

Participant #2

Field: Biology

Rank: Professor

Q: Why did you decide to become a scientist?

A: I don't know if I remember that far back. I was always kind of interested in the world and I actually started out doing physics, so I did physics and maths at school a lot, and I thought that would open doors and I had enjoyed doing my physics degree. I always enjoyed the experimental work and because of that I thought it would be quite interesting to do a PhD. And looked around for PhDs and got one, but then sort of used that to transition to physics to biophysics and then into the life sciences proper. I think the thing that had most interested me in my final year of my physics degree was in classes in biophysics where we learned about protein structure and I kind of saw for the first time what delicate and intricate, sophisticated machinery there was at the molecular level. So, I was kind of taken by that and the way that physical techniques could be used to explore that territory. And I did my PhD and I very much enjoyed it, but at the end of it I didn't really know where I wanted to go next. I actually then got a job with the National Health Service. I wanted to do something worthy and I got a job on their management training scheme, which I did for about a year but I actually realized that it wasn't the right thing for me. I wasn't particularly that good at it and I wasn't that interested and it was a lot of admin. I kind of discovered that I enjoyed doing science a lot more than I thought I had, so I then applied for postdoctoral positions and then carried on a research career from there. So, it's always seemed to me a privilege to be able to spend your life using your wits to try to find out what nature is really like.

Q: You just mentioned discovery. How would you describe what science is?

A: I see it as a form of exploration. So, in the sort of way where some people like to climb mountains or go to the poles, which has always struck me as very cold and dangerous thing to do, science offers a way, an opening to be an explorer into territories where most people can't access because they don't get to study nature and the substrata of reality that scientists do. And you get to see things for the first time. Even in this day in age when we kind of think that science has come so far so fast in the 20th century there is still an awful lot left to discover. So, it is possible, it doesn't necessarily happen every day or even that often, but it is still possible to have moments of discovery where you are the first human being to see something. In my case a particular protein structure, but it is something that no one else in

human history has ever seen before. And we get to show it to the world. It's those moments of excited where you kind of live for.

Q: Earlier you mentioned that you experienced a lot of admin work while working for the NHS. There can be a lot of admin involved in academia. Do you feel the admin work prevents you from doing science?

A: Inevitably it takes away from your ability to do it. And you tend to get loaded with more of it as you get older and more senior. But by that stage you are more invested in the community and the enterprise as a whole and so you see the value of it, you recognize that other people are helping to run the show when you were young and starting out and it seems only fair to do your duty when called upon later on. I mean, academia as a whole is not necessarily always organized in the most efficient and effective ways, so some people can get loaded with more or less admin or some people may be more or less selfish in their attitude to the wider enterprise. That can be a bit problematic at times. But I think it is important that if you worked in the whole business then you also reflect on the job it does, how it's run, how it's nurturing the next generation of sciences. And, of course, I work at a university, so there's a balance to be struck, or a deal between having a job that gives me a salary and a job that gives me laboratory space. And in my obligations to be involved in teaching, and that is a trade off sometimes. You're giving back to the next generation some of the benefits you yourself accrued when working yourself through the education system.

Q: How would you compare the pressure to publish between starting your career and now as a Professor?

A: Well, the pressure is always there. It's not always a bad thing, because publication is the way you demonstrate your productivity. I think you're under some sort of obligation, because money is being invested into you and to show that you're not going to throw that away and of going down pointless investigations that never amount to anything or you never write up even if the result is negative. So, I think it is very important and I think it's sense to all stages, even now I feel the pressure to demonstrate productivity if I got research grants. At the end of the day there have to be a number of papers come out of that. There's slightly separate issue which is to do with the measures of the quality of that work, which is linked and controlled to a degree actually by the way that the publishing industry has developed over the last 20 or 30 years. So, now people are judged more and more on where they publish than what they publish. One has to be very careful about those pressures, because they tend to be --- there's a risk that they may be distorting the system. In my view they're making it more expensive than it has to be, they're putting undue pressures to cut corners potentially, it also slows

down the whole business of science publishing and communicating because they're always aiming for the top tier journals and then working their way down and so it can often take a year or more to get a paper published where the whole process of review and publication if you go through it once it should only take two or three months at max. So, there are costs associated with that and that's all folded in then with the computerization of much of scientific activity, the rise of the internet, the ability to publish and distribute information in an electronic form, when previously it all had to be paper form. And that of course changes the way people think about how they should be communicating their results and that's given rise to the Open Access movement, which I think has been a difficult journey, but a very positive move for science and for all research, I think, but there are challenges in terms of getting it implemented.

Q: You said that the pressure to publish isn't necessarily negative, but the pressure to publish in high impact factor journals can be. Is that correct?

A: Mhm. There is a balance to be struck. The problem is that young scientists these day think that they have to publish in Nature or Science, these sort of top, top journals, otherwise they have no chance of developing a career. But one of the problems is these journals pin their brand in part because they artificially restrict the amount of papers they choose to publish. So, Nature, for example, publishes about 8% of the manuscripts submitted to it. Now they would defend their selection of the 8%, but I think it's arguable that there's another 8% or more which are quite worthy of being published in Nature, but they end up going the next tier down in many cases. And they lose out, because at the moment there's a lot of emphasis placed on the impact factor of the journal you publish in. I don't think there's enough recognition to the fact that the peer review process is a useful process, but it's rather statistic, it depends on just a small number of people reviewing it, and the artificial limits of publication, which is all to do with the cost of printing and distributing a limited number of pages, which is an increasingly irrelevant restriction to place on publishing. So, those sorts of factors are tending to distort the system and the problem seems to almost be incapable of breaking out of that pattern of behavior. And it's because so many participants are already invested in the system that they don't want to break free out of it.

Q: How does it make you feel to see your colleagues and students feel this pressure or anxiety about publishing?

A: It saddens me to a degree. I don't think there's a utopia out there where everyone can do science and everybody's happy and no one feels competitive pressure or jealous of their

colleagues who may be doing slightly better than them. That's all part and parcel of the scientific enterprise, or any human enterprise. There are finite resources out there. Not every grant is going to be funded. Not every student is going to go a PhD studentship. So, there is competition and competition is good. That's the way you try to select the best. But the system has become a bit too overheated and distorted, so there are excessive rewards for publishing in certain journals and people have shifted too much the job of evaluating individuals and their work simply onto the journal brand, and so they don't bother to read the work, they just look and say, 'Okay, so-in-so has a Nature paper, they must be good.' But I think we have to do better than that. And it's partly also, from the perspective a university, it's that the difficulty is that research becomes the end all and be all. Research becomes the number one activity of the things an academic does and certainly it is the word on the street, should we say, when I was a junior lecturer was basically publish papers, get grants that's the number one task, and then do a bit of teaching, sit on a bit of committees, keep your nose clean, but the message was very much that research is important. But actually the job of a university is much more than research. It's certainly important, but there are many other important things that people do and I don't think they get rewarded in quite the same for those contributions, so we need to define a broader palette of activities which are recognized and rewarded because the only way the system will change is to change the pattern of incentives. But that's a system wide problem that even universities aren't ready to grapple, because they know that their own reputations derive to some extent from the number of top tier papers that their staff proceed to publish. So, there have been moves to push the culture toward a more holistic mode of evaluation and that's been seen in things like the Declaration of Research Assessment, which is a two year old initiative from a number of publishers and funders and sort of learned societies. It's a fairly modest proposal trying to insist that people discount the impact factor when evaluating individuals or pieces of research and that they seek other methods to do a better job of evaluation. And in the UK, a total of three universities out of 150 or more have actually signed up to DORA. Partly that's because they haven't done a good job publicizing it themselves, but partly it shows this reluctance for anyone to move first, nobody kind of wants to gamble. There's a great deal of timidity, I think, in terms of staking out your own agenda. I think a place like [university] should have the self confidence to say, 'Look, we know we're a world class institution and we may have relied a bit too much on impact factors in the past and here's what we're going to do in the future, because we really value the people that come and work here. And we really value all the different things that they do, we value their research, we value their teaching, we value their contributions to college life, we value their public engagement activities because we are a university that is very much situated in the world. We aren't an ivory tower, we're a London

based university, but our influence extends all across the globe and we want to shout about that.' But at the moment research is still seen as the be all and end all, so there is a distortion. And that distortion bleeds through to publishing practices.

Q: Since [university] is a highly ranked university, do you feel there is added pressure here for academics to maintain that ranking?

A: Quite possibly, yeah. There are healthy aspects as well. It's good to come to a high performing university, because all your colleagues are all of international rank and that inspires you to think, you know, I want to stay here, and be that good, too. So, if you go to a place where the people are muddling through and not doing much, not being research active, then that's hardly the best environment for you yourself to excel. So, you do want to, and people are attracted to a university like this, because they kind of feel actually like it will be a stimulating environment and it is good to be exposed to colleagues who really are pushing the envelope because that helps to inspire you. I mean hopefully they'll do it in a friendly way, they like to show off that's fine, as long as it doesn't become bitter where they're putting you down all the time. You get all sorts in all universities.

Q: What do you think the role of Open Access is for science?

A: It has the potential to increase the overall value that we derive from the overall scientific enterprise. So, certainly in the UK the government sees it as a way of getting a better return on its investment in the scientific, in their R&D sector. So, I think it's a good thing. It seems like an entirely sensible thing given the digitization of information and the simplification of the dissemination of information around the world. I think it should be seen that the publication of your result is an intrinsic part of the research process. Until you've published anything you haven't done anything that anybody can take any note of. And it's also a potentially effective response that is known as the serials crisis, which is the cost of academic journals has gone up and up and up above the rate of inflation and consuming more and more of the science budget. And yet it's a process where academics have given over too much control over their research results to publishers. Now that was a reasonable bargain in the days where you needed professionals who knew how to print stuff and assemble journals and distribute it around the world. And that was a fair exchange. In the digitized world, people are increasingly asking the question of is that the best method? And it really doesn't seem to be. And particularly when you fold in the problems that an awful lot of peer review is not just about judging whether the science is any good but it's also about judging well, is this good

enough for this journal? And so peer reviewers are being asked to protect journal brands in a way rather than judging science, which has led to an over dependence on impact factors on judging people. I think Open Access, there are many different flavors of it and many different types of Open Access journals, but I think it has changed the way that people think about how they should approach publishing their results. I think it has opened up. I think it should make it easier for people to publish. We've seen the rise of these megajournals, which have a different editorial standard, which is that the work should be novel, original, and be done competently. And any decision of 'is this good for this journal?' is completely ignored. The decision is that if good, original work has been submitted, then it should be published and we should leave the rest of the community to decide if it's good or not. And they'll do that because they'll cite it and mention it and build on it in their own work, and stuff that is a bit dull then will simply not be cited and then wither away. I think that's potentially a good move. There's always going to be competition between scientists for recognition. At the minute they get that through the names of the journals they publish in. That's why they chase after the impact factors, and it's because they don't trust the rest of the community as a whole to make sensible decisions about the quality of their work and so they use the journal brand as, 'I'm a good scientist.' And while the reward system is linked to journal brands it'll be very difficult to break the dependency of that habit there. It's an entirely rational thing for people to do. It's what I did when I started 20, 25 years ago. I knew that publishing in good journals was the way to get recognized. That's less true these days. It's relatively easy to find all the papers that are published in the fields you're interested in. You just set up keyword searches, and there's even social media ways of having groups of people with shared interest. So, that function of discoverability or the journal actually promoting or making your work more visible is a declining function of journals. But it is the reward system that is strongly geared toward journal brands, which is one of the things that make it a little bit difficult for new Open Access journals to break into the market because they have to compete on reputation and people have to take a gamble on them and that's a risk a lot of people aren't willing to take.

Q: What are requirements you have when deciding which journal to publish in?

A: I'm required by my funded to publish Open Access, which I'm entirely happy to do. But the other major consideration I have is that the majority of the work is being done by postdocs and students, it's not done by me necessarily, I may have gotten the money for it and guided the project. But I got to think about their careers. So they're 20, 25 years behind me, and I can't impose my philosophy and outlook on them because that's obliging them to take risks

that I myself didn't take as a young researcher. So, I would give them the last say on where we decide to publish. Currently I'm part of the Elsevier boycott. I haven't actually said that I won't publish in an Elsevier journal, but I won't review for them or edit their journals.

Q: Because that's a choice that online impacts you?

A: Yes. I've left that possibility open, because sometimes you're in a collaboration and it's not my call where to publish. But I would seek to explore viable alternatives that were Open Access, but at the moment there are good alternatives. Some of my postdocs they got to think about their career and I can't impose that on them, so they want to go after a particularly journal brand then I won't stand in their way necessarily. So, there has to be a balance to that, but given a free choice I'd probably just publish in a megajournal the whole time, and just say, this is the policy of my lab, because I think it's the way to get results out quickly as possible, and I think that's the most valuable thing to do, I think it's good work. The referring in those journals is fully competent and exacting. I personally would be prepared to take that risk, but I wouldn't impose that risk on other people, and so I would give them the final say so.

Q: Do you think other high-ranking faculty give the same freedom to their students?

A: No. There'll be a spectrum. There was something over Twitter over the weekend, some PI, I don't know who they were, they weren't named or anything, but some star PI said they would never publish something in PLOSOne and they would rather not publish something than publish in PLOSOne even though, I think, this particular situation was costing a PhD student a publication. They weren't going to get a publication out of it, because the senior author felt that to be an author on a PLOSOne paper would damage his reputation. I think that's a silly attitude to strike and one that's damaging obviously for the career of the student and I think it's entirely selfish and inappropriate. But you do see that. And I've had discussions with colleagues here that think megajournals are just dumping grounds for rubbish, but I think that view is less and less true. And more and more people are just choosing to publish there because I think they get a decent service.

Q: When you are doing appraisals, do you think that megajournals and Open Access are beginning to be looked at more favorably at this university?

A: I can't judge for the department, but I mean people are still fixated on journals and that will take a long time to cure. That's very much an embedded part of the culture. I find myself doing it, because it's the kind of habit of a lifetime but you have to catch yourself and check yourself. The trouble is that one has to bring in the kind of mechanisms that allow for a good,

fair evaluation that is still time efficient. That's the reason people still cling to journal impact factors, because if they're trying to judge people who don't work in the same field as them, because they can't read the abstract of the paper and know if it is a big contribution to this field or not because they're outside the field. So, they look at the journal impact factor, is it high or low, and the judgement is completely dependent on that. So, one mechanism that is being proposed is to get them to identify from all that they've published their four or five best papers and get them to write a short summary of why it's important and to try to explain it to them. I think that's an example of good practice, but one has to get people to do that.

Q: Do you think that the current pressures to publish in these high impact factor journals discourages the freedom for scientists to explore? Or is doing science the exploration and publication just comes after?

A: Well, I think different people would give you different answers to that question. I think many scientists feel that they're exploring and that they're mapping out new territory. There is a lot of great work going on and in these top journals it is true that a lot of what they publish is fantastic work. It is undoubtedly true that people submit really fantastic work there and a lot of it is deservedly published in Nature. The problem is that a lot of stuff that would be deserved to be published in Nature isn't, because there's no room or just a particular editor doesn't take a shine to it. There's a perception that these top journals, particularly Nature and Science, there are particular areas that become hot, that they will take papers in because they're in that area not necessarily the best work or the most reliable work, they're just kind of topical or seem exciting. So, the stem cell that Nature published last year that was eventually retracted I think is an example of that. Stems cells, a massive area, this was potentially a big breakthrough but actually it unraveled alarmingly quickly and there were hard questions to ask about the procedures for that. Science has published junk as well.