Getting that Research Fellowship or Grant

In May 2019 we looked at how to make the transition into a successful Australian Research Council Discovery Early Career Research Award or Discovery Project by turning to two of our Early Career Researcher Network stars, Dr Adam Hochman (Philosophy, CAVE) and Dr Christopher Lustri (Mathematics & Statistics, and **ECR Rep** for the **Faculty of Science and Economics**).

Dr Adam Hochman has just begun his ARC DECRA 'Social Constructionism about Race, Deconstructed.

Could you explain what your DECRA is about?

My DECRA is about the future of racial classification. In my earlier work I argue against the view that there are human biological races, which has seen a revival in recent years. One might assume that if there are no biological races, then racial classification is a mistake, since 'race' has historically been a biological category. However, most race scholars believe that rather than ending racial classification, we should redefine 'race' as a social category. In this project I argue that there is no good way to make sense of the idea of 'social race'. There are no races, I argue, but there are groups misinterpreted as races: racialised groups.

What three experiences were most important for building towards this project?

(1) I wish I had more exciting experiences to share. **Most of the important experiences building towards this project happened while in my armchair, wearing pyjamas, sipping on a cup of tea.** Here's an important one: I had an unsuccessful application for the DECRA in the previous round. I learned a lot from that process. For example, I think I got the tone right in my rejoinder the second time around. While still defending the project, it was less *defensive.*

(2) I realised that scholars were using the phrase 'social constructionism about race' to refer to three distinct views: (A) that race is *not* a valid biological category, (B) that race *is* a valid biological category, which is literally maintained through social practices such as racism, and (C) that race is a valid *social* category. The phrase 'social constructionism about race' has become a "weasel word": an ambiguous phrase that gets thrown around, but which doesn't really tell you much.

(3) I realised that (A) is more accurately labelled as anti-realism about race and that (B) is a form of biological realism about race, leaving (C) as the view most deserving of the title "social constructionism about race". However, I found that too many kinds of groups start counting as races when race is defined as a social category.

What are the most surprising differences between applying for a MQRF and applying for an ARC DECRA?

I didn't find any of the differences surprising (maybe because Macquarie puts on detailed workshops to help you prepare). The biggest surprise in the process (apart from getting the thing) was that the ARC vetoed the word "deconstructed" from the title. It was meant to be "Social Constructionism About Race, Deconstructed", but for some reason the word "deconstructed" was cut (maybe "deconstructionism" failed the pub test!).

What is the biggest misconception about philosophy research you encounter?

That it will be hard to understand. I'm not saying that it is always easy to understand – it is not – but I like to think that I can explain my work to people in everyday language. My heart sinks a little when people ask me what I do, but then I sense that my response makes them nervous. Maybe it's me – I hope not!

How would you like to see your field change in the future?

I'd like to see philosophy become more diverse, both in terms of demographics and the topics explored. It is happening, but progress is slow.

Dr Chris Lustri has just begun his new ARC Discovery Project, 'A new asymptotic toolbox for nonlinear discrete systems and particle chains'.

Could you explain what your DP is about?

I am developing specialised mathematical techniques for studying discrete systems of interacting particles (ranging from atomic interactions, all the way up to micro-scale beads and crystals). I am then employing these tools to predict and explain energy distribution in particle configurations such as chains or lattices.

Many approximation techniques developed to study continuous systems break down in unhelpful (if interesting!) fashion when confronted with discrete systems, typically losing discrete-scale characteristics when naively applied. To prevent this loss, I have devised a method of "splitting off" the discrete-scale variation, to study the large-scale system dynamics using approximation methods and then "glue" the discrete effects back into the system to obtain a complete picture. I use these methods to study granular chains, currently used as waveguides or acoustic lenses, in which each particle can only feel a single neighbour on either side, or magnetic beads which can be felt by neighbours several positions away.

Using discrete methods, I will explain how signals decay and eventually collapse as they pass through the chain and find configurations which mitigate these effects.

As discrete approximation methods become more sophisticated, they will provide new pathways to answer open questions about a vast range of discrete systems, including models of systems describing atoms, beads, crystals, or even ants or people.

What three experiences were most important for building towards this project?

1) The first experience that shaped the project was beginning my postdoctoral work. I had done a doctorate in the UK studying continuous mathematical approximation methods, and my postdoctoral work was a giant sideways leap into studying the behaviour of discrete systems. The learning curve was nearly vertical, but it meant that I cultivated expertise in two very disparate fields. In the end, one of the key selling points of my DP application was that my unique combination of expertise meant that I had the specific insight required to bridge the gap between these areas.

2) The second (and by far the luckiest) experience that shaped the project occurred when I was at a conference in the UK on nonlinear waves, and there was a session with no talks that seemed particularly relevant to me. I wandered into the back of a talk given by an experimentalist who showed some pictures of the waveforms seen in particle chains that they'd been studying in the lab. I recognised some of the features from some models I'd been thinking about, and we began chatting after the talk. It soon become clear that the ideas I'd been developing - entirely theoretical at the time - had very significant scientific applications.

3) The final experience was not getting an ARC DECRA. I spent my last year of DECRA eligibility formulating the project, and was confident that it had a real chance. When it didn't get up, I was shattered. The reviewers commented that the theoretical aspects were well-founded, but the applications were unconvincing. After picking myself up, I ensured that my DP left no doubt about the value of the scientific applications; this was eventually singled this out as a strength of the grant. The reviewer comments from my DECRA helped me grasp the critical importance of framing grants for reviewers.

What are the most surprising differences between applying for a post doctoral fellowship and applying for an ARC Discovery Project?

The most significant step up was learning to pitch the project to a more general audience than other applied mathematicians. One of the best pieces of advice I got was "understand who is on your panel". The application would be read and judged by a panel made up of engineers, physicists, computer scientists and pure mathematicians. These would be experts who understood the value of mathematics, but the calibre of the mathematics alone was not going to get my grant noticed among the hundreds of proposals they would see. If I wanted

them to trust me with hundreds of thousands of dollars, I needed to make sure the applications of my work were clear, valuable, and believable.

What is the biggest misconception about mathematical research you encounter?
People often seem surprised that mathematical methods can provide insight into scientific problems. Many people envision mathematicians as standing around in front of whiteboards trying to solve particularly complicated integrals, or perhaps working out times tables for really big numbers. The most useful thing many people can imagine us doing is figuring out when a 110km/hr train leaving Brisbane at 9am will pass a 150km/hr train leaving Sydney at 11am. People might imagine that we chat with physicists from time to time, but the idea that we could have something to say about biology or sociology seems inconceivable.

The truth is that we build mathematical models of chemical interactions, fluid motion, neuron firing, ecological collapse, or social media dynamics. Sometimes we even leave the moderate comfort of our offices to collect data, work with subject area experts, and help design experiments to validate our models. If you can measure something, chances are that a mathematician somewhere has tried to explain it and predict what it will do next.

How would you like to see your field change in the future?
I hope that applied mathematics continues to work hand-in-hand with researchers pursuing every avenue of discovery, from established historical connections with physics and neuroscience to newly-developing applications being found in in sociology and politics. The great benefit of mathematical modelling is that it distils complex systems down to the bits that matter and uses these to predict and explain behaviour. Applied mathematics is there to tell you not just what the answers are, but why they are what they are.