

Interview with Dr Fiona Ruth Macfarlane from the University of St Andrews and guest editor of SMB newsletter.

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What is your current role and how long have you been there?

I am currently a postdoctoral researcher within the Mathematical Biology group led by Prof. Mark Chaplain at the University of St Andrews in Scotland, UK. I started this position in April 2019, after finishing my PhD within the same research group.

What attracted you to mathematical biology?

When I started my undergraduate degree (in Biochemistry) I had never heard of mathematical biology. I took mathematics as an optional subject and some of the lecturers were doing research in mathematical biology. I was really interested in how they could use maths to describe such complex biological systems, like cancer. I was really inspired and actually transferred my degree to study mathematical biology instead. I enjoyed this course so much that it inspired me to go on to do my PhD.

What is one project you currently work on and what does it involve?

At the beginning of the COVID-19 pandemic the Royal Society set up the Rapid Assistance in Modelling the Pandemic (RAMP) initiative with some groups focusing on modelling within-host dynamics of COVID-19. As part of this, I joined an international coalition who aimed to develop a SARS-CoV-2 tissue simulation in PhysiCell (set up by Paul Macklin) in June 2020. As part of this, I have been working with a colleague from St Andrews on a model of pyroptosis. Pyroptosis is a form of inflammatory cell death where cells release pro-inflammatory cytokines before rupturing. This form of cell death has been observed in patients with severe cases of COVID-19 and can be involved in inflammatory syndromes. Our ODE model considers the pyroptosis pathway within single cells and the key mechanisms involved. This ODE model has been integrated into the wider PhysiCell hybrid model and we are now considering some of the cellular level mechanisms related to pyroptosis and how they may be targeted through treatment.

What is the best part of your job? What is the worst part of your job?

I really like how flexible the job is and that every day can be a little bit different. I would say the most challenging thing is when projects seem to be at a standstill, either through coding issues or just not getting the results you hoped for. It can be tough to stay motivated in those times.

What is the best piece of advice you have received?

It is ok to say no!

Where is the best place you have travelled for work? And why?

I visited the Laboratoire Jacques-Louis Lions (LJLL) in Paris in December 2018. As well as having some very beneficial research discussions, I got to explore the beautiful city of Paris in my time off.

What do you do in your spare time?

In my spare time I enjoy rock climbing and hillwalking. I am also a leader within the Girls' Brigade in Scotland, a volunteer-led youth organisation for school aged girls and young women. Planning educational and fun activities for the girls for our weekly meetings keeps me busy, although the pandemic has moved all of our activities online. Currently, I am also a member of the national board of trustees for Girls' Brigade in Scotland. Through this role I set up a national STEM competition where girls across the country had to research their favourite female scientist, it was really encouraging to watch the presentations created by the girls and their enthusiasm for science.