

## a FORK IN THE ROAD - ALTERNATE PATHWAYS POST-PHD

Two recent graduates share with us their journeys to very different careers post-PhD. John Chow and David Jacques completed successful PhDs side-by-side under the extremely capable mentorship of supervisors Professor Jill Trehwella and Professor Mitchell Guss at the University of Sydney. John is now a strategy consultant with Nous Group, a private sector management consulting firm in Sydney, while David is an Early Career Researcher at the esteemed Laboratory of Molecular Biology in Cambridge, UK. Their stories highlight the range of both specialist and transferable skills that have allowed them to pursue two successful, but very different careers. They also share with us a few profound life lessons they learnt along the way.

### *Perspectives from John Chow*

#### **What made you decide to do a PhD in the first place?**

Interest... and a chance meeting in the foyer of the biochemistry building at the University of Sydney!

I had just completed a Bachelor of Computer Engineering and Medical Science and did some summer research work at the now-defunct Optical Fibre Technology Centre (University of Sydney) looking at micro-patterned polymer fibres with Maryanne Large, and some work with Tony Weiss and Michael James on elastin structure on surfaces at the Australian Nuclear Science and Technology Organisation (ANSTO). I was having a lot of fun with research and particularly with the use of spectroscopy, X-rays and neutrons to study protein structures. While I was pondering my next move, I bumped into David Jacques who told me that a new principal investigator from the US, Jill Trehwella, was coming back to Australia and was looking to do some cool stuff with small-angle scattering on biological materials. She was also looking for PhD students. I found myself with a lab bench and a desk a couple of months later.



#### **What did you gain personally during your PhD?**

##### *Failure hurts but you can take stock and recover*

Like most research projects, I had my fair share of bumps and setbacks along the way, especially during my first two years. I recall one particularly painful incident where we had spent three months preparing samples for a beam-time slot in the States. Five days later we walked away with half our samples precipitating in the tube, the other half producing data that we couldn't interpret, and a sinking realisation that one of our core assumptions may have been completely wrong. My supervisor was excellent in getting me and the other researchers on the project motivated again.

Things took a turn for the better around the end of the second year. I was fortunate to have enough results for a few papers. We received a lovely email from a researcher looking at the same protein some ten years prior who couldn't figure out how it was behaving in solution. Our paper gave him some closure. That was the best part.

##### *Foresight, planning and diligent lab-book skills can make or break a project*

I hadn't quite appreciated the value of serious planning and record keeping until I forgot to do it, and had to go back through my notes to figure out what went wrong. A couple of postdocs in the lab (David Langley and Cy Jeffries) patiently prodded, cajoled and mentored me through the process. They insisted on planning out every possible outcome for an experiment (within reason) and sketching out what this would mean for the project before setting foot back in the lab. This is a skill that has saved me many, many hours in the years since – both inside and outside academia.

##### *PhD students are tough to manage*

I will be eternally grateful for the care and attention that my supervisor spent with me through good times and bad over the course of my PhD. It's only now that I manage junior staff members that I have started to appreciate how patient my supervisor was, and some of the techniques she used to improve morale when things go south. Thanks Jill.

#### **What factors contributed to deciding on your current career?**

Quite a few factors were involved in the decision, but the one that sparked the change was the impending birth of my first son. At the time, my wife Frances and I were scientists in different fields, which made the problem of finding jobs for both of us difficult. We ended up brainstorming possible career configurations on a whiteboard over a couple of glasses of wine, deciding that the best option was for us to stay in Sydney, and for me to take a position outside of academia.

### How did you end up in your current position?

In my case, I was fortunate enough to have a few contacts from one of my extracurricular activities that put me in touch with senior people who worked in both finance and consulting. They kindly gave me some pointers on what my options were, where I needed to study, and how to apply for positions. I decided to pursue a career in strategy consulting – we're basically troubleshooters for companies and government agencies – and spent a couple of months studying up on economics, business strategy, and a particular recruitment test for this industry known as the 'case study'.

I basically had no prior knowledge in any of the areas I now work in before applying. I applied for 20-30 jobs in the first month, got a handful of interviews, and a couple of offers. I took up an offer from Nous Group, one of the largest privately-owned management consulting firms in Australia, which specialises in organisational strategy and implementation for large government agencies and regulated industries (e.g. finance, health, human services). I am still there and still enjoying it.

### What advice could you give someone looking to follow a similar career?

Work on your transferable skills, e.g. analysis, writing, statistics, project management. It will help your research and give you a firm foundation if you decide to leave academia.

### Perspectives from David Jacques

#### What made you decide to do a PhD in the first place?

After second year of my undergrad at the University of Sydney, I was given the opportunity to do a one-year internship at the Australian Nuclear Science and Technology Organisation (ANSTO) in the materials division. Having worked for a year at Australia's only nuclear facility without being allowed to use any of the 'big toys' attached to the reactor, I left with a sense of unfinished business. During my third year at uni, Professor Jill Trehwella arrived at the School of Molecular and Microbial Biosciences and I was offered an Honours project that involved small-angle neutron scattering of proteins. After our first meeting, I left Jill with no doubt as to my position on the use of this particular 'big toy', and that I fully intended to be doing some small-angle neutron scattering. Jill was not put off by my motivation and I had a fantastic Honours year. At the end there was still enough to do on the project to continue it on to a PhD.



#### What did you gain personally during your PhD?

For the first two years of my PhD we did a lot of small-angle scattering experiments and I got a lot of very focused 'technically driven' supervision from Jill. This put me in a position to not only write papers about what we'd done, but also papers about how we were doing it. One of the most satisfying things I did was help draft a document establishing how scattering data needs to be reported in the literature. It has now been adopted by the International Union of Crystallography, and in a strange way it feels like we changed the world the tiniest little bit.

After two years, I moved from scattering to crystallography under the effective supervision of Professor Mitchell Guss. When I was starting out, Mitchell's most common response to any of my questions was, "I could tell you, but then you won't learn anything." When I eventually emerged on the other side having solved a few structures, I felt I at least had a pretty good idea of what buttons to push and why I was pushing them. Now that I've left Sydney, I can appreciate how thorough my training was.

I cannot overstate how much I value the skillset that Jill and Mitchell provided me with. Having supervisors who regarded their students as students and not just 'cheap labour' was something that at the time I did not fully appreciate. It would also be remiss of me not to mention the lab bench tutelage of the postdocs. Dave Langley and Cy Jeffries taught me everything I know in the lab, and showed me that there can be many ways to achieve the same outcome. Also, Andrew Whitten and Anthony Duff showed me that there are people out there who understand the theory and computational side of things way better than I ever will. It's important to know these kinds of people.

#### What factors contributed to deciding on your current career?

The key factor was the fact that I wanted to keep doing science. The second was that I have a very supportive partner, Leanne, who was willing to travel to the other side of the world to help me live the dream.

#### How did you end up in your current position?

Because of Leanne's job as a speech pathologist, it was important that we considered a postdoc in an English-speaking country that would recognise her qualifications. That pretty much left us with Canada or the UK, and after a visit to the Laboratory of Molecular Biology in Cambridge, I was convinced that that was where I wanted to work.

When it came time to look for postdoc jobs, Mitchell strongly recommended that I put in for an NHMRC CJ Martin Fellowship. When I asked several people I knew (or met at conferences) who they would recommend working for in the

UK – Leo James came up on every list and he just so happened to be at the Laboratory of Molecular Biology. I decided to see if he was interested in supporting my CJ application with the sales pitch being, “You won’t have to pay my salary. And if you don’t like me, I can be gone in two years.” I actually said this over the phone. Fortunately for all of us, I managed to get the CJ and the rest is history.

### What advice could you give someone looking to follow a similar career?

#### *Feed your curiosity*

The life of a scientist may not be especially financially rewarding, but you have the chance to be doing something different and interesting (almost) every day of the week. This is a very privileged existence if you stop and think about it. It’s our job to do what interests us. You should be able to do what excites you – I don’t think I’ll ever get tired of the ‘big toys’ of reactors and synchrotrons.

#### *Build up your skills*

I am where I am today because Jill and Mitchell gave me such excellent technical training in structural biology. I’m more interested in answering biological questions than developing methodology, and my skillset can be applied to a great deal of problems. I’ve been fortunate enough to have worked on a range of topics including bacterial signalling, transcriptional regulation, mechanisms of immunity and virology, all because these project required a similar approach.

A group leader once told me that he hates postdoc applications that say, “I would like to learn from you.” What he wanted to see was, “I have this expertise that can solve problems you have.” Skills give you something to help you sell yourself. The PhD is the time to learn those skills. The postdoc is the time to show what you can do.

#### *People are more important than projects*

When the end of the PhD draws nigh, it may be time to do some ‘postdoc shopping’. Potential postdocs often look for projects that interest them, and rightly so. But I find that one of the most neglected factors when deciding where to apply is the human element. Science is not your friend (don’t try to convince yourself otherwise – you could end up very lonely). But the people you work with could be. Ask yourself, Is the group happy? Is the boss someone with whom I can have a free scientific discussion? Will I be able to work with these people? If you get it right, there will be people there to help you – not only to push through the inevitable times when things aren’t going smoothly, but also to share in your (hopefully many) successes.

#### *Keep and eye out for opportunities and take them*

Research is like a bushfire. It’s reasonable to make predictions on how it might progress. But it starts with a spark. And that is very hard to predict. My most productive project began with a casual conversation in a queue for dinner at a Lorne conference. My current project came out of an idea hatched over a cup of tea with some friends at work. Even bumping into John in the corridor led to him starting his PhD. Be on the lookout for these special opportunities. They usually only happen once.

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