



## LIFE AFTER PHD?

The ISG has over 70 PhD research students, working on a wide variety of information security research topics. A PhD degree often appears to be a long lonely road. So why are people doing it? And what are the benefits? We spoke to Caroline Belrose, who completed her PhD in 2006, about life before – and after – a PhD.

### Why did you choose to do a PhD?

Good question! I'm not someone who always wanted to do a PhD but I was always interested in cryptography, and after my MSc in Information Security, I worked for six months with HP Labs in Bristol. I ended up publishing a research paper with one of my HP colleagues and I got a real kick from that. So I started to consider the idea of doing a PhD. My main problem was funding, so when HP generously agreed to sponsor my PhD, I decided to go ahead with it.

### Why did you choose to study with the ISG?

It is the largest and most well-known UK academic group working on information security. I think that's a good thing for students because it means that there is a wealth of experience to draw on and learn from. There is also more variety in the kind of research going on, which is inspirational and gives students more options.

### Dare we ask what your PhD was about?

To provide a short answer I'll discuss my thesis, but a PhD is about far more than the thesis! The first part was about special kinds of signature schemes which involve multiple parties and where you can't determine who from a group of people actually produced the signature. The second part was about key agreement protocols, an area which seems pretty simple, but isn't. In both parts of the thesis I examined how to formulate good security models for the primitives I was working with, and also looked at how to prove that a given signature scheme or protocol was secure within these security models.

### What are you doing now?

After completing my PhD, I was offered a job with Vodafone in their R&D security team and I took it because it offered a good balance between research and industry. I have a lot of variety in my role and a lot of interaction with all sorts of people both inside and outside of Vodafone, which I like. I am involved in managing the security requirements for the phones Vodafone purchases and sells on to customers; security work in industry for standards bodies; investigating new mobile security technologies for phones in the future, and a lot of other small things that crop up that require security expertise.

### You could have pursued an academic career, why have you joined industry?

I realised during my PhD that I wouldn't be happy in academia. I enjoy working on problems and coming up with solutions but everyday academic work is seldom about that. It's also about lecturing, marking and reviewing, none of which particularly appealed to me. Academia offers you a great deal of freedom in what you study but a lot of academic research can be very far removed from current reality, and this became even clearer to me through my regular contact with HP. I wanted to work on things that people other than cryptographers felt was important and that mattered now (patience is not something I'm known for). So, although the world of industry did look a little scary from the safety of academia, I felt that I needed a change and a new challenge.

### Are there any skills that you acquired during your PhD that are useful in your current role?

I learnt to question things and keep an open mind to new ideas. I learnt to reason about problems in order to develop logical solutions, and then to present my findings. And very importantly, I also learnt to trust my own abilities. I discovered that if you just sit down and give yourself the time to think things through properly, you can often come up with some surprising results. The thing is, most of us don't usually bother to try, or don't have the time, so we never really explore what

we're capable of doing. A PhD gives you a unique opportunity to learn these skills, and they'll be useful wherever you go.

### Any advice for anyone contemplating starting a PhD?

Firstly, I would say be honest with yourself about why you want to do it. If you like the sound of the title "Doctor", or you want to impress your friends, or you just don't know what to do next, then I would recommend finding something else. A PhD takes a lot of self motivation, and if your heart's not in it, you may not make it, and even if you do, you probably won't enjoy it. If you want to make loads of money, a PhD is unlikely to put you ahead either, because experience usually counts for more than academic qualifications. If, however, you have a genuine interest in your chosen topic, you enjoy the freedom of being able to explore your own ideas and you think you may want to go into academia or just experience what research is like for a few years, then go for it. I think a lot of people worry about not knowing exactly what they actually want to study, or that they don't know if they'll be able to come up with original new ideas. But these are things that you work out as you go along with the help of your supervisor and fellow students. To me, this is part of the PhD experience. I would also recommend speaking to someone who has completed a PhD to clarify any questions you may have. It's a three-year commitment, so be as informed as possible beforehand.

### Is there life after a PhD?

There seems to be plenty of PhD graduates about who don't require Prozac to make it through the day, so there must be life after a PhD! I miss the "flexitime" of PhD life, but it's great to finally have that thesis done and dusted and not to have to think about it again (until someone starts asking you questions about it!)