

## Pathways Podcast Season Three, Episode Ten – Alumni Insights: PhD and Research

**Adam – 00:00** Hi everyone, and welcome back to another episode of the Warwick Chemistry Pathways podcast. My name's Adam and I work here in the Department of Chemistry, and as ever, I'm joined by our co-host and Director of Student Experience, Tom Ritchie. Hi Tom.

**Tom – 00:19** Hi everyone.

**Adam – 00:20** So, it's June, the end of the academic year is just two weeks away. And graduation is just around the corner. It's a time of year when our students are often, thinking about next steps in new chapters. So, with that in mind, we have two guests on this episode who've been in the exact position themselves, both have progressed onto research studies that have to finish in their Warwick degrees and are now busy pursuing their PhDs. We welcome back Warwick Chemistry alumni, Francesca and Rory. Hi both.

**Rory – 00:48** Hi, pleasure to be here.

**Francesca – 00:49** Hi.

**Adam – 00:50** Yeah, thanks for joining us today. It's great to have you back talking about your experiences. I know our listeners are keen to hear from you, so let's kick off with some introductions. Let's start with Francesca, can you let me know a little bit more about yourself, and about your Warwick journey, such as when you were here and what degree you studied.

**Francesca – 01:09** Of course. Yeah. So, I started in 2017 and I graduated in 2020. Bit of a rubbish year to graduate, but you know, we make it work. I did the chemistry of Medicinal Chemistry course. I absolutely loved it. I was really involved with Chem Soc during my time at Warwick. And I was the Ball Coordinator in my final year, so I organised the ChemBall 2020. Luckily, we managed to pull that off before Covid became a big thing. So, all the hard work paid off.

**Adam – 01:40** Amazing. Glad to hear you squeezing the ball before the pandemic shut everything down just about. Great to hear from you. How about you, Rory?

**Rory – 00:48** Yep. So, I started in 2018. So, I started my master's degree and graduated last year, July 2022. Yeah, it feels like a long time already since I graduated.

**Adam – 02:09** That's great. Thanks both. It's so good to have both of you come and join us today. So, let's kick off with some questions. I think it'd be great for our listeners to hear about what motivated you to pursue a PhD after completing your degree at Warwick. Francesca, how about you?

**Francesca – 02:26** Well, for me, this is kind of a long story. It's, it's all about like, As I said earlier, when I graduated in 2020, it was such an awful time to try and find a job.

People weren't really advertising graduate jobs anymore because pe other people were being furloughed and were more desperate for work than I was, and were more willing and have more experience. So, the interviews that I did do, I was always beaten out at the last opportunity by somebody who wasn't a fresh chemistry graduate. But also, I didn't really enjoy doing my chemistry lab work during my degree. I found it incredibly stressful. I just didn't like the lab environment. I just, I thought that lab wasn't for me. So that also limited me on the types of chemistry graduate jobs I could apply for.

And I found myself thinking, I don't really want to go into a school at this particular point in time because of Covid. I don't see myself as a, as a schoolteacher, so what can I do? And I, I was looking for work, and then...the whole reason that I followed chemistry in the first place was because my chemistry teacher at school inspired me so much. He pushed me to be the best that I could be. He told me uncomfortable truths when I needed to hear them and like his instruction and his guidance is really what's made me the person I am today. And I just felt like I wanted to make him so proud. But when I was in my first year of uni, I actually found out that he'd been diagnosed with bowel cancer, which kind of hit home a little bit. He was a relatively young guy. He had very young children, and I was like, this isn't fair. And then unfortunately just before I sat my second-year exams, he passed away and it really made me want to try and do the best that I could because I knew that there was like a legacy that I wanted to carry on and inspire other people in the same way that he'd inspired me.

Fast forward into looking at chemistry jobs and in early 2021, my, my dad was diagnosed with colorectal cancer and I stopped job hunting so that I could take him toward his appointments and be there for his treatments and like just generally support him however he needed, but also so that my mum didn't have to give up her time at work in order to do those things and sacrifice pay.

So, I did that for a bit, and it was rewarding knowing that I was helping my family. But I also found it quite frustrating feeling like I was sitting around letting cancer control my life. So, I started researching, cancer biology master's degrees, and I found one really locally to me. It was about an hour down the road on the A12 at the University of Essex, and I got in contact with the Course Director. I decided that it was what I wanted to do. I asked my family if they would support me in doing it and if I could stay living at home rent free. And they supported me pursuing this.

So, I started, I was really worried coming from a Chemistry background, I was so worried that I would struggle. Actually, I excelled at Biology, at cancer Biology more than I ever did at Chemistry. And I think it's just how my brain was wired. So, yeah, I just, I knew within a couple months of doing my masters I wanted to stay on at Essex and do a PhD research project in cancer, genomics, proteomics, sort area, with an element of computational biology is what I look at. So yeah, for me, it was quite a personal motivation behind pursuing a PhD, but I think with the area that I research, you need that sort of personal approach to it. Cause you just, yeah, I don't know. Its hard to put into words sometimes.

**Tom – 06:34** Thanks Francesca, I mean that's a really. That's, that's a really personal story that you've shared, and I think it's really interesting listening to what you're saying about having that real focus and aim with what you want to do. I want to pick up on a point I found really interesting where you said, 'I went to do biology and I realised that's just how my brain was wired'. And I think that's a really important point that we want to get across to kind of current chemistry students and those who are going to be graduating soon, is that yes, you've done a chemistry degree. You know, you'll have your BSC or your chem. But that doesn't mean that you are limited to just doing this; the skills that you will get in your chemistry degree will allow you to go and do so many other things. And, and it's actually realising that the world is, it's that cliché, but the world is your oyster at this point. You can go and choose things that you want to do, and, and I think your story is such a kind of powerful and, and kind of incredible example of that. And, and just wanted to say thank you really for, for sharing it with us.

**Francesca – 07:33** Thank you. Yeah, I think if you find something that you're passionate about, it doesn't matter what your previous experience is, you just need to try your hardest and that's all that matters.

**Adam – 07:43** That's great. Thanks so much for sharing, Francesca. It was really interesting. How about you, Rory? What motivated you to go on to do a PhD after you finished your degree at chemistry?

**Rory – 07:53** Oh, wow. How, how do I follow up from that? That's, that's really good, really inspiring. So, I just started start with a little bit about what my PhD is in, so, unlike Francesca, I guess it's, it's sort of maintaining the, the chemistry aspects, but sort of in the context of nuclear medicine. So, it's, it does have an aim sort of for particularly cancer radiotherapy, and so I'm studying a PhD at King's College London. And day-to-day I'm sort of based at St. Thomas's Hospital, which is sort of in the heart of Waterloo, Westminster area. And I'm developing new sort of radiopharmaceuticals, sort of from the ground up really, and analysing their suitability and diagnosis and therapy. And really sort of where my, main points of inspiration came from, was that during my, MChem year, so my fourth year of my integrated masters, I worked in the lab of Professor Peter Sadler.

So, he's, you know, a big name in the metals in medicine field, I guess, you know, bio inorganic chemistry. And I was working on kind of Platinum four photoactivatable complexes for cancer chemotherapy. And I think this work really was a great introduction for me into the sort of the field of medicinal chemistry.

I mean, I guess it's a bit of a cliché to say, but it was always something like, I always kind of had it in my head that I wanted to work in something with clear real-life application. And I was quite lucky really in that my chem supervisor. So, it's a woman by the name of Chinzia Bertini. So, she was my sort of primary supervisor during this work within the Saddler group. She was a former PhD candidate at Kings, so she was working in a very similar sort of field of nuclear medicine, and she was really instrumental in sort of helping me with my application, and help facilitate some correspondence with my then prospective supervisor.

**Adam – 10:09** That's great. I mean two very different stories, but I think it really demonstrates kind of the networking opportunities and seizing the most of what life really throws out there for everybody.

And yes, it might be personal motivation, as we've seen with Francesca, but also, I think the opportunities that you've found Rory as well have been just as valid. I think it's probably representative of how students move on and the opportunities that they find. So, thank you so much for being so candid and sharing those, those experiences with us.

So, for any listeners out there and for our current students that maybe thinking of applying to do research studies, can you talk about the application process? Were there any challenges that you faced? How about you, Rory?

**Rory – 10:53** My PhD is, is funded by what's called the Engineering and Physical Sciences Research Council, so the EPSRC, and they have a program through, the Centre of Doctoral Training, or CDT, all the acronyms called, Smart Medical Imaging.

And, so for the application process, I had to submit a cv and write a sort of 200-word motivation letter, sort of briefly explaining my, my motivations for pursuing a PhD as well as choose three projects in order of preference that the supervisors sort of devise and propose to the CDT.

Once I'd sort of had this stage accepted, I then went through to the interview stage with two separate panels, and the first one was kind of a general CV interview where I had to talk about my motivations for doing a PhD as well as sort of having some questions about a presentation that I had to also work on.

Then the next part was like a discussion on a recent publication within the field where I was asked sort of questions about the nitty gritty science of, of the work. One thing I'd like to stress really as part of the, the sort of the challenges and you know, for anyone that's thinking of applying for a PhD is that it's always worth getting in touch with the prospective supervisors ahead of time to get some sort of insight into the project as well as potentially the environment that you might be working in.

**Adam – 12:27** That's great to hear. Thanks for sharing. How was your experience, Francesca?

**Francesca – 12:31** Well, I got into my PhD through a completely different route. I am classed as a self-funded student, so, I came up with the idea for my project. I wrote a project proposal. I submitted it directly to the university. I specified who I wanted my supervisor to be and yeah, I just had like an agonising two month wait where I just had absolutely no information on what was going on whether they were even reviewing my application or not. But yeah, so I wrote my proposal based on my master's research, I came up with my own project, so it wasn't a fully formed project that I was already applying to work on that somebody else was already working on. It's completely my own idea. But that does come with the caveat of not, of being self-funded. I luckily obtained student finance, England's doctoral loan.

So, for the three or four years of the PhD that is just shy of 28 grand, which doesn't add up to a lot, when you bear in mind that you've got to pay your university tuition fees. Most universities often want you to pay a bench fee as well, which is like renting the bench space in the lab, but also paying

for all the consumables and the reagents and stuff that you're going to need to use during your time researching at that university.

So, I think I've got some statistics. I think bench fees can cost up to 10,000 pounds per year, but for a project like mine that's, some wet lab, some dry lab Essex charges about £4k. So, it's, it's a lot of money on top of like a 6,000-pound tuition fee for the year. Luckily, because I did my masters with Essex, I'm allowed to use an alumni discount, which is based on my grades. So, because I got a distinction during my Masters, I'm eligible for a 33% discount on my tuition fees, but only for the first year of my PhD. So, the biggest challenge I faced whilst applying was firstly the weight and like the, not knowing the stress of being in limbo, but also just not knowing how I was going to afford to pay for my studies.

Like I had to quickly work out that actually I wasn't going to be able to rent somewhere. I was going to have to ask my parents to live at home again for another three or four years, and I was going to have to resign myself to commuting an hour each way every day. So that was the biggest challenge, definitely for me, along with finding money to fund things and be able to live comfortably.

**Adam – 15:13** Thank you so much. I think it's really interesting, again, just how different both your experiences are. And again, it's really representative of the opportunities out there when it comes to progressing into research studies. So, I realise you're both relatively close to the start of your PhD experiences, but has, has there been any highlights or breakthroughs or any discoveries that you've found so far?

Rory, shall we start with you?

**Rory – 15:39** Yep, no worries. So yeah, as just to echo what Adam's just said, I'm still in the very early stages. For me, sort of personally, a lot of my work so far has been quite heavy on the organic synthesis front for what I'm working on. And for anyone who might be familiar with this, they know that it can be quite a long, painful process. I can see Francesca nodding her heads along to that.

However, it can also be quite rewarding when things go well. And where I'm at currently with my PhD, I'm potentially, fingers crossed, approaching a bit of a breakthrough in the coming weeks. So, I'm edging towards sort of synthesis of one of my final products.

So far, it's sort of just been satisfying really to manage, to get through each step of the synthesis that I've got up to thus far. So, when you spend so long trying to get one step of a six-step synthesis to work it, it feels extremely rewarding when you finally get there. So, I think like you really have to sort of cherish the, the little victories when doing a PhD.

**Adam – 16:59** That's great. Thanks for sharing. How about you, Francesca?

**Francesca – 17:02** I have to admit that I think one of the most rewarding aspects for me so far, again, being very early in the process, is actually the conversations that you can have with people when they find out that you're doing a PhD. Generally, people want to hear about my research, especially when I say that I'm researching cancer, and it's great to have those conversations with people and help educate people, even just the smallest bit for five minutes out of their day. There is so much

misinformation about cancer and just about diseases and things in general that we...like having a five-minute conversation just on the side of the street when someone says, oh, hi, what are you reading there? Oh, it's actually a paper for my PhD research. It's just so rewarding. But I think other than that one of the things that I have enjoyed the most is the opportunities that I've been presented by doing my PhD. I'm actually presenting my research at a conference in Bulgaria at the end of the month.

**Adam – 18:01** That's great. Thank you so much for sharing both of you. So please tell me if you've had any surprises or unexpected insights whilst doing your PhD studies. Francesca, shall we kick off with you?

**Francesca – 18:12** Yeah. Well, one of mine is actually just a kind of a little small surprise. So, I mentioned earlier that I really didn't enjoy doing my chemistry labs when I was at Warwick, but I've actually found out that I love biology labs. Like as I said before, it's this little niche that I've found that I'm really excelling in, I've just learned how to culture cells and I've recently been doing a pilot experiment with some gene editing based on CRISPR Cass experiments. I'm just preparing my first samples to send off for sequencing so I can find out if it's actually worked, how it was supposed to work. So, I'm just so pleased that I'm not like, dreading the lab every day and I'm, I feel, yeah, I just feel like I'm at home now.

**Adam – 19:01** That's amazing to hear. I think it's really important that you feel comfortable and at home in whatever you do. And I think that. Obviously translates into research studies as well. Rory, how about you? What about your experiences?

**Rory – 19:14** So, yeah, I suppose, despite what I said previously, I do enjoy the sort of the, the nitty gritty synthesis aspect of my work. I've discovered, I guess that I like putting together, for example, a drug molecule step-by-step, and I think there is, there is a great deal of satisfaction that goes along with that. But yeah, for this, for this reason, I guess involving myself more in, in drug development is, is definitely something of future interest, but at the moment I'm kind of just taking each day as it comes, and learning something new about the sort of the nuances of synthetic chemistry.

**Adam – 19:57** That's great. I think you mentioned there about being satisfied and the nitty-gritty and kind of the day-to-day life, and I think it's really important that any future plans, whether it's research studies, whether it's your job, or just life, that you actually receive some sort of gratification for what you do. Otherwise, it's going to make it really, really difficult. So, I'm really pleased to hear that both of you are finding your experiences really rewarding.

**Francesca – 20:21** It's important as well to say that undergrad teaching labs are not representative of what it's like to work in a research lab, like the experiments that you do in an undergraduate teaching lab, they have been tried and tested. They know that they're going to work, they've been optimised. So, I think a lot of the stress for me came from the fact that what if it doesn't work? It, it's

supposed to work. So, what if it doesn't work? That means it's my fault. I've done it wrong. Whereas in a research lab, you don't know what's going to happen all of the time. You don't...it might be the first time you are trying this experiment. Nobody's tried this experiment before, so you need to just do it and work out what went wrong and how to optimise it. And that is something that comes with years of experience. In a research lab like the CRISPR Cass experiments that I'm doing? Yes, CRISPR Cass has been around since what, 2012, and it won the Nobel Prize for Chemistry in 2020. But this slightly altered version that I'm doing is based on a CRISPR select paper that came out in early this year or late last year or something like that. So, like there isn't really anybody to say this is exactly how you need to do it, I need to do all that optimisation myself.

**Tom – 21:29** It leads me back to something that we talk about a lot at the moment with the review and redesign of our curriculum that we're doing is introducing spaces where students can fail because I think we have such an aversion to failure in in society. You know, because we live our lives in public, we are very, very nervous to be seen, to have failed something.

And actually, what you've both kind of alluded to is the fact that to make progress, you need to fail because you need to try something. And if you keep doing what everyone else has done relentlessly, you'll never find anything new in the modules that I run. There are moments in there that are intentionally designed for you to fail so that you learn that failing is fine.

And I think listening to what you've both said, That's kind of the point of a research degree. You have to just keep failing until you succeed. I think the idea of getting comfortable with failure is something I would recommend really highly to everyone get. Learn how to be comfortable with failure, whether it's in research, whether it's in life, you know, applying for jobs, whatever you are going to apply for 200 jobs probably, and get turned back from 199.

That's okay. That's part of the process...it's not okay. But that's part of the process. You know, that's, you have to go through that failure process, and I think if you can get comfortable with failure and kind of treat it like an old friend, then nothing can really stop you at that point because you're not nervous about failing.

**Adam – 22:49** That's great. So, I'm guessing we're coming to the end of today's episode, but we've got the kind of the killer question coming up. What are your future plans after your PhD? Rory, what's your thoughts?

**Rory – 23:03** At the moment, it is just sort of, I'm just thinking a little bit about whether I want to continue in academia or pursue work in industry or some sort of r and d role, I guess. I think one thing that at the moment I am definitely interested in is staying within the field of medicinal chemistry.

**Francesca – 23:24** I feel like I've very much come full circle. I think at the moment my initial plans will be to try and stay in a similar field to what I'm doing. So, cancer proteomics or genomics, with a strong computational element as well as a wet lab element. So, I want to try and find a postdoc working in a research group at a university. And then my end goal would be a lecturer doing my own research and have my own research group, and passing on that inspiration that my, as I said

before, my chemistry teacher passed on to me in the first place. And I feel like that would be the perfect way for me to carry on his legacy and continue inspiring the generations to come.

**Adam – 24:05** So, we might even see you back at Warwick Chemistry teaching some sort of medicinal chemistry.

**Francesca – 24:11** I'd never rule it out. Never say never.

**Adam – 24:13** So, thank you both for joining us today. The conversation's been really, really interesting.

I think you've managed to really convey your experiences and your journey from your experiences in Chemistry at Warwick, right through to what you're doing at the moment. So, thank you for taking the time. We do really appreciate it. I think it's probably worth saying for any listeners out there that are currently doing their chemistry undergrad degree with us, if they are thinking of doing research studies, get in contact with your personal tutor, have those conversations, make an appointment with the careers service. They're going to be available throughout the summer.

Thanks everyone. Bye for now.

**Rory – 24:50** Thanks for having me and thanks Francesca. It's really interesting and yeah, thanks everyone for listening.

**Francesca – 24:57** Yeah, and it was really nice to meet you, Rory.

**Rory – 24:59** Yeah, and you.