**Joey and Richard**

**0:00:00 - 1:09:08**

Richard: Cool. Okay. We're recording.

Joey: All right. We are live. Okay. The Richard and Joey show.

Richard: Okay.

Joey: I wish I'd prepared some, like, cheesy intro.

Richard: With like an assistant doing sound effects.

Joey: Yeah.

Richard: Cool. Okay. So did you do some homework?

Joey: I did a little bit of homework. I figure it'll end up being a little bit

freestyle, but I created a few questions that could sort of guide the...guide the whole thing. So should we just kind of jump right into it?

Richard: Sure. Let's do it.

Joey: All right. So, you know, the basic stuff just to get started. Your name is...

Richard: I'm Richard Smith-Unna.

Joey: And you are how old?

Richard: I'm 30.

Joey: Amazing.

Richard: Sadly, I've made it. 30.

Joey: And your current location.

Richard: The basement of my house, which is in Saffron-Walden, in Essex, in the UK.

Joey: And how far is that from Cambridge?

Richard: About 20 miles from Cambridge.

Joey: Wow. So then you ride your bike there?

Richard: Oh, no. I...I actually rarely go in. I work from home almost all the time. But I go in one day a week, Mondays, and I drive.

Joey: Wow. That answers some of the questions. That's incredible.

Richard: Yeah. We used to live in Cambridge, but we moved out here because we wanted to buy a house and you can't. You can't buy houses in Cambridge unless you're like extremely rich. The only thing we could afford was like a garage. Like car storage. A single small garage.

Joey: Wow. But it's worked out. You work remotely and stuff.

Richard: Yeah. Yeah. It's actually awesome. I'd never lived in the countryside before. So as much as we have countryside and rural areas in the UK, we have an extremely high population density. I'd always lived in, like, suburbs west of London where all the towns run into one another. There's no loose space in between. Or if it is, it's owned by the military, so you can't...there's no real countryside. But here, we're just surrounded by fields and woodland. You just walk outside in any direction in rural areas, which is awesome. I didn't realize I would love it, but I do.

Joey: Oh, nice. And you don't feel sort of isolated like from your lab group at

all?

Richard: Oh yeah. Actually, well, I kind of already was because my lab group is like...I don't actually know how many people we are now. Like 15 people, 13 of whom are molecular biologists. Like lab...wet lab biologists. And then two of us do computational stuff exclusively. And we can actually sit in a completely different part of the building with a bunch of other computational people who all spend their entire day face-forward to their screen, headphones on, no discussion except online. So we talk sitting next to each other. We talk online so we don't have to stop, like. So I feel no more isolated here than I did in Cambridge.

Joey: Fair enough. I guess the difference is that you can stay home and, you

know, with a kid.

Richard: Yeah. And the dog and just it's also just I can work much better here. It's my own space. I get to decide how I lay it out. And if you're a computational person in a biology department, then what tends to happen is, very quickly, word gets around that you're a computational person. And if you try and sit and do some work for a day, that's punctuated by like 30 different biologists coming up and tapping you on the shoulder and asking you a question, which could range from being, "My computer is not working, what can I do?" right through to "I've got this data that I've generated, and I don't know how to analyse it. Can we enter into a large collaboration for the next six months?" And so some of that was useful when I was first starting with my PhD because I got a load of the collaborative...collaborative papers that I've been part of came from that. But after awhile, I was just like, well, I can't take on any more projects, so there's no point in me letting people tap me on the shoulder. I'll just leave. I'll just go home.

Joey: Okay. Got it. All right. Well...

Richard: I'm giving a bad impression of myself at the beginning of this interview. I'm a hermit. I live in the ground and I don't talk to anyone. People try to talk to me, and I'm like, "Go away! I live in the ground." I'm not really like that. I'm very sociable, but maybe online.

Joey: And then you grew up sort closer to London, then.

Richard: Yeah. West of London in Guilford and Surrey. So it's kind of where most of the people who commute into London live in Surrey, and it's very densely populated. And it's sort of just completely different, actually, to anywhere else in the country. It's also where the kind of characteristic...like the famous British accent comes from. It's called the home counties accent. And that's the region sort of immediately around London, but particularly around the west.

Joey: You've like acquired that or did you try to [0:06:07] yourself?

Richard: Well, like, it is my...I grew up with it, so for me...well, for several years as a child I didn't know anything else. Actually, that's not true. My entire life I've listened to audio books every night as I went to sleep. I was very aware as a child of the different accents. But yeah, I never realized that my accent was essentially English until much later. And I have tried to tone it down a bit because sounding posh is not really a good thing in England.

Joey: All right. So one of my questions actually is what's the best part about

being English?

Richard: I guess this isn't really exclusive to England, but just...just safety. It is quite safe in England, more I think than anywhere in North America. I just feel extremely safe in the UK. I can...I can do pretty much anything. Like I can go pretty much anywhere in the UK and know that I'm definitely not going to get shot no matter what happens. That's actually surprisingly unusual. Like in terms of like where in the world you can be sure of that. But actually I'm also fairly certain that I'm not going to encounter any kind of violence, and probably no crime. I mean, we obviously have crime and we have loads of areas with much higher crime rates than others. But in general, it's an extremely safe country compared to lots of other places. And we have a kind of functional partial socialism, which allows us all to get access to loads of stuff without having to worry about paying for it. So if I'm ill, I can just go into the doctors and I know I'll get treated no matter what, even if it's...even if it's just something inconvenient as opposed to life-threatening.

Joey: Right.

Richard: Yeah. And in general, we have a kind of social safety net that means that actually that I've been in a situation many times when I could have used that social safety net and chose not to. But having it there means that, like, nobody should...nobody should completely fall through the cracks. Like we shouldn't have extreme poverty, although...

Joey: Yeah. All right. Now that we're kind of warmed up here...so I'm just

curious to sort of document my theory of academic trajectory. It sounds like you found many different things and sort of duct taped them together in a way that’s interesting and coherent. I’m just curious about your life[?]. I mean, we talked about this a little bit before, but just sort of for the record or whatever.

Richard: Yeah. So there was never any plan. As a child, I...I was good at stuff at school, but I strongly resented adults who...who told me that I had to follow rules but wouldn't explain why the rules were the way that they were. And so I was...I was very naughty at school, and the way that I remember, at least, is that it was largely because...because people were telling me stuff, and I was like, well, you're lying to me. I know that those rules must be in place for a reason. And if you can't tell me why, then I'm not going to follow those rules. So I was just kind of deliberately naughty through most of school. I got expelled from secondary school. I nearly got expelled from primary school. I got expelled from secondary school. It was weird. This weird, like, sort of counterpoint because I got a scholarship to my secondary school. Academically, if I could be bothered I was good. But I generally couldn't be bothered. So I wanted to go to this school, so I tried hard for the exam and got a scholarship. And then once I was there, I just sort of went rampantly getting in trouble until eventually I got asked to leave. And then, yeah. My school years were just irrelevant to my education, really, which was almost entirely outside school. My parents, who were quite intellectual people. They cared about education. They cared about reading and knowledge and understanding, and I kind of got that from them even if I didn't live into it as much. But then as an adult, I went through this meandering journey of...well, initially as a teenager, I was very, very interested in computers. All the time, that was really all I cared about, actually, as a teenager in terms of academic subjects. Then when it came time...you know, when I finished...in the UK, we do A levels. That's kind of the equivalent of finishing your high school diploma, I think. And then you go off to university. Or most people. A lot of people go off to university. And I thought, well, I don't really know what I would do unless it was computer science. And honestly I felt at the time that I could learn computer science in my spare time without going to university and not bother with that whole stress of having to apply to universities and stuff. So I didn't go. I didn't study computer science in my spare time, so I just sort of...did basically nothing productive. Until eventually I ended up going to South Africa. I had worked in a series of camera shops and then in one particular one, I'd worked my way up to being the assistant manager. My entire purpose in working at camera shops was to get good discounts on camera equipment. And because I liked...I for some reason got into photography. I wasn't very good at it, but I got into it. And then I used my discounts at the camera shops to buy a load of photography equipment, and then a friend of mine, because I went to this school where my parents couldn't have afforded to send me, but I got this scholarship. So I was this incredibly naughty kid at this school where everybody else...a lot of other people were very well behaved, and they had very wealthy parents. My parents weren't very well off. And so some of my best friends’ parents were multimillionaires. And one of them...one of them, who's...who's actually just a great philanthropist. His name is Kim Tan, and he'd, during his PhD, he discovered some cancer-related treatment and had patented it and made a lot of money off of licensing and patenting it, and invested the entire profits from this patent licensing into charitable work. And one of the things he was doing was he bought a game reserve in South Africa. He bought a huge chunk of land, and what he wanted to do was reconnect an ancient elephant migration pathway that went from another elephant reserve in the south up to the various other natural reserves further north in the country. And so he was buying up these chunks of land in between, like with the charity. And the idea was that it would make loads of money because actually people would pay a huge amount to go to game reserves. But also it would serve his conservation purpose.

Anyway, he knew that I had this big pile of camera equipment, and so he offered me to go out there for several months and work as a wildlife photographer and just document the game reserve before it was open to the public. So I got this really cool experience that was just completely...it was just nepotistic. I was in the right place at the right time. I had a great friend, or a friend with a rich dad. Or at least I had a friend whose dad's charity had a lot of money, and got to go to South Africa, take pictures of animals, but mainly just have a really cool time following around this conservation biologist who lived like a kind of...he was a bit of an anachronism because he was a cowboy kind of thing. But he also had a four by four and radio tracking equipment. And so he would kind of race around just this wilderness with radio tracking equipment and a gun and, you know, be looking for rhino and elephant and this kind of stuff that they'd released and they were tracking them. And to me that was just sort of the most romantic idea of what you could possibly do with your life. I just thought if I can do this for the rest of my life, I’ll be happy. That's how I felt at the age of about 21. And so I decided to come back to the UK and study conservation biology, which I did. I went to University of Western England and did a conservation biology BSc. And whilst I was doing that, I kind of actually discovered that I'm really an academic, which I hadn't really realized before. But I love thinking and learning and organizing my knowledge and all these things that academics do. And I just completely had not twigged to it throughout my entire childhood. So I was there as a sort of early 20's person who'd suddenly discovered a love for knowledge, and everyone else was there as like the 18 and they'd just had their first taste of freedom. And they're all partying and I was like, well, this is going to be easy. I'm the only person who's actually interested in doing the work. And so it was very easy, actually. I did very well in terms of marks and things, but that was really because everybody else was pissing around all the time. So I became very interested in plants during my degree, and I did a year in industry working at the Millennium Seed Bank (MSB). And also another feature of this is that I'd irritated my parents by systematically ruining all the opportunities that they'd given me as a child to the point where they weren’t' willing to support me to go to university, which was completely reasonable. And so I had to support myself, and I worked either full or part time the entire time through university. I did software development. I did some ecological surveying. And then after I'd done this year in industry, I came back to do my final year at university. I actually didn't attend at all, and I carried on working for the Millennium Seed Bank full time during that time and just read the notes and stuff. The work I was doing at the MSB was very related to my coursework, so I managed to get this pretty sweet situation where I was getting paid to just finish my final year without having to attend university. And then I had to stand up and take the exams, and I got...I got quite complacent in the exams because I figured out before I went into my final exam, that only the outcomes that were possible were if I passed the exam at all, which meant in that case getting a 30 percent. Like 30 out of 100, then I would get a first-class degree overall. And if I failed it, I would fail my degree overall. So I was in this bizarre situation where a single point difference in my exam would have given me either a great degree or I would have wasted my entire time at university. For some reason, I got really complacent about that. I was like, you know what? I'm not going to revise for this exam. I'm just going to go in and wing it and see if I can do it. I was kind of pushing the boundaries of...it was definitely not sensible, and it was very arrogant and stupid. I went in and I had no clue about the subject matter. I got in and I was like, wow, I really should have revised. this was the worst idea ever. And I wrote just...I wrote these essays in response to the questions that were just...just like clearly deliberately trying to obfuscate the fact that I didn't know what I was talking about. And then I just panicked about it for six weeks until I got my results back, and eventually I got my results back and it turns out that I had got exactly the pass mark. So I got a first-class degree. And I think the reason that I got that pass mark was that one of the lecturers must have noticed that it was me and was just like, ugh, he's going to fail his entire degree if he doesn't get 30. Like let's make sure he gets 30. That was the only explanation I could think of because I did so terribly that I shouldn't have gotten any marks.

Joey: Wow. Amazing.

Richard: So actually during my time at uni, the other part is that every summer and holiday, I was doing research projects with different lecturers and researchers there. And they were all very supportive and generous. And I think they were just pleased to have someone who was really interested and, again, it was just because I was a bit older and had come back of my own free will instead of, like, this is what society thinks I should do at this age. And yeah. So with all of that stuff, with all that experience, I decided that I...given that I now had discovered that I was an academic, I was fed up with being around other people who were not interested in their work. And I thought, well, I'm going to pick the place where I think I'm most likely to find a cohort of people who are also interested. And so I was like, well, I'm going to go to Cambridge. And then Steph and I decided to do the same thing. Not the exact same thing, but we both decided to go and do PhDs at Cambridge. We both got in and it was kind of miraculous, really.

Joey: And, like, that answers one of my questions: why Cambridge over, like,

the other universities?

Richard: Right. So I actually did...I was pretty systematic about it. I'm actually quite...I was going to say "scheming," but that's not very good. I'm a very strategic person. I thought very carefully about the balance of what my interests were. Fundamentally, I wanted to do a PhD because I wanted to be a scientist. I wanted to save the world. I wanted to make the world a better place. And I thought, well, I have certain skills, and I'm going to get better at some things during my PhD. What I should try and do is find a lab whose work could potentially change the world, but where they're probably held back by the lack of the kind of skills that I have. So I did this several months long analysis where I would read articles in the scientific literature and the press about just projects that were expected to have a huge impact on the world. What kind of aspects of agriculture, for example, were we expecting to struggle with in the future, and what research projects were tackling those. And I narrowed it down to three or four research topics that I was interested in, and then I did some more kind of analysis of the literature to figure out who did I think were the key players in those fields who were most likely to be able to make those breakthroughs? I was looking for people who had lots of resources. So they were not going to be short of money, but what they were lacking was some kind of expertise that I thought I might be able to provide. And I narrowed it down basically to the C4[?] Rice[?] project and a couple of other crop engineering projects, because they were doing a lot of plant physiology stuff, measuring plants on a large scale, and none of them seem to have any programmers. And I was like, well, they're going to have huge amounts of data. Surely like my kind of vague skill set will come in handy. And then, I emailed. I chose C4, emailed a bunch of people, and the only one who gave me a polite reply was my current supervisor. And he was very...he was very nice and interested.

Joey: And your current supervisor...

Richard: Julian. So he is...he is an excellent person. He's very modest and understated, but he actually is running a research group, I think, who have a very high potential to have a huge impact on the future of humanity. But he's very...he's very modest about that. He would never say that, but other people would say it about him.

Joey: I think that kind of leads into nicely my next question. Where are like the

top five things people need to be talking about in science? So with respect to your research, but also like science in general. This is [0:22:43] science and stuff.

Richard: Well, so maybe for that...sorry. Go on.

Joey: No, I just said lay it on me.

Richard: Okay. So...well, I came into science, first of all, through just wanting to be kind of a romantic cowboy in Africa. And once I'd scrapped that idea, I realized that some of these...some of the things that we were applying science to really could make people's lives better on a vast scale, or could make humanity more sustainable or less likely to destroy itself in the immediate future. And all of those things I thought were extremely valuable, and I still do. In particular, I think I'm not...I'm not so sure that science could really refer to a humanity sort of apocalyptic disaster. I do think it can make people's lives much better in the really quite immediate future as well. So on the time scale of small numbers of years, five years, applying a scientific breakthrough in agriculture can literally alleviate starvation or malnutrition on a massive scale and make a difference in children dying and...or growing up with serious, you know, life-destroying diseases. And learning to be healthy adults. And so part of...part of what science needs to be doing is focusing on humanitarianism. And that's fine. We kind of...science is already doing fine at that, and we also need some things that aren't focused on those outcomes and blue skies research where you're not just requiring everybody to be telling you what their impact is going to be because that's not achievable. We can't...of all the science that has ever done great things for humanity has been built on thousands of little pieces that look like they were never going to do great things for humanity, but were just interesting factual discoveries about the universe that we live in. And so it's important that we continue to make those discoveries, because the applied stuff doesn't have to be about that. **But throughout my PhD, I became more and more aware, to the point where it dominated my worldview, that actually science is really quite badly broken in various ways. Systematically broken. Systemically broken. And is being exploited on a massive scale to the detriment of humanity, society, and science itself.** And so whilst there are a bunch of questions about what things should we actually be studying, I think there is a much more...recently the outcomes are focused much more on what should science really look like. How can we design science to perform the role that society believes it's getting in return for its massive, absolutely vast historical and current investment? Because if we as scientists--and people do this a lot. Scientists do this a lot: say science needs to be funded more. Then we can't do that in good conscience if we then throw wads of money at companies who are producing pathetically valueless products like publishers or people who make scientific machinery who have just insane markups and insane profit margins for things which are actually trivial to do. But the way that they've managed to sort of milk science so systematically is by getting in early before it was trivially easy to do those things and monopolize all these different streams of money that are going after science. It's been very difficult for anyone to break through those monopolies. So I think that we have a kind of...what's it called? A moral thingie. You know? A thing where...so it is our responsibility as scientists, as people who are paid to do what we want to do, which is almost all the scientists I know are doing it not for money, because there isn't a lot of money, they're doing it because they want the intellectual freedom to study the world and have fun pointing out new stuff. And we are asking people to pay a vast amount of money, not *to* us, but so that we can do that. People are paying a vast amount of money, society is. If we want them to do that, it's our responsibility to make sure that that money is being spent effectively. It doesn't have to be spent on us, but it does have to be spent in such a way that the public can get some kind of value back for their money. I think at the moment we are failing completely to do that. And in the process, that is really I think the kind of...it's the centroid[?]. It's the most important node in a huge network of problems in science that affects things like the incentives, which change the way that scientists act. It affects science culture because we're so controlled by publishers and the people who take money from us, and by the people who give money to us, grant-awarding bodies and the people who sit on their committees that the way that scientists behave is almost completely predetermined by the rules of that system, which are all shit. So my career from now until it's...until it's getting to a satisfactory level, has to be primarily about making science work right because I would love to be a good scientist. But I can't in good conscience focus on being a scientist when we're wasting everybody's money and doing much worse science than we could otherwise be doing. So yes, we need to fix things.

Joey: Yeah. Cool. That's super, super nice. And in a sort of contrast, what are the sort of top five things or so that people need to be talking about outside of research and science?

Richard: So they need to be...say again. Sorry.

Joey: I think I'm just curious because you have like really specific interests. You

are quite...you've quite well broken down the things within science and your research that you're trying to address. I'm curious just what are the things outside of science that also kind of drive your interests? So like the Syrian refugee crisis, for example.

Richard: Right. Right. So okay. So in that case, there are a few things. So there are some which are more sort of internal, psychological things, which relate to society. And there are some which...all of the things. All of the things I could list would be some balance of my...my personal issues and how they interact with external issues. But the more...the more internal personal things are, I just...I don't only not respect authority, I think authority is just about the worst thing ever and I hate it. And I just...it's a so deeply ingrained thing in me that authority is useless and that people who seek out positions of authority tend to be so terribly unsuitable for the thing...you know, for the position. For the role it's supposed to be achieving. They're just people who want authority who tend to rise to positions of authority, not people who want to do things that positions of authority are supposed to be achieving. So that really affects a lot of the things that I do. I really cannot stand if someone tries to tell me something from a position of authority or if someone tells me that things have to be done this way because those are the rules or that the system works this way and therefore it makes sense to do things this way. I don't accept...I can't accept those justifications for anything. And so a lot of my behavior gets driven by this kind of very deep reactionary sort of flipping out that happens when someone tries to tell me you’re allowed to do that thing. Or actually this thing which would benefit society well, we can't do that because, you know, these are the rules and these are the people that are in charge and so on. So that really riles me up and it also gets my creative juices flowing and tends to make me find ways to get around the system. So that's kind of one thing.

A more external thing is just human suffering. So I'm actually...it's weird because I'm a very un-empathetic person in that I've had to really teach myself how to be empathetic. And it's not that I'm...I haven't actually learned to be empathetic as an adult. What I've learned is this is what...I basically learned what other people might be feeling in lots of situations and I try and, like, act in a way that takes that into account. But I'm very bad at reasoning about what other people might be feeling unless I've been told. I try, but I'm terrible at it. I try and get better at it, but I fail. But in just learning and asking and trying, you can actually sort of be outwardly empathetic without internally having the machinery for it. But for some reason, what does really deeply affect me is a sort of more global idea of especially suffering that I just...I'm very deeply moved by the fact that my life is so easy compared to so many other people in the world. And when you actually observe what that means, like what that real difference is. So I've not traveled particularly far, but I've been spending some time in Africa, even just traveling around Europe. I once, with Steph, my fiancé, and some other people, we cycled around Europe 14 countries in 90 days sleeping rough. Wild camping the entire time. And that was kind of eye opening because Europe has actually got a lot of poverty. And those...like seeing that kind of thing, but also just thinking about my privilege really makes me want to do something about it. I kind of feel that one of the best uses of any skill that I might have would be to make it so that other people don't have to struggle to get access to the same kind of life that I've been able to enjoy. so that really drives me. I mean, fundamentally that drives me in everything. That's like the reason that I choose the projects that I choose. And I also try and guide my decisions in all my projects using that. But then the kind of anti-authoritarian thing and that interact together to mean that what I end up doing is picking projects where I can screw the man at the same time as liberating or giving something to people who are being screwed by the man. That's my kind of thing.

Joey: Oh. Brilliant. That's really a perfect answer. And I think it's clear, you

know, that a lot of stuff that you do is driven by trying to even up the field or not even evening, but create equity. So that's kind of [0:35:21]. Cool. So just...I guess I'll [0:35:29] transcription. So I'm going to kind of move on. So if you weren't in academia, what would you be doing?

Richard: I'd probably be in jail. In all honesty, as a...as a teenager, it was a very serious fork in the road for me that I could very easily have become a career, like, I don’t know what the word would be. But I would be some kind of criminal and I'd be doing some kind of...as a teenager, I was so disenfranchised that I...I seriously considered, like, just...just forget about society or at least what it expects or would allow me to do and just spend my time doing things that are really really fun and also fuck society over as much as possible because I really...I was really frustrated as a teenager. I had no...I didn't understand myself very well. I was at serious risk. The problem was I had, through a series of unfortunate accidents, become quite technically skilled at various things to do with computers and network security. And so there was a serious risk that I could have gotten myself in a completely life-destroying trouble. Luckily, that didn't happen and I only got myself into life-changing trouble and was able to sort of turn it around and say, well, actually, I'm going to [0:36:59].

Joey: Oh wow. Great answer. And then is your intention to become a professor?

Richard: No. Not at all. No. I think it's actually quite important to not have that intention because a very small portion of people in science are going to become professors. It doesn't seem like a particularly interesting or glamorous job to me. The main thing that you get from it is respect arbitrarily for your authority, which irritates me very deeply. But also...I mean, it...I think being a PhD student is about as fun as science gets because, especially if you get to be a PhD student the way I have, which is that my supervisor has been extremely generous in allowing me to follow my own intellectual whimsy. I just...I've done whatever I've fancied as long as I was producing good outputs. And I've figured out a way of doing that. And so to me, my PhD has just been an adventure in exploring whatever I wanted to. Literally I've had no boundaries except that I've had to just produce things that tick certain boxes. And that has been amazing. But if you progress in science, you become a post-doc. You're working for someone then. Someone actually tells you what to do. Almost...there are very few people who will ever spend a lot of their hard-earned research money on employing you and then say, you know what? Just do whatever you feel like. There are a couple because some of them have found me. And I do have the option of doing that, but I don't think it extends very far into the future because the further up you go, the more time you have to spend doing administrative stuff. Because fundamentally, you're going into management. This is true of all...a lot of jobs, the way to progress is to go from doing the thing that you cared about and have the skillset for to something which is actually a completely different skillset, which you probably don't care about but is the only way to add more money and respect. So people become managers, even though they're really software developers or designers or artists or consultants or whatever. They end up being crappy managers. And I think we have a lot of crappy managers in science because people don't realize they're bad at it. They don't seek out training, and the institutions don't give them management training. I don't want to be a professor at all. I think it's [0:39:18].

Joey: Nice. Cool.

Richard: I don't know what I want to be, but I want to carry on making decisions on a very short-term basis and have a lot of fun doing it.

Joey: I mean, would you consider ever going into, like, making a startup?

Richard: Yeah. I definitely...you know what? I didn't really know what a startup was until the second year of my PhD, and it was completely life-changing for me when I discovered Hacker News. So Hacker News is this...I know you probably know Hacker News. But Hacker News for others is this website. It's a forum run by Y-combinator, which is a venture capitalist firm who run a kind of summer camp for people who are starting technology companies. And they take people who have got these early-stage companies and anything from an idea to an existing company, and they help them just be the best company that they can be through a very intensive summer process. They've done this lots of times and been very successful in lots of huge companies and lots of not-so-huge, but very happy, companies as well. And some have tanked. But as a community, they’re tech people who are interested in bettering themselves and they often have interesting things to say. Or [0:40:36]. So this forum called Hacker News where people post stuff about technology, about startup culture, and I just started reading it because I got bored with other tech places like slash dot. And I found it and it was completely life changing for me because there was this whole community of people who were like me in lots of ways. They were quite anti-authoritarian. That was very clear that they weren't interested in succeeding by other people's rules. They wanted to succeed on their own terms. They were interested in making things, which I love doing. And they were interested in just ignoring the preconceptions that you're expected to have, and then trying to think about how to do something and then just doing it. But a connection I hadn't made before is that ideas are incredibly cheap. A lot of people around the world are having wonderful ideas about how things might be done every second of every day, and if you have an idea, chances are thousands of people have had it before you. Or if you were lucky enough by chance to be the first person to have it, that's nothing special or important. What's important is taking your idea and doing something valuable with it. And I had not internalized that yet until I saw Hacker News where they have this...a tradition, I guess I would call it, called Show HN. HN being Hacker News. People post a new post and they start the title with Show HN. And then the description, a very short description, of their project that they want to show people. And it's usually software or a website or something like that. And it just blew me away that people would spend the weekend or sometimes five years developing something, and then they completely bare their souls at Hacker News and sometimes get torn to shreds, but more often than not, they get a bunch of useful technical advice and some praise and a bunch of connections with other users. But it really made the difference to me, seeing that. I think it's just fundamental to the startup culture that you just do things. You move fast. You have an idea... it's worthless unless you do something with it. And once I internalized that, my life really changed, actually, and I started doing projects that affected the things that I cared about. And that's how I'm here now, really because otherwise I'd probably still be a suffering PhD student.

Joey: Great. That's really perfect. And how do you keep finding time to keep up

with all these things? [0:43:01], but also like how do you find time to read all the content that's out there that's sort of informing your interests?

Richard: I spend a lot of time in front of the screen, and also my...I think I just have something that's fundamentally broken in me that my down time is...is...is thinking or making stuff, usually on a computer. So bizarrely, I have [0:43:28] at a family life. I have my fiancé Steph. We have a house together. We have baby now that's coming up to 5 months old. We have four cats and a dog, and all of those responsibilities take a huge chunk of time and effort and energy. But for me, the way that I relax is by sitting down and writing a program that solves a problem that's been irritating me for ages. Or just reading anything. As a teenager, my nickname amongst my group of friends was Rikipedia. Because my name is Rick usually, but I just obsessively would read the Internet in any spare moment, and I just knew Wikipedia really quite extensively and would tell people when they were factually wrong about things. I don't know how I find the time. Actually, I do know some of the things. I spent several years panicking about I have all these interests. I need to really, like, focus on productivity. I need to learn some methods of being productive. All that stuff is just nonsense. Like, you do need to have some kind of process, but it doesn't have to be designed by someone else. The thing that matters is figure out what things matter to you the most. You just need to be able to sort and filter. Like if you have two functions that you can apply to the things in your life--sort and filter the things. Filter out the things that are actually not important or not important any time soon, and then sort the remainder so that you focus on the things that are most important right now. But also you have to understand how you are motivated, and for me I am motivated by immediate deadlines. So I'm not very motivated by “this thing's due in six months. It'll take six months of work. I'd better start on it now”. I'm motivated by “this thing's due in two weeks and it takes six months' worth of work. I'd better finish it in two weeks”. That has, for some reason, worked out for me over and over again even though it's been quite stressful and I should really stop doing it. Because I know that it creates a lot of stress for Steph, who has to see me be intensely stressed out about these deadlines I've left way too late. Essentially I work by...I just collect all the projects that I love, and I try and filter out the ones that I think are going nowhere. If something is beyond me, which I've increasingly started to accept, like, one of the things that I've started focusing on is building a community who obviously cares about it and are better able to look after it than I am. So if I have an idea, a great way to act on an idea is to just collect together a bunch of people who also might care about it and have time or energy or resources to do something. And so a simple act of organizing can seed a project that you're involved in. In my case, bioJulia is a really good example. I wrote none of the code for bioJulia. I've had a bunch of discussions, and I've done a bunch of thinking about how the community and project might be sort of designed to achieve the goals that we want to achieve, but I've written very little code and actually all the work has been done by people far more brilliant than I am at programming. And realizing that I couldn’t do it was a huge thing. I think it would have been a terrible project if I'd tried to do all of it myself. It would have gone nowhere, in fact. So yeah. Community is basically how you can be productive and make as many of your ideas into reality as possible. And I think something I've recently started discovering is that Mozilla fundamentally gets that. I didn't realize that many people fundamentally got that, but Mozilla is kind of built on that. So if there's some great way we can change the world, that's fantastic. But we're not going to do it. All we do is give a voice to people who think it's a good idea so they can create a community and get on with doing something about it.

Joey: Great. All right. Just a few more here. So can you talk about how hip-hop

and open science are related?

Richard: Yeah. I could talk about that all day. Many days, actually. Okay. So I think hip-hop has a bad rap. See what I did with that? Hip-hop has a bad reputation because...well, because actually because of the best things about it. But some of the best things about hip-hop come out in a bad way. Hip-hop originates from ancient and culturally extremely developed African civilizations that have been long ago destroyed and dismantled and exploited by colonial powers, and their peoples exploited and dehumanized all over the globe to advance colonial interests. But whilst people were being shipped off around the globe during the slave trade, and they were forced to do all kinds of things that people should never be forced to do, what was not taken away from them was their culture, their history. That was never forgotten. And there's something very deep about certain kinds of rhythm that for me, I can't ignore a hip-hop beat. I first heard hip-hop at something like the age of 10, and when I was like “this is actually a kind of music!”, and I realized that pretty much all the music I'd loved most in my childhood turned out to have been hip-hop, and I didn't realize. And once I had the Internet, and I was like, “holy shit, this is all hip-hop. Hip-hop's a huge thing and I can just download loads of hip-hop and listen to it”. Well, so very, very far back in human civilization we've been exploring rhythm and music. And in African culture, for tens of thousands of years that's been important. Hip-hop really is a musical art form that is focused on that. So the music is about rhythm. It often is manifested with a particular kind of beat. And then rapping, which is one of several elements of hip-hop, is about the spoken word, but it's about using the spoken word, and the human voice as a percussion instrument to express meaning in a more complicated way than you can possibly do without using the human voice. I think this is something that has been misunderstood culturally, or at least has failed to be grasped culturally. And very few other musical genres do such beautiful things with the human voice as hip-hop does. So okay. So we're getting a bit off track.

So I said that hip-hop has multiple elements, one of which is rapping. MCing. Another is DJing, and DJing is really quite interesting. People probably think of DJs as people who get up in clubs and play music for other people. That's not what DJing is at its core. DJing is about exploring the history of your own culture and selecting things that have been expressed in a way that you think captures something that you want to say, and then combining those things that you've extracted from the history of your culture together to create a new expression. So DJing is about combining bits of music together that already exist to create a new bit of music, but it has a very, very rich culture and a very rich history, which is really about respecting what people have done before you, respecting the creativity and intelligence of people who have come before you, taking what they've done that you think is amazing and using it to create something that is incrementally getting more and more amazing as time goes by. Something really cool in hip-hop culture is that it's a very respected thing to be able to identify the historical lineage of beats, of music idioms, of quotations and of samples. Samples being music that has been taken from a previous bit of music. Respecting the history of your culture is a huge thing in hip-hop, and I think that’s very important. It's extremely similar to science where citation, showing the origin of your ideas, and the facts and ideas that you've used to reach your conclusion, that is exactly what's happening in a hip-hop song when a DJ mixes together samples. When a rapper uses certain kinds of cadence and rhythm that are actually, if you studied rappers historically, then you would be able to tell when some rappers, even when what they're saying might not seem very interesting to you, their cadence or the words that they're using or the particular rhyme scheme is a reference. It's a way of saluting people who come before.

So something that is true in hip-hop, which is not true in science, is that really anyone can be involved in hip-hop. Science does not have that. Science has a very strong exclusivity about it. Science thinks it's more important than it is, and the people in it think they're more important than they are. Well, people in hip-hop - because of the history of especially black culture in America, people of color have disproportionately bad access to resources - ignore resources, educational resources, all kinds of things. So what you hear in hip-hop mainly is people telling you what their lives are like. It's a social documentary that is extremely vast and complicated, and it tells you that people are suffering in the world today in first-world countries. And when people are talking about drugs and guns and prostitution, misogyny, these kinds of things, it's because they're telling you what their lives or what their environment is like. And I think it's brutally honest. Maybe it's not worth always hearing the same explanation of that kind of thing over and over again. And some people are able to be descriptive about that without irritating white people who have fragile sensibilities. But fundamentally, it doesn't matter how cool you are. It doesn't matter what color you are. It doesn't matter what education you've got. Hip-hop is just a way of telling people about anything that you want to say, and it brings with it a very rich cultural history that involves respecting what's come before. Science has the rich cultural history of what's come before. What it doesn't have is that anyone can get into it regardless of their economic status, education, race, color, all of these things.

We have a severe access problem in science and I actually think that hip-hop is quite a nice route into solving that problem. My favorite thing that I saw at MozFest, which is just fantastic from beginning to end, my favorite thing was about hip-hop in hacker spaces - hacker spaces being places where people who like programming go to make things. The session was about how people of color feel fundamentally unwelcome in those spaces by virtue of standing out as being clearly different from all the other people there, who tend to be white or sometimes of Asian origin and generally all wealthy, generally all dressing and acting in a certain way. So anyone who's different from that feels unwelcome.

And a very cool approach to that problem was being used in a project called MossCode. And MossSide, which is where MossCode is based, is an area of Manchester that is, by UK standards, extremely deprived. It has a high level of violence, crime. It has, again by UK standards, a high level of gang activity and it's just a statistical fact that if you grow up there, your prospects are relatively poor. And so MossCode is about expanding the prospects of people in MossSide, young people in MossSide, by connecting to them through hip-hop. Because hip-hop has a lot of connections to programming as well. Programming has a history of citation, of respecting what's come before by reusing code that other people have written. But more interestingly, hip-hop is algorithmic. So hip-hop is about: “I create something small and clever, and I repeat it in a certain way”, which is fundamentally how programming works. Programming is about I build a small element, which is clever, but on its own, it's not very interesting. When things become really amazing is when you lay lots of those things together, repeating them all in different patterns and different frequencies… that's how computers work. Why we have the internet and smart phones and all the amazing technology we have today is all those little clever things that get repeated. Hip-hop has exactly that in its beats, in its rhymes, and in its culture. And so MossCode is this cool project that's about “can we teach people...rather, can we reach people”. There's these people who are actually incredible. If you were to talk to kids who are writing hip-hop lyrics or making beats today, they are insane. They're insanely clever. They're cleverer than me and they're cleverer than you, and they're cleverer than almost everyone in science. And if we were to give them access to science and enable them to... and if we could convince them to be interested in what we think is interesting, which maybe isn't important enough for them... but if we could do that, then they would do a much better job than we can. So MossCode is a great way of doing this by telling people... taking these kids who care deeply about hip-hop and saying to them, “What are you interested in?”. And they then tell you about some aspect of hip-hop. And without fail, you can map it to some aspect of programming or science, and you can use that aspect of programming or science to then analyze or get a deeper insight into the hip-hop, which is what they really want to do. And it's not about teaching them things, because we don't know more than them. They know a lot more about hip-hop, and sadly, even though I've been studying hip-hop for 20-something years, I still don't know anywhere near as much about it as someone who's lived it their entire life. And so it's really just about tell me what you love, and I will just give you any information I have that can help you explore that more. And I think what we'll find is that a lot of the outcomes will be people doing incredible things that would have not happened before.

Joey: Wow. I missed that session, but it sounds like you...you had the best one.

Richard: I loved that session.

Joey: Yeah. And the same thing. How are hacking and science related for you?

Richard: Okay. So...well, hacking...there are a lot of things going on in hacking. Actually, hacking has a lot of the cultural...the cultural similarities with modern science in the way that it's broken. Hacking values knowledge, especially knowledge that has never been previously discovered, extremely highly. So lots of people think that we like to argue about what hacking really means, but to me, the two major definitions which people like to give, which is gaining illegal access to computers or computer systems and tinkering with things to make clever, small projects, they are really quite closely linked, at least in my own conception of it. So in order to gain access to a computer system, or to do something fundamentally clever that astounds people around you by how clever it is, you have to think of things that nobody's thought of before, or at least things that nobody's expecting. That's really what we have to do in science as well. We have to...we have to take a huge amount of information in, which if you don't already know, to be able to come up with a new way to break into a computer system that's been used by millions of people and tested and secured by millions of people, that can take an incredible amount of ingenuity and research. And the skills are really quite mappable between science and hacking. But the rewards are quite different, I would say. So there is a lot of attention to prestige in both cultures, but hacking is just fundamentally more playful. And it's because money's not involved, or at least it's not heavily involved. In science, there is a pool of funding. People have lives and they have to...they have to support their families and themselves. At the end of the day, they will compromise for the incentives. They will compromise so that they can have a roof to sleep under. Hacking tends to be done by people who don't need to make that kind of compromise, for whatever reason. They've got a day job, and then they do the hacking in the evening. They don't have a day job and they're living off the state or something, or they don't care about having a day job because they just enjoy hacking so much. Whatever. These are people who are not motivated by money; they're motivated by discovery, intellectual curiosity, and often hatred of authority.

Joey: Bravo. And I think just the...I've got one question on dance moves. Maybe

just to sort of wrap it up. So what are the major influences of projects that are influencing you now or have in the past. Workshops[?] and people.

Richard: So ones that I’m doing or involved with, or ones that are externally [1:03:52]?

Joey: Both. And I guess what are the projects that are sort of up and coming.

Can you give us a little preview of what's been brewing?

Richard: So in science in general, I think the exciting projects all come from people who are trying to hold us to higher standards as a community. That's really it. That's all it takes for someone to do something really quite extraordinary or to create a great project, is to hold themselves and other people to higher standards and then think, well, how can you enable that through something, technology, that falls into a community or policy or whatever. I love small experimental pugnacious publishers who are challenging what we think of as how we should be sharing science. Because, for those who don't know… What happens in science is scientists spend years coming up with something, spending a lot of public money in the process coming up with some fact that they think is true about the world, and then they write up a complicated document that uses a lot of unnecessarily long words to say the thing that they think they've discovered. And then a publisher says, well, I'll tell you what we'll do. We'll put it on our website. Yeah. If you give us £5,000. Which is so insane because obviously putting things on a website is free. I mean, hosting a website in the modern world is so trivially cheap that it is actually free at the point of doing it for almost everybody who tries to do it. So publishers are charging us £5,000 for a service, which is not a service. And then they charge the public a huge amount of money to read it. So publishers who are really innovating and holding themselves to the highest technical standards, trying to be efficient and not maximizing the amount of money that they can suck out of the public, but actually just provide the best service that they can to science and then get out of the way and not try and do anything else, those people are just heroes. Because everybody else in the publishing game, the people who have been in it for a long time, they love inefficiency and they love just getting the most money they can for just no reason, even if it's not profit. They'll charge money and employ more people and use up that money doing nothing. I don't understand how it works. So I hate Elsevier and I love the PeerJ. The PeerJ are just exemplary in so many ways, and Elsevier are just examples of bad behavior in almost every form. And there are lots of other things. I actually think things like Github, a lot of the technological layers on the Internet really enable science to do things that weren't happening before. And they enable access that wasn't there before.

And Software Carpentry, that's a really awesome project. So Software Carpentry is about a pretty simple thing: just teaching scientists who are writing code to do it well using things that we know from the tens of millions of people who have been writing code for a very long time. Amazingly, we don't learn how to code properly in science. We just start doing it and teach ourselves. Software carpentry is just saying, well, okay. Let's just take a week and help you learn some good practices. But they not only do that. They take very seriously what we know from research about teaching to try to help people learn most effectively and not waste their time, and they take very seriously access, accessibility, inclusivity. So they try very hard to break down some of the barriers that prevent people from breaking into computational science fields by making their stuff accessible. And it literally is just that act of caring about it and thinking about it that is going to make science a better place in the future. So pretty much any project that's doing that.

Joey: Great. And I think...yeah. I think that’s probably as far as we can go.

Richard: Cool. Yeah. I think we've gone for a long time.

Joey: So thanks so much.

Richard: Thank you, Joey. I'm sorry that I just went for it there.

Joey: Yeah, no. That was super nice.

Richard: That was a lot of words.

Joey: [1:09:02] questions. I'm going to kill the recording now.

Richard: Cool.

Joey: Over and out.

1:09:08

[*End of recording*]