

## Numberphile Podcast Transcript

Episode: The Numeracy Ambassador - with Simon Pampena

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Speaking with Simon Pampena, Australia's National Numeracy Ambassador who once dreamed of being a Jedi.

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[gentle piano music]

Brady Haran [BH]: Today's guest is Simon Pampena. People who watch our videos will doubtless recognize Simon's wild curly hair and unbridled passion for all things mathematical. [music continues] His videos have been millions of times, including Epic Circles and the Legend of Question Six. But on the otherwise of the world in Simon's homeland of Australia, his career's followed an interesting path, from hanging upside down in trees attempting to be a Jedi to

analyzing the statistics of wine sales.

[music continues and fades out]

BH: Let me start by asking, Pampena? Where's that from, that name?

Simon Pampena [SP]: Well that name is from Australia because that's not the way it's actually pronounced.

BH: Yeah?

SP: I grew up thinking that it was Pampena [PAM-PEE-NA].

BH: Hmm?

SP: Because that's the Australian English pronunciation.

BH: Yeah.

SP: But it's actually Pampena [PAM-PUH-NUH] or in Italian, Pampena [PUM-PUH-NUH], so it's from Italy but my family came to Italy couple of centuries ago via Spain.

BH: Right.

SP: So I kind of look more Spanish but then my mum's Southern Italian which is more Greek.

BH: Yeah.

SP: So I'm Mediterranean basically.

BH: Very Mediterranean. So Simon how do you introduce yourself? Like, do you say Pampena [PAM-PUH-NUH], you pronounce it correctly?

SP: I do say Pampena [PAM-PUH-NUH] now, but there isn't a consensus in my family so some people say Pampena [PAM-PUH-NUH], some people say Pampena [PAM-PEE-NA]. It's one of things, when I was in Italy everyone got my name right.

BH: Yeah.

SP: And I was I getting it wrong.

BH: [laughs]

SP: So when I came back to Australian I was kind of... I started pronouncing it even with more of an... affectation. Like Pampena [PUM-PUH-NUH]...

BH: Yeah.

SP: You know, with the Italian accent and I was just annoying people and...

BH: [sighs]

SP: ...that wasn't good when you're starting a career of trying to get people to like ya.

BH: [laughs]

SP: So... I toned it down a bit. I kinda went a little bit half half. So Pampena [PAM-PUH-NUH] is what i say now.

BH: Do you correct people or do you just let it slide whatever they say?

SP: As long as they get my first name right, I consider that a win, so that's fine.

BH: So, you're born in Adelaide weren't you?

SP: Yes I was. Yes.

BH: Same as me!

SP: It's actually a really cool thing, it's great to be from Adelaide.

BH: I'm Adelaide proud, I think I'm more Adelaide proud than you are from previous conversations we've had.

SP: Well I've changed. I've changed.

BH: Yeah?

SP: Adelaide was just an incredible place to grow up for what you and I both are doing, it's like... it was perfect. There was nothing much to do.

BH: [laughs]

SP: We had access to, you know, the best kind of entertainment and education in the world, and if you had an idea of like doing something exciting you could... there was time and space to do it. So it's perfect.

BH :Whaddy mean nothing much to do! We got the Big Rocking Horse, got Mall's Balls...

SP: [laughs]

BH: There was Magic Mountain, Marion Shopping Center.

SP: So after a weekend of doing that [laughs] then there's time to follow your pursuits.

BH: [laughs]

SP: Let's say the weekend definitely were chock-a-block but then you know, maybe during the week, you know, you had time to do other things.

BH: So, as a child what were you like? Were you geeky? Were you really into mathematics? Was, you know, was the writing on the wall?

SP: The writing on the wall was that I was a geek absolutely. Everybody knew I as a geek. My cousins told me how I would get unusually excited about... things.

BH: Hmm?

SP: So you know, if we were... to do something remotely space oriented.

BH: Yeah.

SP: I was the one who was getting really excited about Voyager II visiting Uranus and the fact... the ABC... a national broadcaster was gonna have a special on it, and I was getting exciting and telling people.

BH: [laughs]

SP: I mean look I was a Star Wars fanatic.

BH: Yeah.

SP: And, you know, my story now I've heard plenty of times, you know, I was so into Star Wars, I so wanted Star Wars to be real and like I took a scientific approach and I studied the way that Luke, you know, was learning to be a Jedi in Empire Strikes Back and so I was tryin' to do the same thing and we had a peach tree out the back and I would hang upside-down from that and try and focus my attention the Yoda figurine and...

BH: [laughs]

SP: You know I was just trying to like... be scientific about having this ability to use the Force. Then what ended up twigging was that and it was... this was science fiction and there was this thing called science fact that was actually kind of more amazing.

BH: Yeah.

SP: Because you could do real things. So my imagination was prone to... [sighs] getting excited about like complicated awesome things that kind of eventually led me here.

BH: Do you know... Mark Hamill liked one of my tweets the other day? I don't think I've ever been more excited in my life. Like Luke Skywalker himself interacted with me.

SP: Hang on was that... was that the one that you baited him with?

BH: [laughs] I've baited him numerous times.

SP: [laughs]

BH: [laughs]

SP: Well is this the latest one? Was that the one with the chicken piece? The nugget?

BH: Oh, yes, yes. The chicken nugget that was the shape of the Millennium Falcon.

SP: That is well done.

BH: Which Star Wars film was your favorite?

SP: Which one do you think?

BH: Well... I mean most people like to say the Empire Strikes Back but...

SP: Hmm.

BH: I could see you being a Return of the Jedi man.

SP: Oh really!

BH: Yeah.

SP: Return of the Jedi is my chicken soup.

BH: Right.

SP: That's the one I go to when, you know, I've liked... if I'm feeling a little bit emotionally raw, I will go to that. But Empire was the first one I saw and that's the one that like I'm sure my parents lamented because, you know, they ended up having to spend so much money on those toys. Yeah that was the one that just

grabbed me and the... you know and the story telling and just... everything about it... then I discovered Star Wars after that and...

BH: Hmm.

SP: Star Wars has been the one that I've kind of grown up with now. Whenever I'm involved in something artistically or making something... education film or, you know, like a show or something. I always compare what I'm doing to Star Wars.

BH: Hmm?

SP: Just to kind of like... I've watched that so many times. I've tried to extract the juice from Star Wars, like why was it so good?

BH: Yeah.

SP: And yeah and for me one of the biggest things I took out of it as an adult was editing. That it really was like... a beautifully crafted film which you don't see because you see all the explosions and lightsabers and stuff. I think if you asked me what I wanted to do when I grew up, it would be I wanted to make Star Wars.

BH: So when you weren't hanging upside down from trees trying to use the Force...

SP: Mhm?

BH: Were you into mathematics, or were you just into more general science and spacey stuff?

SP: Yeah, like that's... [sighs] I've been asked this lots of times, especially by



kids 'cause you know I do a lot of school shows and they don't believe that I actually love mathematics and I really do and... you wouldn't be doing something like this for as long as I have if you didn't.

BH: Hmm.

SP: I was absolutely fixated with physics and, you know, Einstein's Theory of Relativity and I suppose I was into it a little bit because Einstein was so famous...

BH: Hmm.

SP: But you know, I was young. But yeah I can remember sort of really getting into it, really getting into like Carl Sagan's stuff, Cosmos when that was on telly in Adelaide, you know, like it was the most mind blowing thing I've ever seen on television and it was like... it was those sorts of ideas that kind of really encapsulated my thinking. And it was that kind of like that Star Wars feeling. You know, it's like okay this is the real thing. And I had a really... a great teacher in year 9, he was fresh out of... university. So he was like twenty-four and me and my mate Paul were both into science and we asked him what E equals MC squared was, and after class he just explained it to us.

BH: Yeah.

SP: And I was like... absolutely... like blown away. And we had a book on Special Relativity in our library, which is nuts. And nobody borrowed it. It's like the last time it was borrowed was twenty years before I borrowed it.

BH: Yeah.

SP: And it had a proof of E equals MC squared. A mathematical proof.

BH: Huh.

SP: Which is... it's really interesting, it's like... I studied that 'cause it's like it had this thing called binomial expansion which is kind of like expanding brackets for square roots.

BH: Hmm.

SP: So it's kind of... it's kind of a little bit bizarre but I could follow it as like a very precocious... what, twelve, thirteen year old. And I could follow the logic, it was like, they expanded the relativistic mass equation and they ended up getting like a conservation of energy and from that they worked out that there had to be a rest energy. So there had to be  $E$  subscript naught equals  $M$  subscript naught  $C$  squared. Which was the rest energy, so mass is equal to energy. And that I think was the first time I really even with a simple equation like that I really thought, wow, you can understand something absolutely sublime about the universe through mathematics and I think it's one of an important part of me getting so excited about is that nobody told me, I found it myself. I think that's part of being a nerd as well is like... you kinda stake a territory and you kinda own something and you... kinda revel in the fact that you know more than someone else in some sense.

BH: Yeah.

SP: Like I felt like I peaked behind the curtain and I saw all this maths running, all these equations that were creating the world. So... I started becoming like extra into mathematics. One of my nicknames, which I don't think was done with much love, was Albie, which was, some sort of shortening of Albert Einstein.

BH: That's pretty cool.

SP: [laughs] it is, but it was more when I was being... when I was getting

excited about problems in [laughs] in maths class.

BH: Also though, I mean, obviously any one who's seen you in our videos and the many videos and things you're in, you have like this incredible shock of hair which is really like, you know, striking looking, did you have like sort of Einsteinian hair then or were you a bit more trim?

SP: No... no. I was going to my mother's hairdresser.

BH: Right? [chuckles]

SP: So they were suppressing what was to become my signature look.

BH: Right.

SP: I mean like I was pretty nerdy... [chuckles] and in my shows I still show like a picture of me when I was fifteen and it's like... you know, the bum fluff above the lip and the braces, I mean like, seriously it's like when people are at their lowest point and their most insecure, parents like, you know, put braces on their kids.

BH: [laughs]

SP: Crikey, I don't know how we come out of it.

BH: [laughs]

SP: So yeah, so I... I was super super nerdy and... this thing that I discovered which was at uni my hair... kind of fits the type, right? It's like...

BH: Yeah.

SP: You know, it's kinda like the crazy scientist.

BH: Yeah.

SP: But, all that love and all that stuff I hope people see when, you know, they watch the videos that you and I've made together is like, that's pure me. That's kinda like you're not talking to me as like... however old I was... thirty. It's like, I'm still that kid when I'm getting into this stuff. So it's kind of special, it's like I can time warp back to that period in my life and have that enthusiasm again.

BH: So if I'd spoken to you when you were at an age, you know, in mid sort of teens where it's you start to actually seriously think about what do I wanna be when I grow up.

SP: Yep.

BH: Beyond, you know, astronaut or fireman, and you're starting to seriously think, okay what am I going to be.

SP: Yeah.

BH: What sort of answers would I have been getting in like high school, as you start making those decisions about what subjects to do and what would I have heard?

SP: Mathematical physicist. I knew that by year 9, yeah.

BH: Right.

SP: I knew I wanted to be a mathematical physicist, so much so that when it came time in year 12 to list what you wanted to do at uni...

BH: Hmm.

SP: I put Bachelor of Science, at Adelaide Uni, Bachelor of Science, at Flinders Uni...

BH: [chuckles]

SP: That's like two of the main universities out near Adelaide.

BH: Yeah.

SP: And then... something else and something else science related and then right at the end I just put Bachelor of Dance.

BH: [laughs]

SP: There's only one thing I wanted to do. I wanted to go to Adelaide Uni and I wanted to be a mathematical physicist. Even though I had to like... I did get a letter and it was like, no leg warmers in your... [tsks] in your routine for your audition.

BH: Right.

SP: For Bachelor of Dance, and I was like, yeah okay, well that's not gonna happen.

BH: What did you wanna do? Did you wanna like make rockets or build nuclear bombs or... what did you see yourself doing if you had achieved this goal?

SP: I wanted to solve the big problems in physics. I wanted to be the guy! [chuckles] You know, I wanted to get involved in String Theory, I wanted to do

quantum gravity. Like quantum gravity I was trying to solve quantum gravity pretty much straight after  $E$  equals  $MC$  squared. So I took like what I was learning in geometry.

BH: [laughs]

SP: And like I've lost it now but I was basically trying to bring together the quantum realm and special relativity in year 9.

BH: [laughs]

SP: And... because like everyone realized, you know, I was going fanatical about science, one of my mum's friends knew a guy, a physicist who was in Adelaide.

BH: Hmm.

SP: There's lots of physicists in Adelaide. It's a nice place. And this bloke came around. A physicist came to my house and sat with us and I still remember like he came in and he had this cool tweed jacket with like leather patches.

BH: [laughs]

SP: And... he was like salt and pepper hair, super smart...

BH: Yeah.

SP: Really amazing, and we just sat and... he just sat on a... in our lounge and my mum was there and I was there and he just talked to me about physics and told me about CERN and told me about, you know, all the exciting stuff that was planned.

BH: So he was brought around purely just for your entertainment?

SP: I mean I would do that for someone now. But... yeah like, yeah he just was like there's a curious mind... Peter Toy I think his name was. Peter Toy.

BH: Right.

SP: And so that was my first in and this was one of my first kind of like, you know, hustles, I remember getting on the bus one day and going into town and actually going to his desk and dropping my thirteen year old theory of quantum gravity on his desk.

BH: [chuckles] Yeah?

SP: And I'd stapled it really nicely and I put it on his desk.

BH: Did he read it?

SP: Yeah, well, you know...

BH: [laughs]

SP: [laughs] I don't know. [laughs] Probably didn't. [laughs]

BH: [laughs]

SP: Pretty cocky that I'd thought I'd solved all these equations.

BH: He then published it under his own name. He won a Nobel Prize for that.

SP: Yeah yeah he probably stole... yeah I'll have to go through his back catalog.

BH: Ahh.

SP: And of course, like I got all this great support, you know, like, it's one of these things that I found out about and then, well you know, when it was like parent teacher night, you know, my teacher would just say to my mum, oh, you know, what are you doin' with him? Like, it's... this is amazing. You know, what's your secret? How is he so engaged? And I would just listen to this going oh wow, I'm like, all the adults love me.

BH: [laughs]

SP: [laughs]

BH: What did your parents do, Simon? Were they fostering this? Did they have this kind of background or was this completely alien to them?

SP: So my dad was a mechanic.

BH: Right.

SP: So he was a motor mechanic and very smart, very good with his hands and very mechanically minded.

BH: Yeah.

SP: But my mum is, she was a primary school teacher, but she is very humanities based like... super humanities based.

BH: Yeah.

SP: So I asked her when I was a kid, I was like what is pi? And she... oh, sorry



mum, but she couldn't answer me. She was like, oh I don't know.

BH: Well there's a few Numberphile videos we can point her to now.

SP: [laughs]

BH: [laughs]

SP: [laughs] She knows now! Yeah, she knows now.

BH: Right.

SP: Everyone knows now.

BH: [laughs]

SP: But the interesting thing is, is that my whole life has been, you know, it's kind of like I've always found myself between both of those worlds so... the whole humanities thing, like, you know my mum and I would watch BBC documentaries or we enjoyed watching like I Claudius which was like this amazing BBC thing from the Seventies which was, you know, it was this just this incredible piece of theater art. Like we would... we'd love that stuff and we'd watch it together and I was really into literature and into ideas.

BH: You say you were nerdy. Were you shy? Or were you kind of outgoing, you know, show-off, performer, as a boy, as a teenager?

SP: I didn't realize I was a performer until [sighs] I did the Italian play. I was doing my only humanities subject in the end was Italian.

BH: Hmm.

SP: Which was, you know, I think I was just trying to get the marks but you know I like learning Italian.

BH: Do you speak Italian now, still?

SP: Yeah, I still speak Italian, yeah.

BH: Hmm.

SP: Do you speak Italian?

BH: No, I tried to be smart and reply with no in Italian and I realized I don't even know how to say no in Italian. [laughs]

SP: [laughs] Tutti benvenuti.

BH: [laughs] I've got no idea.

SP: So we did as part of Italian culture, theater is a big part of Italian culture and history and so we did an Italian play. My Italian teacher wrote it and it was kind of a send up of Australian Italian weddings, so it was very kind of, classic kind of ethnic kind of comedy where it's like...

BH: Yeah.

SP: Groups come from different countries and they try and hold onto their culture and they... and it's kind of laughing at that sort of thing.

BH: So my Big Fat Greek Wedding before that was a thing.

SP: That's what it is. Yeah. So it was my Big Fat Greek Wedding Australian style.

BH: Yeah.

SP: Very similar. So I played the mother of the bride.

BH: [laughs]

SP: And I basically channeled my hysterical auntie and...

BH: Yeah.

SP: All these kind of incredible personalities, you know, from Southern Italy.

BH: Yeah.

SP: And I just channeled it, it was effortless, it was like I just existed and just... it would just flow through me.

BH: Yeah.

SP: Like electricity and that was shocking to me.

BH: Yeah?

SP: And I remember it like my mum like... laughing to the point of tears but at the same time straight after she was like, okay, well you have to forget that.

BH: [laughs]

SP: Because, there's no way my son is gonna go and become unemployed, you know, trying to make it in Hollywood.

BH: You think that gave you the taste though? That gave you... that was your gateway drug?

SP: But once you experience something like that and performers will understand, as soon as something like that happens you can never go back.

BH: [laughs]

SP: Because it was like magic. It was just like, oh my... what just happened?

BH: Yeah.

SP: But I can remember specifically before that, 'cause my favorite TV show was a show called Beyond 2000.

BH: Oh Yeah! [pause] Now you're talking.

SP: Yeah, Beyond 2000, like it made... I was very easy to shop for at Christmas 'cause like they always bought me the Beyond 2000 merch.

BH: Yeah. [laughs]

SP: So I've still got them.

BH: This was a show in Australian where it was like a sort of a magazine style show where there's a series of reports about technology and what the future's gonna be like, you know, look at this new thing it's called a computer printer and things like, yeah.

SP: And it was called Towards 2000, beforehand, that was the previous show.

BH: Yeah.

SP: On the ABC again and you can actually find online there's like, they introduce this amazing thing called the CD.

BH: [laughs]

SP: But anyway, yeah there was this show called Beyond 2000 and I was so into like every week. There was a core of really hardcore nerd friends. Paul was especially big, he's like an aeronautical engineer now. But we would both just like talk about it and talk about what they found. 'Cause I was thinking about this just recently, I remember thinking I can do this. And it was a really interesting like, I don't know if you had this happen in your life where it's like you see someone do something and you go, oh I can do that. And without having actually tried it, it was this really weird thing. And that's before I performed, it was just this sort of like, oh these people are talking about science and they're telling people about science and it's like I can do that. And it was one of those things which... I dunno it was really clear.

[gentle piano music]

BH: Did you get into the University of Adelaide?

SP: Yeah, yeah, I did. Yeah.

BH: Doing the Bachelor of Science?

SP: Yes, I did. Yeah.

BH: Yeah?

SP: But yeah the weird thing that happened was... when I got to Adelaide Uni, you know, life started. Like I didn't have a social life beforehand. I was such

a nerd and just like didn't go to parties or anything, only in year 12 I started going to parties. But I'm made up for it [laughs]...

BH: Right.

SP: ...in my first year of uni.

BH: Right. [chuckles]

SP: And one of the things that happened was, is like I didn't study very much, I got terrible marks in my subjects.

BH: Hmm.

SP: Which is... I'm still kind of lament now 'cause it's like I wasted time but I mean... I was learning stuff that I... it's been invaluable after university which was really kind of becoming a social person. Which I think a lot of nerds go through.

BH: Yeah.

SP: But basically the weird thing that happened was that when I started doing physics and I was like, yeah okay so, you know we had some pretty amazing people in mathematical physics, we had a guy called Szekeres who was the son of a famous mathematician, Szekeres, who we actually did a video on one of his theorems, Szekeres and Erdős. And so he was like... he found like asymmetrical solutions to general relativity, like... amazing stuff. And he was the most sociable out of all of them. So...

BH: Hmm.

SP: What I found was it's like... the people that I wanted to join, I didn't

wanna be, like they were just too nerdy for me. And there was no like...

BH: Right.

SP: ...conversation, I didn't see them talking to one another. I didn't see them joking, I didn't see them like interacting. They just were all holed up in their rooms. And so what I found was, it's like, I kind of lost heart, I was like, oh you know, I wanna find people that, you know, are into like talking and ideas and excitement and I found [laughs] the humanities people, maybe because they didn't have as many contact hours, it's like they were up for that.

BH: Yeah.

SP: So, I ended up kind of being a little bit lost, 'cause it's like I still loved maths and physics, I just didn't feel like I belonged.

BH: Simon, do you think you had that right? Because that feels to me like a stereotype that a lot of popularizers of mathematics and physics and that try to overcome, you know? Oh, no we're not nerdy people, it's a fun life as well.

SP: Yeah.

BH: And you're kind of now reenforcing that stereotype, that people think, oh I don't wanna be a mathematician, they're all nerds. And you're kind of saying, that was the impression you got when you started surrounding yourself with them.

SP: Now but this is the thing is that, it's all changed. So...

BH: Right.

SP: If I went to uni now, it's completely different.

BH: Okay.

SP: Or maybe I was just very sensitive to it. Maybe that's probably what it is, like if I'm gonna get a little bit...

BH: Hmm?

SP: ...kind of self reflective. Maybe I just was like, no, I probably amplified certain aspects.

BH: Hmm.

SP: I definitely was more attracted to hanging out with the humanities people.

BH: Right.

SP: So it's like anyone who was like, you know, wanting to talk and wanting to communicate, that's what I was like craving. I was all filled with maths and physics so I didn't really need [laughs] I didn't need any more of that. Like I didn't even study for my astronomy exam, my first year astronomy exam.

BH: Yeah?

SP: 'Cause I'd been like prepping it for, for five years.

BH: [laughs]

SP: So it was definitely the humanities was like, that's what I found that I... but then it was like what job do I do? Like I had no idea.

BH: Yeah.



SP: 'Cause it's like... you know... do I just become a teacher? Is that my calling? What is it?

BH: So what is university for you, Simon? Is it sitting in maths and physics lectures and then going to the pub with the art students?

SP: Brady, it wasn't even that, I mean I'd... [laughs] like in my first couple of years I wasn't even going to lectures. I was just... just socializing.

BH: Yeah?

SP: Terrible. But... I made up for it big time, so... probably after first year, second year, I started... I just pulled my socks up and I studied really hard.

BH: Hmm.

SP: And what was great was by that stage I found that the maths got really interesting. Like, pure maths gets really interesting in third year of a bachelor, like you start learning about group theory, you start doing real analysis, topology.

BH: Hmm.

SP: Like it gets really exciting.

BH: Yeah.

SP: [laughs] 'Cause what happened as well it was like, I had sort of lost some of my chops, I had been like this A grade student, like really really good and then it's kinda like I sort of was out of practice.

BH: Yeah.

SP: 'Cause I was kind of, you know, I wasn't a great student, but that was really good because then I can sympathize with people who struggle with maths, because it's like I had to struggle to get back on top, so... it kinda works out.

BH: Hmm. Hmm.

SP: I ended up moving to Melbourne, where I still am.

BH: Yeah?

SP: And then that's when I did pure maths and I found a bunch of people who... are pretty much like... some of the best maths people I've ever met.

BH: Are you still at university at this point, Simon? Like did you do like a further qualification or...?

SP: Yeah well I moved to Melbourne Uni.

BH: So you moved like mid degree, did you? So you sort of transferred your degree?

SP: No, no. I had finished by Bachelor...

BH: Yeah?

SP: ...but because Melbourne University is... specializes in low dimensional topology, so lots of knot theory...

BH: Hmm.

SP: I had to... and that wasn't the Adelaide University speciality so I had to kind of do extra undergraduate subjects.

BH: Okay.

SP: Which they called a postgraduate diploma.

BH: Yeah.

SP: And at the same time I did honors.

BH: Okay.

SP: Which I... I did with a crazy Polish mathematician.

BH: Yeah?

SP: Who I'd got the feeling he hated me but I think that was just the way he showed affection.

BH: [laughs] Okay. [laughs] What happens then? How do you kind of start a career?

SP: It was gonna be more study, so I ended up, you know, kind of like doing Masters and all in pure mathematics.

BH: Hmm

SP: Like, pure maths I absolutely love but it really... it can really do your head in. Like when you're doing it all the time, you know, like one of the reasons why people who are like mathematicians are not very social is 'cause your brain is absolutely sometimes fixated on a problem and you can't think outside of what

your brain is absolutely filled with.

BH: Hmm.

SP: And for me that was like a bit of a problem 'cause it's like I need to be social. I need to communicate and this is... my head was fill of... my thesis was on the Banach–Tarski Paradox.

BH: Hmm.

SP: Which is a nutso theorem and you know I decided to throw in understanding Zorn's Lemma at the same time which is another nutso result. So it was like I was just in this world of pure psychedelic abstraction. [laughs]

BH: Yeah.

SP: So I had to pull away from it, like just going into more of that wasn't... I just I think I'm gonna have some sort of nervous breakdown. So yeah, so I ended up getting a job and I ended up working as a statistician which, [laughs] I, you know... I don't think... I think I did one subject in statistics, maybe Statistics 1, but nobody asked.

BH: Yeah?

SP: I just had this first class, you know, [laughs] honors degree and I started forecasting wine sales for Foster's Wine Estates.

BH: What kind of factors go into forecasting wine sales?

SP: [laughs]

BH: Like obviously you can look at what's been sold before but are you like

looking at things like... weather or demographics or what kind of inputs are going into that? That sounds fascinating.

SP: Yeah and it was! It was really fascinating yeah. And I mean like if I didn't have all this stuff that I was doing I think I would've been very happy to keep doing it.

BH: Hmm!

SP: It wasn't using all that other stuff like that's... [sighs] I think I was actually sold on that when I started. It's like, you know, we're going to bring in [sighs] you know, like economic data and forecasting, you know, like...

BH: Yeah.

SP: ...whether you know they'll sell more sparkles or whatever but...

BH: You're gonna be the person who finds like the Riemann Hypothesis of selling wine and find this incredible sweet spot of how to sell...

SP: [laughs]

BH: ...a zillion bottle of wine in a day or something 'cause of some code you cracked. [laughs]

SP: Well it was actually it was all about... so my job was all about saving money. So it was all about streamlining production.

BH: Oh alright.

SP: Yeah. So it was not as [sighs] it's not as sexy as all that.

BH: Right.

SP: But I mean it was the alcohol industry so that was like...

BH: Yeah.

SP: ...incredible. Like one of our meeting rooms was the bar.

BH: Right.

SP: Where it was all free booze.

BH: [laughs]

SP: Which sounds great but it's not when you're, you know, your boss kind of bails you up at the end of the day.

BH: [laughs]

SP: And you're kind of feeling a bit weak because [laughs] you've had a few beers.

BH: [laughs]

SP: I mean basically I was babysitting a statistical software package and I had to tune models. It was just all about getting like the right R squared, so you're trying to kind of get these models which are forecasting at the right level and you kind of link safety stock to...

BH: Ahh.

SP: ...you confidence intervals and...

BH: So it's not like you'd say, quick, ship four hundred crates to South Yarra there's about to be a major run on white wine, I can sense it! [laughs]

SP: [laughs]

BH: I've got the data! [laughs]

SP: I'm sure that's what the people who hired me wanted.

BH: Yeah.

SP: But that was never gonna happen.

BH: Okay.

SP: One of the things that actually happened was I had to start... like this wasn't actually in the job description but I actually had to start communicating mathematics or statistics which I know some people don't accept it but it is part of mathematics. I had to start communicating that to people who, you know, like... left... only had a high school qualifications.

BH: Right.

SP: So, the people I was like working for, these sales people, who were like fighters really.

BH: Hmm.

SP: And they wanted to like carve up, you know, the Melbourne wine buying public into like these artificial territories. It's like we're gonna put these three suburbs together and you're gonna forecast that. And I'm trying to go, no, that's

not how forecasting works.

BH: Yeah.

SP: You need to look at the total. And I was... and I found myself having to like run these presentations where, you know, it's kind of like a Youtube video, you gotta make it as interesting as possible and you've...

BH: Yeah.

SP: ...gotta stop people from like hitting the kill switch as soon as it gets boring. And I found that that was a big part of the job.

BH: Yeah?

SP: But the maths part was... like I think I could've made it... if I had more time, I could've made it more interesting but it was mostly just the software was doing most of the job and I just had to understand what the software was doing.

BH: Okay, well keep me going on the path then. I feel like we're still a long way from where we are now. How do you suddenly become this math superstar of Australia?

SP: So the other thing I was interested in is in performing.

BH: Hmm.

SP: And so finally finally finally I could not ignore this performing bug that I had inside.

BH: Yeah.



SP: And I had to go on stage so I did the thing called Raw Comedy, which is a big thing in Australia, it's kind of run by the Melbourne Comedy Festival, which kind of like is the Edinburgh Festival, it's a big one.

BH: Yeah.

SP: Yeah I did this kind of Raw Comedy, which was all about undiscovered talent and it was my first time on stage for ten years since that performance I did in year 12.

BH: Yeah.

SP: And so I had like, so much pent up energy and like...

BH: [laughs]

SP: I just was bursting so I just remember like giving this performance which was incredible, it was just this incredible performance.

BH: Was it math related, Simon? Or was it just like general comedy or...?

SP: No it wasn't. No. It was [laughs] pretty [laughs] it's not for this podcast, I don't think.

BH: Okay.

SP: But anyway [laughs] so yeah...

BH: It was adult humor.

SP: Yeah it was definitely adult humor of a time. I think what was great about it was like I reconnected with something that I knew was there. But it was good.

It was really good. And all my friends came along and after that it's like oh, I was like, I won the night, it was like I won this heat.

BH: Yeah.

SP: And it was all kind of like too much and I was overwhelmed. And I had to do the next heat and then I kind of bombed. I was a little... I was like, you know, I was like too much. So, after that I spent some time kind of like, you know, kind of forgetting about it and kind of getting used to the idea of performing.

BH: Hmm.

SP: But I did have this sort of sense that if you want to be a really great performer you have to do something new or you have to find something very distinctive. You have to find your own voice.

BH: Yeah.

SP: And I kind of studied someone like, you know, Steve Martin was like when he was doing his stand-up back in the Seventies he was incredible but he was doing silly when everyone else was doing political stuff.

BH: Right.

SP: And I kind of thought, oh that's how you do it, it's like...

BH: Yeah.

SP: You work on your skills, but I thought... well I'm into maths so I'm gonna try to put maths and comedy together.

BH: Right.

SP: And this is going back to 2003.

BH: Yeah.

SP: So I was like, you know, that's what I'm gonna do and [sighs] nobody was with me like...

BH: Yeah. [chuckles]

SP: My girlfriend started crying...

BH: [laughs]

SP: ...and she said you're gonna fail.

BH: What she was... like 'cause you're like, I'm gonna quit my job and become a maths comedian and she's like oh no I'm never gonna eat again?

SP: No it wasn't even that. She just thought I was just gonna like embarrass myself.

BH: [laughs]

SP: And she was like crying for my own pain and her reflected pain.

BH: [laughs]

SP: So, you know, it was like nobody believed that I could do it and so, I ended up getting really angry and it was after like my first year, my second year I did something, then my third year, it was my third time doing Raw Comedy, and that was 2004, and yeah, and I did this thing called the Angry Mathematician

that wasn't my name, it kind of that's what it was. And I was just was this ranting like maniacal kind of mathematician who would just scream at the audience and kind of tell them that they'd lost their mathematical souls and it was very funny but it was like this energy. It was this energy and this kind of like nobody knew what was happening. Nobody knew what I was gonna do next including myself.

BH: Right.

SP: There was like one maths joke at the end but it wasn't like... it was just more a performance.

BH: Yeah.

SP: But that got me all the way to the state final.

BH: Right.

SP: So that was a huge... it was like I was one of ten people in Victoria which is the number one place for doing comedy in the country.

BH: Mhm.

SP: And I kind of dropped out of that, like, again it was just too much, I couldn't handle other performers like jealousy or just that energy, I just was like, man this is weird, like it's so different to what I was used to. But after that that's when I realized that I couldn't ignore this thing and so that's when I did my first comedy festival show.

BH: Right.

SP: Which was called the Angry Mathematician.

BH: Yeah.

SP: And what was incredible now was like I can see what I did back then kind of by accident is what I've repeated over and over again, it's like, I had an idea and I made it work, and people who were also talented wanted to join forces. So I had like a director who wanted to direct me and I had like a publicist who wanted to, you know...

BH: Yeah.

SP: So this thing just happened. And I just kind of rode it.

BH: Are you still working in the wine industry at this stage? Like at what point do you...

SP: Yeah.

BH: ...like you know, let go of the... the safety of a normal paying job?

SP: So I did that first comedy festival show in 2005 and it wasn't until 2009 because basically I didn't go to drama school, I went to Melbourne Comedy Festival.

BH: Yeah.

SP: So that was my drama school.

BH: Right.

SP: So I had three years of performing and it was the best education for me in terms of theatrical training.

BH: Simon reading between the lines it sounds like, you know, you had some bad shows, you had some duds as you were learning along the way, why did that not deter you? Why did you keep getting up to get punched in the face again and again? Like, you obviously had some belief you were on the right track.

SP: [laughs] That's a great question. I think performing is weird because when it's going really well you're not thinking, you're just experiencing it. And so it took me a long time to work out how I was doing it. And, how it was going wrong. The way I've explained it to people, it's like... if you wanna learn how to play the guitar, you can't think about playing the guitar, you actually have to hold the guitar in your hand and use your hands to strum it to learn how to play.

BH: Hmm.

SP: And so, learning how to do comedy is learning how to play the audience and you have to be in front of an audience to do that. But, a guitar isn't gonna make you feel small and worthless and...

BH: [chuckles]

SP: ...hate yourself.

BH: Yeah.

SP: But an audience is very good at that.

BH: Yeah. [laughs]

SP: [laughs] So for example the first time I performed was a magical night, that first performance in Raw Comedy.

BH: Hmm.

SP: I had no idea how I did it. I had no idea.

BH: Yeah.

SP: It just was pure energy coursing through my veins.

BH: I think it must be like golf. The first time I ever hit a golf ball with a driver by fluke...

SP: Hmm.

BH: I hit it beautifully and it went really straight and far and I thought, that felt great this is amazing. And I've probably hit a hundred thousand golf shots since that have all been terrible. But that first one's [chuckles] just kept me going.

SP: Yeah, I've since discovered [sighs] in my long life of, you know, researching things, it's like flow and its sum.

BH: Yeah.

SP: You know being in the zone, but yeah it's a lot to do with kind of activating your brain and connecting everything together.

BH: Hmm.

SP: Yeah I definitely had plenty of gigs that didn't work. Sometimes it's not your fault, it's just the audience, you know, your publicist comps it with a bunch of people who hate mathematics, that's a really hard gig to, you know, kind of win people over.

BH: Yeah.

SP: But, I do remember at one point after my third comedy festival I sort of said to myself, I think I was walking around Fed Square with my girlfriend and it was like I just was thinking maybe you're not good at this, maybe you just have to give up. And I remember clearly thinking that to myself in the same way that I thought, you know, when I was younger like, oh you could be on [laughs]  
Beyond 2000.

BH: Yeah.

SP: This voice came through but at the same time I thought well, I just couldn't imagine given up. Like I'd rather go down in flames like I just thought there's no way I could forgive myself for stopping.

BH: Is that a stubbornness or is that a kind of just, you know, a mindset of give it a go? Or is it like a lack of shame?

SP: Well I don't know if I had shame.

BH: [laughs]

SP: I was deeply insecure about performing.

BH: Yeah.

SP: But that's 'cause I'm a perfectionist, it was like anything that went wrong I would be like, oh no! What it was is that, you know, there were moments of absolute bliss on stage.

BH: Hmm.



SP: It was just pure connection. I didn't know what I was gonna say next and I just open my mouth and I said things and once that happens it's like even if there's lots of bad shows, that will happen again, and I just want that to happen again. So I suppose it's like the work itself ended up being the thing that pulled me through.

BH: Yeah.

SP: But I have to say anyone who wants to be a performer or definitely wants to do science communication 'cause we need lots of good performers doing science communication, is that it really really comes down to experience and that's the thing that I gave myself by not stopping was just... I just ended up accumulating enough experience that I started finally working out what was going on and I finally got consistently good, which is what you need.

BH: Now tell me how does this become your job, Simon? How do you break the shackles of wine statistics?

SP: That's when the other part of being good at this sort of job is the hustle. And so I ended up somehow getting into a cocktail party at the ABC in Sydney. I flew there one night, came back the next day.

BH: What you flew there with the intent of getting into this cocktail party?

SP: A friend of mine was a like a biomedical engineering and he had won an award and he was at a science mixer.

BH: Yeah?

SP: And they had a bunch of people from Catalyst which is the number one science program in Australia.

BH: Yeah.

SP: And so he said come along there'll be Catalyst people there. So... I just went along and I met all these people and...

BH: So you flew to Sydney for one night just to the intent of... semi-crashing the party and networking?

SP: Yeah. If I did it now it'd be a tax write off. [laughs]

BH: [laughs]

SP: Yeah but that's what I did I just... I just went there and...

BH: [laughs]

SP: You know, Brady, I don't even know why. I mean like I think people like me and you do things like that, I don't know what was driving me.

BH: Oh, you speak for yourself, Buddy. [laughs]

SP: [laughs]

BH: I wouldn't fly to another city to crash a party.

SP: No, I wasn't invited!

BH: [laughs]

SP: I was his plus one, but, you know...

BH: [laughs]

SP: Yeah. So that was a really important event and then a woman named Frankie Lee who ran ABC Science Events, so the live arm of the ABC science thing, so not the TV programs or the radio.

BH: Yeah.

SP: She was on the lookout for good science content for live shows.

BH: Right.

SP: So she flew down to my show the second year I think I did it.

BH: Mhm.

SP: And... that's when I knew that I was a performer because... I knew she was in the audience, she didn't really talk to me very much before we got started. I knew that this was my kind of big break. [chuckles]

BH: Hmm.

SP: In Science Communication. And that night was amazing.

BH: Right.

SP: And so I kind of really like because everything was on the line and it was like so kind of like charged.

BH: Yeah.

SP: After that she was like okay you can do it, and then it took like maybe two years... well she did something with me the next year but by the second year I'd

asked her again, 'cause we were like friends and she was like a really big supporter of mine.

BH: Yeah.

SP: And that's when I said, can I get a grant for National Science Week? Which is the one week in the year in Australia which is like, they do lots of science events in August.

BH: Yeah.

SP: And she said absolutely and she got me a touring grant.

BH: Right.

SP: Which I could not believe, like it was twenty grand and it was like what! And I was like, are you sure? And she was like, of course!

BH: Yeah.

SP: And so she put me in touch with like all these people at universities in Tassie, in Darwin, in like all over the place.

BH: Yeah.

SP: And, I did that tour in August 2008, I was not the same person when I came back. So, that was the huge break for me because I took my show to audiences that actually wanted to see science content. So it was the first time [laughs] I was like I wasn't part of a comedy festival where it was like people who are taking a punt on some weird show. It's like I had rooms full of like... science and maths lovers. And we just connected. It was like we found each other.

[gentle violin music]

SP: So four months after that seminal kind of tour I was doing a major project at Foster's, I had to go overseas and like train people to do my job.

BH: Yeah.

SP: And at the same time I had this other grant for this massive... another massive show.

BH: Yeah.

SP: And I hadn't even written that, so that's when I left my job. That's when I went professional.

BH: Right.

SP: And I thought, oh no, like, and this was just at the, you know, like global financial crisis, I told my mum, I'm leaving my job, she started crying, she said, sorry Simon, I have to call you back. [laughs]

BH: [laughs]

SP: And... [laughs]

BH: [laughs]

SP: It was amazing, it was this amazing thing. But yeah it was like one of the... I knew this was one of the biggest decisions in my life where, it's like I kinda had this idea where it was like, in like there were two rivers in your life, like I was on one river which was like corporate and like houses and wealth and

that sort of thing.

BH: Yeah.

SP: And then I had this other life and I felt this kind of sensation that these two rivers were at their closet point but they were never going to actually intersect. So I had to like pick up my canoe and go through the wilderness and put it in this other river.

BH: Yeah.

SP: If I was ever gonna make this happen.

BH: Yeah.

SP: And I'm so happy I did because a week later I was made the Australian Numeracy Ambassador.

BH: What is that?

SP: So back then it was the Federal Education Department in Australian had kind of like a National Science Week but it was for kids at school.

BH: Hmm.

SP: And it was focusing on literacy and numeracy and so they had two ambassadors, one a literacy ambassador and one a numeracy ambassador and I was like the best candidate at that time...

BH: Yeah.

SP: ...to promote numeracy. So yeah, I had this huge thing and at that time it

was Julia Gillard was in charge of Education.

BH: Right this is a future Prime Minister of Australia.

SP: Like that was her year, like everyone was talking about Julia Gillard and everyone was, the media was all over it and I was her ambassador for numeracy.

BH: Yeah?

SP: And so I ended up performing for her during this National Literacy and Numeracy week, which again was a huge event. That was that August, sorry September. And she personally wrote me a letter and said, to make me again the Numeracy Ambassador which hadn't've happened before.

BH: That's such a fancy job title, Australian Numeracy Ambassador.

SP: Well what it did was it just kinda gave me, it was like a certificate of authenticity. So with that, I could go to schools all over the country and just go, oh I'm the Australian Numeracy Ambassador, what's that? Oh, I promote numeracy.

BH: Hmm.

SP: But really what it did was, people just took punt on me.

BH: Hmm.

SP: And that's all I needed because as soon as I did my shows they could see that, okay this guy connects with the kids and he's... 'cause I'd, you know, I'd spent years in front of people who didn't want to listen to me...

BH: Yeah.

SP: ...like and I was trying to make them laugh so by the time I got to kids this was like... this is amazing.

BH: Does it also give you like diplomatic immunity from like parking tickets and stuff when you're abroad?

SP: Becoming an ambassador?

BH: Yeah?

SP: ...a couple of times I did put ambassador on the...

BH: [laughs]

SP: ...the ticket when you have to come back into the country. It's like...

BH: [laughs]

SP: ...I'm an ambassador.

BH: Oh you get to go through that channel and don't have to line for your passport?

SP: [laughs] Yeah that's right! [laughs]

BH: [laughs]

SP: Just get through on the VIP.

BH: Yeah?



SP: It just gave me a great opportunity to kinda get out there and let people give me a go and also it was, you know, when it comes to communication having like a three word bio was pretty amazing. Australian Numeracy Ambassador.

BH: Yeah.

SP: And that sorta says everything.

BH: What do you do now? How do you describe your job now? How do you eat?

SP: Well... I'm a professional science communicator.

BH: Hmm.

SP: So I do work [sighs] man I've done so many things, so I've... live shows have been a big part of what I do...

BH: Yeah.

SP: ...which has been a bit difficult this year, 2020. So there's been... a lot of kind of movement around with that.

BH: Yeah.

SP: So, lots of live shows moving into kind of mathematician in residence. That's the next thing which is gonna be happening soon in the next couple of months. So yeah, kind of like getting really stuck into engagement, it's all about engagement but now it's... I've been doing it for so long it's kind of like really clicking into the curriculum. So we're trying to advance STEM, we're trying to get kids engaged and really my job for that education part is really about connecting the dots for people, and that's a huge need. So my money comes from

this huge need of like in Australia and in the UK and all over the world about getting students into STEM. That's really my job. So I've got my comedy which is kind of like the icebreaker. That's the pointy bit that kind of gets people...

BH: Yeah.

SP: ...you know, kind of like get their attention and then after that I've developed workshops, I do moderation, I do panels.

BH: Yeah.

SP: I flew to Brazil in 2018... for the International Congress of Mathematicians where like I was just asked by someone who'd seen the Numberphile videos to just be the moderator for a panel on mathematical engagement. So a mixture of writing and performing and workshops and...

BH: Yeah.

SP: [chuckles] and engagement.

BH: Simon, a lot of people you might talk to about public engagement with mathematics will talk about a lot of altruistic things like I think mathematics is so important for the future of humanity and I want to progress it and inspire the mathematicians of tomorrow.

SP: Hmm.

BH: But a lot of the time talking to you maybe you're just being brutally honest, but a lot more of it is... I love it when people laugh at me. I love it when people applaud. It seems a lot of your drive is coming just like a more base just love of performance. You know?

SP: Well, that's probably where I let myself down because all this maths stuff is so innate. I don't mean to make that sound like I'm big noting myself but I mean, my relationship with mathematics is kind of so kind of old and like I was doing this sort of thing when I was a kid explaining mathematics to people and because I would look at their faces and see when they were getting bored I'd change things up. I mean, I'd been practicing this, you know, all my life and so... I get really excited about doing a good performance and making those connections but all the maths stuff, I mean, I should talk about that more 'cause really the most... kind of necessary thing and the most interesting thing to a lot of people who are outside of mathematics. It's like how do you engage people with mathematics. And it's like, well, for me, it's hard work but it flows because I love mathematics, so I've done so much of it, I understand how it works, I understand how it's put together, there's a whole bunch of math I don't know. I don't pretend to know everything, of course. But when it comes to talking to someone who doesn't understand it, that's when this thing comes out of me, like I engage and I connect and I try and see, you know, I have like a feedback loop with one person or an audience.

BH: Hmm.

SP: But I mean for me it's the performance side of thing is the thing that I've really enjoyed developing.

BH: The math thing almost goes without saying for you it seems, like, you know? Of course I love talking about mathematics to people.

SP: I suppose. Well, I mean like, you know... I mean I've done a lot of content, right? And the stuff that you and I have done, what's really interesting is that people have asked me, you know, like how much preparation goes into, you know, the Numberphile videos, and it's really interesting 'cause it's like I've spent... or the stuff I did for Discovery, you know, I'd be... working for days preparing that stuff.

BH: Hmm.

SP: But with you and me, it just happened live. So I prepared what I was gonna talk about, but I didn't prepare what I was gonna say, like that just all came out.

BH: Yeah.

SP: And I think what's... really important about that is the fact that it's really good because it is so flowing. I think science communication has a problem where lots and lots of smart people are in science communication but they don't have necessarily that experience of flow and communication and making things really watchable and really engrossing and like the idea of stopping doesn't even enter your head, but... if you're reading a paper or like, you know, you're reading some research sometimes you... you have to stop and have a coffee because it's just not written for a human being. It's written for some sort of Turing machine to go through step by step. So what we've done on Numberphile is the opposite, it's like, we've made maths for humans and... that's what I think now more and more in my career, that's what I need to do, I need to part of that process of making more humans doing maths and humans talking about maths rather than, you know, list of axioms and like, you need to know this before you know this before you know this, and it's like, yeah... that's not how we work, you know? Don't bury the lede, start with the most important thing.

BH: You've talked a bit today about how performing to an unreceptive audience that hates mathematics can be discouraging and the pleasure you'll get from then performing to a receptive audience that appreciate mathematics.

SP: Or winning over a bad audience as well. [chuckles] That's pretty amazing.

BH: How do you reconcile that? Preaching to the choir, the ease of having a

rapport with an audience that already appreciates mathematics to, you know, are there uncrackable nuts?

SP: A younger version of me would be like, I can crack any nut.

BH: Yeah?

SP: But in actual fact, I can crack them but you can't crack people wide open unless they want to be [chuckles] cracked wide open.

BH: Yeah.

SP: But definitely you can get through to people and so for me the whole joy of performing and this is in this time now of the coronavirus it's like I'm missing doing that live performance, is that a performance is a two way street. It's like, for me at least as my improvisation chops and what I get out of it is, I'm telling my material to the audience and I'm getting a response and then that's changing what I'm saying, even if it's scripted, it changes your intonation, it changes your motivation, and there's this thing going on. It's what we feel when, it's like, oh this is really authentic. It's like it's moving too fast to be faked and so what I find is, is that when I get into that kind of zone even if it's a tough audience, if I'm somehow connecting to them, it's like this absolute rush of like... you know, energy, you know? It's like this... wow! And then I separate... like I'm not longer conscious of myself as a person it's like I'm just this performer. So like that can be incredible and so at the end of it if I can get people, like some of the best experience I've ever had was a lady came up to me after a show in Hobart once and she said, and she actually had tears in her eyes, I'm not making this up, I've got a photo, and she said my father was a mathematician and he always lamented that he had a daughter who never understand mathematics but this is the first time I've understood Pythagoras' Theorem, 'cause of your show.

BH: Wow.

SP: I do an explanation of Pythagoras' Theorem which involves like a Hollywood trailer.

BH: Yeah.

SP: Anyway I won't go into too much, but it's like it's very engaging.

BH: And then you took a photo of this crying woman.

SP: Yeah of course! I had to document.

BH: [laughs]

SP: My god! Tears, Brady! Tears!

BH: [laughs]

SP: That's what we do it for! We wanna move people!

BH: You must see a lot of science communication by other people, whether they're kind of professionals or wannabe professionals, or just scientists and mathematicians who are doing a bit of outreach on the side.

SP: Yeah.

BH: What do you think they do wrong the most?

SP: The checklist, you've gotta put the checklist away. And that's really hard. So whatever checklist you've got about, you gotta get to this point, this point and this point, or you know, you've gotta try and explain this whole concept, I find that with science communication it's like just pick one thing and say it well. Like

if you can just get one thing across to an audience or a person and it really engages and really kind of they get it... that's your job, because with that kernel of knowledge comes a change in perception about their relationship with science. What I feel like I've got is a good sense of is like I really... I really empathize with my audience and I always think about where they're at. So I always think, okay, what does audience know? If I'm speaking to like undergraduates in mathematics, okay they know what the direct function is, right? That's the level they're at. If I'm talking to a bunch of just general public and they're just mums and dads, okay they're sleep deprived, they don't know really know much, the kids are looking at me wild eyed and going look at the guy with the crazy hair. So, what do they know? How am I gonna engage them? Maybe just talking about prime numbers and doing something interesting is going to get people on board, so... where I think people in science communication it's like the... most of the job is just understanding your audience. You've gotta know your stuff and you gotta know your stuff back to front and you've gotta know it so, you're not thinking about it, and then the big job is who am I talking to. Which is all kind of the dramatic arts, it's like that's what drama is all about and performing like theatrical performing and songwriting is all about, you know, feelings and emotions which don't really kind of sit with science communication but I feel as though it's central to really good science communication. 'Cause feeling comes through and feeling is what you need as foundation before you can put any knowledge on top.

BH: Early in our conversation you were telling me about when you were a boy wanting to make a breakthrough, wanting to prove something in the theoretical realm that hadn't been proven before and even writing such a proof.

SP: Yeah.

BH: However ill conceived that may have been.

SP: [laughs]

BH: That's quite unusual for someone so young...

SP: [laughs]

BH: ...to already be thinking that way... you know that this is how mathematics works. This is how you become great in the world of mathematics and physics. And yet you haven't gone down that path, rather than being a hero of science and mathematics you've become someone who tells the story of the heroes.

SP: Yeah.

BH: Do you ever wish you'd gone that other path? That other river? That we were making videos about the Pampena Theorem?

SP: [laughs] There was no other river.

BH: Yeah?

SP: That's the problem. I think I've been a successful scientist because I've looked at the facts. And the facts that were presented to me were that I wasn't a fantastic research mathematician. For me to actually get new mathematics, it was gonna be really hard work and I... worked closely when I was at uni I met people like John Hii, the guy that showed me the tennis ball, we did that Tennis Ball Theorem video.

BH: Yeah.

SP: Like he is amazing. And he could think mathematically in a way that I couldn't. I was always inspired by the, you know, the story of Johann Kepler, where it's like, he saw the poetry in the universe and he tried to create a universe



where the solar system was made out of platonic solids, but the evidence presented to him told him that he wasn't and then he just made them into ellipses and his heart was broken but he actually created the science that we still use today.

BH: Hmm.

SP: That was inspirational, 'cause I thought wow that's... that's some gangster stuff, you know, he like broke his own heart to get to answer, to the truth.

BH: Yeah.

SP: And for me it's like, I had to admit to myself that like I just was... it was gonna be an absolute slog for me to do great mathematics. Because I'd met people who were... it was obvious they were gonna do great mathematics and there was a difference between us.

BH: Hmm.

SP: But what I did find I could understand it and I could understand it in a way that was like I sort of felt... I've heard of other people talk about this, I'm dumb, which is not true, but it's like you know, like I struggle to try and understand something but once I understand something, I can communicate it to someone else and I'm good at that and that's what I recognized. There was that river. There's no river to me being a research mathematical [laughs] not in this lifetime. That was like... there was like... it's a tributary and it's not the way.

BH: Would you swap it? Do you envy those people? If you had that divine people to swap your performance abilities and life you've had to be Terry Tao?

SP: Wow. [sighs] I mean... there's a lot of human experiences, you know? And it would be amazing to be able to be in Terry Tao's brain and be able to see

mathematics the way he does. The way my brain overheated with trying to understand Banach–Tarski Paradox and writing a thesis on it, I can only just kind of like maybe have a pale facsimile kind of appreciation of what Terry Tao must go through. I mean I would love to have that, but I am actually really very very happy with my own little joyful mathematical discoveries [laugh] so you know like if I do an International Maths Olympics problem and that's been set by someone who's, you know, way above my level, and I get it, I can see the structure and I get... I see what the whole questions about, I mean I wouldn't swap that for anything, even though that's probably the feeling Terry Tao has when he solves like an amazing like unsolved theorem. [chuckles] I don't have to solve new maths, I just wanna be able to have that feeling and have that realization even if it's something that's been discovered a thousand times before, I don't care.

BH: Well, Simon, I don't know when I'm gonna get to see you again and film in person for Numberphile. At the moment it feels like it's a million years away, as we're locked in our houses on opposite sides of the world.

SP: Yeah.

BH: I hope its not too long 'cause it's always really good fun for me and your videos are always super popular on Numberphile so let's do it again... soon? Hopefully.

SP: I've got some good ideas too.

BH: Yeah?

SP: Oh, jeez I got some good ideas.

BH: [sighs] Oh, don't tease me!

SP: [laughs]

BH: [laughs]

SP: Some really good ideas.

BH: Ah!

SP: But anyway, yes, we'll have to wait... well you know maybe if you come down to Australia...

BH: I was scheduled to come before the pandemic.

SP: Oh.

BH: I was over. I was there. I was gonna be there, it was on.

SP: It's a great place to ride out 2020.

BH: Yeah.

SP: [laughs]

BH: We'll see.

SP: [laughs]

BH: I have given some thought to coming over for a few weeks but we'll see. If I do I'll come over to Melbourne and...

SP: No, no, no, no! We should go to Adelaide.

[gentle music fades in]

BH: Adelaide?

[music continues]

SP: And we should film ourselves going to the big rocking horse.

BH: [gasps] Ah Yeah!

[music continues]

SP: Going to the beach!

BH: We'll do a video about spheres about the Mall's Balls.

[music continues]

SP: There you go!

BH: Yeah!

SP: Touching... I will do a 3D version of Epic Circles.

[music fades up]

BH: Yeah? [laughs]

SP: It'll be Epic Spheres.

[music fades up and continues]

BH: That's all from us today, our thanks to Simon and until we get to make more videos together, I will link to some of his work and other material in the show notes, please do have a look. [music continues] I'm Brady Haran, you've been listening to the Numberphile podcast, and if you'd like to help us make more episodes please do consider supporting us on Patreon, the address is [patreon.com/unmadefm](https://patreon.com/unmadefm) and we appreciate everyone who's helping already. Also thanks to MSRI in Berkeley, California for it's support of Numberphile. [music continues] We'll be back again soon with another episode.

[music fades up and out]