells was a significant challenge. Cytokinesis occurs in *Penium* very quickly (~10 min), so timing as to when to label and image the cells was tricky. This step alone took almost a year to yield consistent, reliable results. After months of taking samples to the microscope and learning to spot dividing cells based on their morphology, I was able to figure out when the cells were dividing the most. Also, a fellow grad student (thank you, Rosalie Sinclair!) set up a light-dark cabinet for plant growth that I found very helpful in synchronizing *Penium* growth just enough to give me reliably dividing cultures.

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

After months of failed labeling experiments with Aniline Blue, I went to the confocal microscope one day and I saw the brilliant Aniline-Blue-labeled rings and rings-plus-puncta patterns in my cells. The signal was so bright, so clean and so consistent that I knew it had to be real. I was so excited, I immediately sent the data to Georgia (my main advisor) and our collaborator, David Domozych. I couldn't wait to present those results in the lab meeting that week.

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Destiny Davis

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

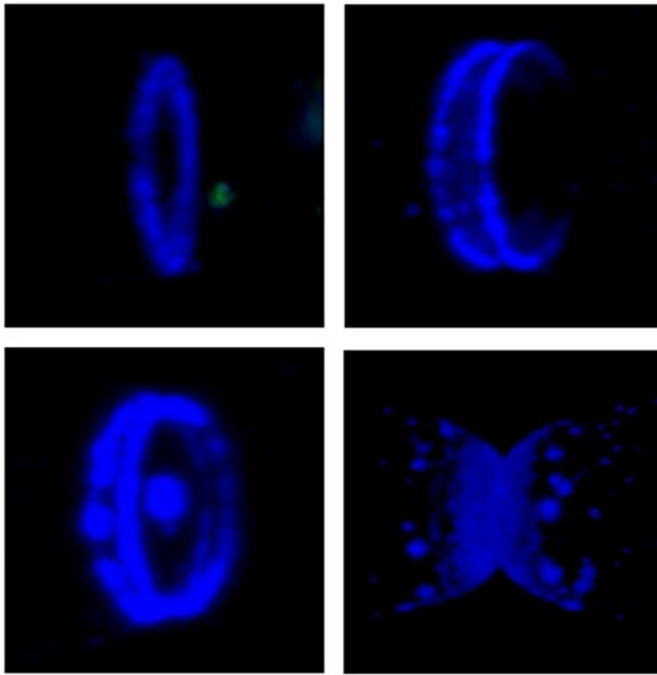
We wanted the paper to have a wide audience. We like that the Journal of Cell Science publishes research in a variety of organisms and, being a plant cell biologist, I love seeing plant papers pop up outside of specialist plant journals. The coolest part of science, to me, is identifying similar biological themes across organisms that are both closely and distantly related. We kept this in mind when deciding where to submit this work.

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

David Domozych has been instrumental in guiding me through this project. His generosity in sharing his thoughts and experience working with *Penium* helped me design the project and interpret the results. Perhaps his constant encouragement and genuine excitement for my ideas motivated me more so than anything else.

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've always been drawn to science for what it could teach us about life, but sometimes I feel that I fell into a scientific career almost by accident. I originally wanted to study English and writing in college but when I found myself enrolling in more and more science classes, I couldn't ignore that biology was what I wanted to pursue. Thanks to some amazing mentors early in my academic career, I never felt that there were limitations on what I could achieve.



Subset of the major Aniline-Blue-labeled patterns that occur at the isthmus zone of dividing *Penium margaritaceum* cells. Early in the project, I had a particularly good day at the confocal microscope when I saw all four of these Aniline Blue patterns in the same sample of cells. Even though I ended up seeing many more instances of these patterns over the following year, these are the exact four images that made it into the paper. The first pictures I took ended up being the best.

Who are your role models in science? Why?

Some of my biggest role models are my peers. I was fortunate to have spent my time in graduate school around some brilliant fellow student-scientists, who were just as fun to talk science with as they were hanging out over a beer. Many of my friends have gone on to achieve great things and have strong careers. I aim to follow suit.

What's next for you?

Initially, I was looking for jobs in science communication and science writing given my time spent with the UC Davis 'scicomm' group, Science Says, during graduate school. But when I read the postdoc project description at the Joint BioEnergy Institute with Dr Jenny Mortimer, it sounded like a perfect fit. I'm excited to stay in research a little longer.

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

I almost left graduate school in year 4. The pressure of being a young adult in my 20s and trying to establish myself as a professional in the field, while bearing the significant mental, financial and emotional burdens of graduate school almost made the research I was doing not worth it. Although the insecurity and anxiety didn't go away overnight, I'm glad I stayed and completed my research. What helped me most, in addition to therapy and a fantastic dissertation committee, was taking ownership of my project and remembering that my PhD was *mine* and I alone had the power to see that the project was completed.

Reference

Davis, D. J., Wang, M., Sørensen, I., Rose, J. K. C., Domozych, D. S. and Drakakaki, G. (2020). Callose deposition is essential for the completion of cytokinesis in the unicellular alga *Penium margaritaceum*. *J. Cell Sci.* **133**, jcs249599. doi:10.1242/jcs.249599