Dr Adrianne Jenner is a lecturer at Queensland University of Technology. Her research focuses on the field of mathematical oncology and immunology, amongst other topics. In general she is interested in how mathematical and computational methods can be used to generate virtual patients and virtual patient cohorts to explore how diseases behave, in order to inform therapies.

How did you get into the field of mathematical biology? Was there anything or anyone who particularly inspired you?

Growing up, I always really liked mathematics. I think it was because algebra felt like it made sense to me, and I loved being challenged by tricky problems. In saying that, I was never sure that it was what I wanted to do with my life or if I loved it enough.

During my undergraduate degree, I spent a semester at the University of Sheffield, UK, and there was an incredible lecturer there who taught an applied mathematics unit on local stability analysis of differential equation models. I believe it was the standard SIR and predator-prey models. Seeing how mathematics could be used to answer problems in biology immediately hooked me and I knew I had to learn more.

I eventually did my PhD at the University of Sydney with Professor Peter Kim, Professor Adelle Coster and Professor Federico Frascoli on mathematical modelling of oncolytic virotherapy. I think working with them and seeing their passions for their respective areas of mathematical biology gave me a real insight into the breadth of this field and how exciting it is to work in.

Coming full circle, I believe now that I've found what I love about mathematics: being challenged mathematically but also having purpose for the mathematics that I do.

Your work covers a range of modelling applications, including studying virtual patients and virtual patient cohorts, heterogeneity and parameter estimation, and immunotherapy and oncoloytic viral therapy. What is an aspect of your work that you are most proud of?

I'm proud of a lot of the work I've done with virtual clinical trials. I've really enjoyed how a system of differential equations informed by data can be used to create "virtual" patients for which a range of treatment modalities can be tested and, hopefully, a more effective protocol determined. What is a simple mathematical technique can have major impact on our ability to improve drug and therapy development. There is still more we can learn about how to better build virtual patients and inform their characteristics with

relevant data, but from the work we've done so far there have already been really interesting findings.

A specific result I'm most proud of would be the work developing an agent-based model in PhysiCell for glioblastoma (a type of brain cancer). This work coincided with a clinical trial that was being run for an oncolytic virus. Our model suggested that patients with high stromal densities would perform poorly under this therapy, and this was then validated clinically.

Do you have an example of something you're currently working on or a recent result that you are really excited about?

Recently, my PhD student and I wrote a review on the current state of mathematical modelling of multiple sclerosis, an immunological disease affecting the brain and spine. This incurable disease is, arguably, under modelled and so much of what we have learnt about the immune response through immunotherapy and virotherapy is translatable to this disease. I'm now working with a handful of students and new collaborators to build models that might help us understand the immunology of this disease, so definitely watch this space.

What is a challenge you've encountered in your career path, and what inspired or encouraged you through it?

I found the biggest challenge I've encountered in my career was taking a postdoctoral position overseas. When I finished my PhD, I was confident that I wanted to be an academic, I loved teaching and research, however, no part of me wanted to move overseas. The advice I received was strongly in favour of needing to move internationally, but I was comfortable and happy in my life in Australia. I spent a long time weighing up whether this career was worth the move and almost left academia. My partner chose to move with me and support me on my career endeavour which helped immensely. I also found a postdoctoral supervisor (Dr Morgan Craig) who I really clicked with. I don't think I could have moved had it not been for finding a supervisor who was inspiring like Morgan. With hindsight, I can say the move was incredible for my career, however, was still a very challenging time for me personally.

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

My perfect weekend starts off with a really nice meal. We love to cook or go out for dinner and I enjoy being a sous-chef so we often plan our Friday nights around cooking. Otherwise, I'm often travelling on the weekend to visit family and friends or go away exploring to new areas. If we're ever home it's doing work on our house, going for a bush walk, or going running.