

Only a Physicist?

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I'm writing this a few days after completing my 8-week internship at Imperial College's Centre for Environmental Policy (CEP) and I'm looking back, feeling really quite impressed by how far I've come since my first day. I've been working under the supervision of Dr Audrey de Nazelle on a quantitative review of air pollution studies completed over the past sixteen years. When I've met up with friends over the summer and told them that's what I've been doing, their responses have generally been something along the lines of: but how did you get into that? You're *only* a physicist!

If you'd have told me I'd have been doing something like that over the summer in February, I'd have probably have said the same thing. It isn't that I thought physicists were particularly dim – quite the contrary – I just hadn't yet grasped the idea of physics having any relevance to environmental problems and most certainly not to policy. Physicists belong in labs. Environmentalists belong in wellies, preferably surrounded by greenery. This was my somewhat warped world view of the time. That was until I saw a hero of mine, Jon Shanklin talking at an event hosted in the physics building at Imperial one evening. He gave a brief of account of his time in Antarctica and how he (and his colleagues) discovered the hole in the ozone layer. At the end he then offered up his take on one of the greatest challenges facing our generation – anthropogenic climate change. The solution he said, lay partly with scientists. People like him. This I knew, but then I realised he also meant people like me. I left his talk feeling really quite passionate about the environment, but also empowered to help change it for the better. It was a result of hearing Jon talk that I decided to email Audrey to see if she could offer me any experience working in her department over the summer. Jon had come very close to convincing me that scientists can do anything – though so entrenched was my idea of what a physicist did, I needed first hand proof.

I spent the night before my first day of my placement somewhat anxious – I briefly relapsed into my old beliefs regarding the role of a physicist. Then I got started and realised what a fool I'd been. By the end of my 8-weeks I was really quite grateful for my training in physics, having exercised so many transferrable skills – coding, statistics, data handling, reading scientific papers, problem solving, writing reports on what I'd done. The skills I used were identical to those I was using in term time, only the context different. My knowledge of the subject grew as I read, and what's more, my skillset developed. I learnt how to program in R (a computer language particularly useful for statistics) and create data visualisations in tableau (a business analytics software); I learnt about t-tests (statistics) and calculating confidence intervals. I have no doubt that when I resume with my physics course in October, that I will be a better physicist for what I have learnt over the summer.

In my personal life I'm somewhat political and in part due to my scientific background, have a particular interest in the idea of evidence based policy. The idea is simple and in my opinion common sense – if you're working in policy you should evaluate whether your policies are actually making a difference or not, and if not look at how they can be improved. Working at the CEP it was interesting to see how these ideas were being put into practice. In my work I was dealing with numbers called exposure ratios. They compare the exposure to air pollution of a person whilst travelling on a particular mode of transport to some reference value – say the exposure experienced by a pedestrian or cyclist travelling along the same route under similar conditions. Some of the ratios I was dealing with had previously been sent to the World Health Organisation for use in a planning tool aiming to allow policy makers with a non-technical background (often in organisations such as local government) assess the outcomes of their policy decisions before committing to them. For

instance, cycling is currently being promoted as a healthy alternative way of commuting. To promote it many authorities are looking into building more cycling infrastructure. These tools can be used to estimate the economic benefit in terms of reduction in pollution and increase in activity levels, enabling planners to make wiser decisions and ensure money is spent where it will make the biggest differences. For those interested you can have a look at how the tool works online at <http://tinyurl.com/8fj78k8>.

One of my favourite parts of the work I was doing was the problem solving. Obviously when performing a calculation, you can't be sure as to what answer you'll get until you've performed it – you can only have a rough idea until that point. Towards the end of my final week my supervisor noticed that some of the exposure ratios I'd been working with weren't quite right. At this point I was extremely pressed for time and had to go about finding out what had caused this. It was actually quite a nice end to my placement giving me a chance to use pretty much all of the skills I'd developed over the previous few weeks. At first we were unsure whether the issue was affecting all the results or just a few, what the issue actually was and where it might lie. Using some of the coding skills I'd picked up, a bit of intuition and a lot of deductive reasoning I was able to locate the root cause in a matter of hours. The feeling I had upon the finding of the error was one of extreme satisfaction and the work I was doing was full of such moments.

For those of you reading this and wondering whether to apply for the create your own internship scheme next year I'd urge you to seriously consider it. I have gained some invaluable work experience in an area I may not have normally been able to and as a result, I've decided that the environmental sciences are most certainly where I want to be heading when I graduate. The scheme is really quite amazing in that it allows you to arrange work experience near enough anywhere you fancy at no, or little, financial cost to the host organisation. It opens up so many doors that may be closed under normal circumstances. My experience, from submitting my application to my final day, has been nothing but positive. Although it might seem daunting approaching a stranger asking them to host you, from my experience people are more than happy to work and share knowledge with an enthusiastic person who shares their passions!

Finally, a massive thankyou to Audrey and Juan Pablo of the CEP as well as all the staff at the Ogden Trust involved in administering the programme – I have had an absolutely fantastic summer that wouldn't have been possible without you all.