

## ECR SPOTLIGHT

## ECR Spotlight – Grace Rogerson

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 during our centenary year, but also the huge variety of animals and physiological systems that are essential for the 'comparative' approach. Grace Rogerson is an author on 'Incubation temperature alters stripe formation and head colouration in American alligator hatchlings and is unaffected by E2-induced sex reversal', published in JEB. Grace is an undergraduate integrated Master's student in Biology in the lab of Dr John Mulley at Bangor University, UK, working in the field of developmental biology.

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

I am currently in my fourth year of a Biology Integrated Master's degree at Bangor University. During my earlier years at university, I was able to study biological systems in a much broader sense, from the diversity of living organisms to bioscience skills to medical microbiology. During my third year, I was able to choose almost all the modules I took and personalize my degree. One module was 'BSX-3148 Developmental Biology', where I learnt about models and techniques used in studying animal development and how these link to human and animal disease. This module sparked a huge interest in developmental biology and drove me to investigate the effect of incubation temperature on American alligator development alongside Dr John Mulley for my third-year dissertation project. For my fourth-year dissertation, I am working towards developing a sand rat PCR sexing technique to enhance their use in developmental studies.

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

Young American alligators are mostly black/dark grey with a pale yellow/white underbelly and stripes. We found that the incubation temperature of American alligator eggs affects their head colour, the number of stripes they have and their tail tip colour. American alligators incubated at lower temperatures (29.5°C compared with 33.5°C) have darker coloured heads, fewer stripes and were less likely to have a white tail tip. Young American alligators are hunted by several visual predators, so rely on camouflage to protect them until they are adults. As the climate warms and the incubation temperature of American alligators increases as a result, their camouflage could be disrupted, and they might be at a far higher risk of predation in their younger years.



Grace Rogerson

#### What are the potential implications of this finding for your field of research?

Discovering that a warming climate could have unforeseen and lethal ramifications on American alligator survival was a shocking revelation. It may mean that other species' development (particularly that of other ectotherms) is affected by increased incubation temperatures too. As climate change continues, it is vital that these affects are discovered so that the species can be protected against the changes.

#### Which part of this research project was the most rewarding/challenging?

One of the most rewarding moments of this research project was when I ran the preliminary statistical tests and found that incubation temperature did in fact significantly affect the development of American alligators. I would say that the most challenging part of this research project was trying to understand what the genetic causative factors underlying these changes might be. This is still an area I sometimes find a bit confusing, but I would love to keep learning about it!

#### What do you think experimental biology will look like 50 years from now?

I think we will have done enough research on model species that they are no longer required, and that experimental biology can be conducted without the use of sentient organisms. I think that most

Grace Rogerson's contact details: Bangor University, Bangor, Gwynedd LL57 2DG, UK.  
E-mail: grr19tpb@bangor.ac.uk



**Alligator YK4.29** photographed on a gridded mat and with a reference colour standard, ready for photographic analysis in ImageJ v1.53. This alligator was incubated at 29.5°C and treated with a vehicle control (0.5 ml g<sup>-1</sup> egg weight absolute ethanol) only.

genomes will either be fully sequenced or can be fully sequenced with ease. This will open up doors to studying animal and human disease and will hopefully solve a number of our current medical questions.

**If you had unlimited funding, what question in your research field would you most like to address?**

I would like to work out the genetic mechanism behind the effects we see in our paper. This is an area I currently find a bit

challenging, so it would be great for me to be able to understand more about it!

**What changes do you think could improve the lives of early-career researchers, and what would make you want to continue in a research career?**

I would love for it to be easier for researchers to access funding information and find appropriate funding bodies. This would be especially helpful for undergraduates (like me!) or recently graduated researchers who do not know where to look or who to ask.

**What's next for you?**

I am currently in my fourth year, so finishing my degree is my main focus at the moment. I don't have any solid plans for the future yet, but I would love to do a PhD at some point. I might seek out a graduate scheme or a graduate job first, but a PhD is definitely something I am interested in doing.

**Reference**

Rogerson, G., Bock, S., Loera, Y., Parrott, B. and Mulley, J. F. Incubation temperature alters stripe formation and head colouration in American alligator hatchlings and is unaffected by E2-induced sex reversal. *J. Exp. Biol.* **226**, jeb245219. doi:10.1242/jeb.245219