"Technical Skills Are Always Useful, No Matter What You're Actually Working On"

Matthew B. Wall

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Abstract In our interview with Matthew Wall, we learn about the potential to work in a position that bridges between commercial and academic research. Using the cognitive neuroscience approach of functional magnetic resonance imaging (fMRI), Matt conducts research on the effects of drugs on the brain. After a difficult PhD studying implicit learning and resulting in no publications, technical experience with fMRI and programming acquired during his PhD laid the foundation for his career. While it is useful to have a career plan, you also need to be flexible and realistic about your options. Strong research skills and an interest in methods are valuable and could lead to a path like Matt's.

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Chris: Can you introduce yourself and tell me a bit about your current position?

Matt: I'm Matt Wall. My main employer is currently a company called Invicro, which is an international contract research organization (CRO), meaning we do research projects for other commercial entities, mostly companies in the pharmaceutical and biotechnology industries. We have a few sites in the United States, one in Europe (London), and a small office in Japan. I work at the London site, where we also do a lot of academic work, mostly with people from the main London universities (Imperial College London, University College London, and King's College London). Because of my involvement in various bits of academic work, I also have an honorary senior lecturer appointment in the faculty of medicine at Imperial, and I am an honorary research associate at UCL as well. My area of expertise is neuroimaging using functional magnetic resonance imaging (fMRI), so most of my job is based around that technique, but within that, it can be pretty varied, and at any one time I'm juggling multiple ongoing research projects—some commercial, some academic—which are at various stages of development, data acquisition, analysis, and being written up. These range from academic neuro-endocrinology projects, testing out new drugs for commercial companies, more technical projects focused on acquisition or analysis methods, supervising master's or PhD student projects, and collaborating on studies looking at the brain effects of cannabis, MDMA, psilocybin, or other drugs.

What was the focus of your PhD?

I started my PhD in 1999 in the Department of Psychology, University of Cambridge. Because my supervisors moved during my PhD, I actually finished it at the Department of Psychology, University of Southampton, though I stayed a registered student at Cambridge, and officially got my PhD from there. My PhD work was on pretty straightforward cognitive psychology, and I used reaction time tasks to investigate the possible role of implicit learning in anxiety and threat perception. I'd done an experiment on implicit (unconscious) learning for my undergraduate research

project and was really keen to try and apply that to different sets of stimuli for my PhD work. That was perhaps my first major mistake with my career; my supervisors (very sensibly) suggested an alternative project that probably would have been somewhat easier and more achievable, but I was very keen to focus on implicit learning and basically ignored their advice. It turned out to be a very difficult topic for lots of reasons, and I got a grand total of zero papers published from my PhD work.

As you were finishing your PhD, what were you thinking about your career plans?

My PhD work was not stunningly successful. I managed to write it up into a fairly coherent thesis, but I didn't have much else to show for those years of work, so I felt I wasn't a strong applicant for research positions. Toward the end of my PhD, I was considering all kinds of options. My girlfriend at the time was a medical student, so for a little while, I was even looking into graduate courses in clinical medicine. At that time in the early 2000s, there was a little bit of a revolution going on in cognitive neuroscience. The early work with fMRI in the mid-to-late 1990s had generated a lot of excitement, and a lot of departments were interested in it and some were even buying equipment, but there were still relatively few people who knew how to work with those techniques. I was as excited by this new technique as everyone else and realized that it was going to be an important method, so I decided I would try and get a research job using fMRI.

I got interviews for a few post-doctoral positions—in Cambridge and King's College—but with no success. Then I applied for a Wellcome-funded postdoc position at Royal Holloway and was lucky enough to get an offer there. The psychology department at Royal Holloway had just bought a new MRI scanner and needed staff to use it.

Can you tell us a bit about what day-to-day life is like in your current position?

It's pretty varied. I currently have one research assistant and PhD student who I work with very closely, and between us, we're responsible for all the fMRI projects that are running at our facility, so we have to do everything. On any given day, we might be writing stimulus programs for experiments, running pilot scans or doing other technical testing of the scanners or stimulus equipment, assisting the radiographers with data collection, or running data analyses. I may also be talking to customers and preparing proposals for potential studies, or attending regular meetings. There are monthly or fortnightly meetings that focus on planning/forecasting, potential new projects, and various business units like the MRI group, or the

analysis group. Plus there are a number of other PhD students that I help co-supervise and quite an extended network of academics that I work with on various projects, some of which I have regular or semi-regular meetings with. At some points during the year, I also supervise Imperial MSc students, so I try and spend as much time as I can with them, particularly at the beginning of their projects where they need some help and teaching. Occasionally, I might go somewhere else in London to meet someone else or give a talk or something, but usually everything's pretty local.

I try to have one day a week working at home where I'm supposed to focus on writing papers. I usually manage to stay at home, but very often I end up using that time to catch up with all the admin tasks and emails that have accumulated that week, so it's only semi-successful. At least a few times a week, I tend to crack open my laptop at about 9 pm (after my kid has gone to bed) and do a couple of hours of catching-up work in the evening.

What do you like most about your work?

The variety of things I work on and the pretty large network of people I end up working with. The fact that, unlike academic scientists, I have very little pressure on me to write grants or publish in high-impact journals. I take on as many students as I want, and I never have to sit down and mark a stack of essays or exams. I like doing the research myself, but as I get older, I've found I really enjoy a mentoring role too; my first PhD student did some fantastic work throughout her degree that we're both really proud of, completed successfully, and has moved on to a great post-doctoral position at Oxford, and that's been incredibly rewarding for me.

And what do you like least about your work?

While I don't have the pressure to write grants, I am under constant pressure to bring in more commercial work from external companies, and that can be difficult. Then, when we do get a commercial project from, say, a pharmaceutical company, there is typically a very large team of people working on it, sometimes across multiple companies/organizations at different sites around the world, and everything proceeds extremely slowly and with a huge amount of bureaucracy involved. Academic teams tend to work like agile start-ups: they don't have a lot of money, but they tend to move fast and get things done. Working with large companies is the opposite, and sometimes, it can be incredibly frustrating. They also tend to be quite conservative and risk-averse in lots of ways, but particularly when it comes to their approach to research. Academics want to try exciting new things because they want to be at the cutting edge, but commercial customers often want to do an exact

replication of a task that's been done hundreds of times before because it works and they're likely to get good results.

How do you think having a PhD has helped you succeed in your current position?

There were two things my supervisors were insistent I learned during my PhD that I'm grateful for all the time. Firstly, they made sure that I was able to program my own experiments. I learned to code in C and also in this horrible old DOS system called MEL (Micro Experimental Laboratory). I never use C or MEL anymore of course, but the principles led me on to learning MATLAB, Python, bash scripting, and various other things, which has been such an enormous benefit throughout my working life. Secondly, they taught me about really good, efficient, experimental design, which is also knowledge that I've relied on a lot in my career and have tried to pass on to others.

Now, I guess I could have acquired those skills and that knowledge without doing a PhD, but it seems much less likely. I've known people who have worked in similar positions to me who didn't have a PhD, but they're rare. Most science-led businesses want scientists for employees, and that means people who've had scientific training, which usually means a PhD.

If someone currently finishing their PhD was considering a position similar to yours, how might they decide if it would be a good fit?

It's tricky trying to decide on a commercial/industry career. I actually think my current position is fairly unusual, in that it's a commercial company, but I still get to work on a lot of academic projects. For me, at some point, I realized that what I really enjoyed was the process of doing research: figuring out design issues, squashing programming bugs, trying new ways of analyzing data, that kind of thing. My current position has a certain amount of corporate annoyances associated with it—nothing's perfect, after all. But it lets me work with really smart, engaged people, and I get to do all the fun parts of research without having to worry too much about where the comes from. That means I give up some autonomy and end up working on other people's projects somewhat more than my own, but I like the variety.

A lot of people like academia because they feel it gives them an opportunity to work on a topic that they deeply care about. Do you think this is also true in your current position?

Somewhat. I certainly get to work on a lot of different things that I find very interesting, which is great of course, but it means that I've never really developed a sustained line of research on any particular topic. My publication list is really varied and starts with lots of low-level vision research from my postdoc years and then meanders into psychopharmacology and pharmacological fMRI, with some neuroendocrinology and some methodological papers, plus a few other random things scattered throughout. Through taking up whatever seemed to be the best job opportunities that were available at the time, I've ended up being more of a specialist in the methods I use, than on any particular research topic, and I'm basically fine with that. I find most topics in psychology and neuroscience pretty fascinating, once you get into them enough. This is something I often find myself telling younger colleagues, particularly when they're applying for PhDs: Don't get too hung up on any particular topic. Some people have a burning desire to work on, for instance, psychosis and will only apply for positions in that area, which I think is a mistake. PhD and post-doctoral positions are incredibly competitive these days, and you should apply for everything you can find. You may end up working in an area that perhaps you hadn't considered before, but that often gets you some different experience and perspectives. Maybe you get back to your favorite research topics later in your career, or maybe you carry on working in the new area because you find you enjoy it. It's good to have some kind of plan, but often you need to be somewhat flexible and realistic about your options as well.

If someone was interested in pursuing a similar career path, what would you suggest they do to better prepare themselves?

The number one thing: learn some useful skills. Most of the opportunities I've had in my career have come about because I've had skills that have been useful to people. I got my post-doctoral position because I could do a bit of programming, and a lot of my collaborations have come about because I've offered to program tasks or run analyses for people. Learn how to program: it doesn't really matter which language, but try and learn a couple! Learn how to use Unix/Linux systems and some bash scripting; learn how to design good experiments; make sure your statistics knowledge is solid and up-to-date; learn how to make great-looking figures with image-editing software; learn about pre-registration and the open science movement. Anything like that. Really solid technical skills are the most important things I look for when hiring people. You may know everything about the literature on a particular topic, but that knowledge is specific and of limited usefulness if you end

up working in a different area. Technical skills are always useful, no matter what you're actually working on.

Based on your journey, what advice or suggestions do you want to pass on to someone who's currently finishing their PhD?

With due consideration given to blind luck and both survivorship and hindsight bias, I think if my career demonstrates anything, it's the virtue of being flexible about your research. I've never had much of a plan for my career and have generally taken jobs that were convenient at the time, with relatively little regard for the exact research topic. Possibly that suits me more than others, as I found myself interested more in the methods than any particular research topic, but I still think it's a valid approach to a career; science needs expert methodologists as well as specialists in particular topics after all. Attention to learning useful research skills early on in your career can help in following a path like this, if you think it might be for you too.

Thank you so much for sharing insights into your journey with us; it is greatly appreciated!