Dr Michael Watson is a lecturer in Applied Mathematics at the School of Mathematics and Statistics at the University of New South Wales in Sydney, Australia. He has a keen interest in mathematical and computational modelling of biological and physical systems, particularly in the area of the formation of patterns and structure in tissues and multi-cellular systems. He co-leads the Cardiovascular Modelling subgroup and was recently featured on the SMB podcast *Biology in Numbers*.

Who or what inspired you to pursue a career in mathematical biology?

My pursuit of a career in mathematical biology was inspired during my undergraduate studies at the University of Dundee. I had always wanted to do something mathematical, and I knew that mathematics had many interesting applications, but learning that mathematics could be used to study biology and diseases such as cancer completely blew my mind. In Dundee, I was fortunate to be taught and supervised by experienced mathematical biologists such as Fordyce (Dyce) Davidson and Mark Chaplain. Both Dyce and Mark inspired and encouraged me to pursue a PhD in mathematical biology, which I then proceeded to complete with Steven McDougall at Heriot-Watt University in Edinburgh. In my current role at UNSW, I am very fortunate to have been asked to teach a course in mathematical biology to our undergraduate and postgraduate students. The opportunity to open their minds to this amazing field is a dream come true for me, and I can only hope that I inspire my students as much as my lecturers inspired me.

What is something exciting you are currently working on?

The current project that I'm most excited about is a collaboration with Mary Myerscough and Joseph Ndenda from the University of Sydney. We are developing new models to investigate the role played by smooth muscle cells (SMCs) in atherosclerotic plaques. SMCs have traditionally been regarded as helpful in plaques because they deposit a dense collagen cap that protects the plaque from rupture (a common precursor to heart attack or stroke). However, recent experimental studies have shown that, when exposed to lipids in the plaque, SMCs can differentiate into lipid-scavenging, macrophage-like cells that can migrate away from the cap and exacerbate plaque progression. We have developed some simple ODE models and some very complicated PDE models to study this differentiation process and its consequences, and I'm excited to see the insights that these models will provide.

You lead the cardiovascular subgroup within SMB – what is something you've learnt through doing this, or through some of the connections you've made in your subgroup?

The main thing that I've learnt is that it's a really challenging subgroup to lead! It's easy to perceive that the Cardiovascular Modelling theme has a relatively narrow scope ("isn't it just fluid dynamics?"), but this couldn't be further from the truth. The subgroup aims to represent modelling of all aspects of the heart, vasculature, and blood, and covers applications as diverse as angiogenesis, cardiac electrophysiology, thrombosis, hematopoiesis, and many others. The scope of the subgroup is therefore very broad both mathematically and biologically, and it's difficult for just one or two people to have sufficient knowledge of the research and researchers in all of these areas. Fortunately, I have been able to assemble a diverse leadership team with expertise in several different areas so that the activities of the subgroup can cater for as wide a range of interests as possible in the cardiovascular space.

What do you wish you'd known about mathematical biology and research before you started your career?

In all honesty, if I'd known anything at all it would have been helpful! When the idea of pursuing a PhD was first suggested to me, I had no idea what a PhD was nor what it would involve. Indeed, I don't think I'd ever even seen a research article, and I certainly had no concept of the weird and wonderful world that is academia. Looking back now, I feel that this lack of knowledge was both a blessing and a curse. I've no doubt that I have failed to capitalise on some good opportunities during my career because I have not fully understood their significance. However, particularly as a PhD student, I'm sure that my naivety (and unfettered enthusiasm) was a crucial factor in producing the research that I did. I guess that the success I have had in my career to date, despite this initial lack of knowledge, is testament to the excellent colleagues, collaborators, and mentors that I've had along the way.

And on a lighter note, what would your perfect weekend look like?

I'm quite a simple soul, so I don't need much to make me happy. A weekend of good food, good coffee, good wine, good music, and good company will always do nicely. If I was feeling more adventurous, I would love to spend a weekend exploring one of Europe's many beautiful cities. I often travelled to Europe when I lived in the UK, but it's such a long way away from down under. My partner and I got engaged in Seville back in 2015, and it would be awesome to have the opportunity to return there one day.