[Intro Music]

Maggie:
Hi listeners! Welcome back to Carry the One Radio: the science podcast. I'm Maggie and today I'm bringing you another episode in our Young Scientist Spotlight series, where we interview early career scientists about their work and their journey. Today I had the opportunity to speak with Dr Danielle Twum. She's a cancer immunologist who works in industry helping doctors and researchers improve cancer treatments. We talk about the pitfalls of grad school, what makes good cells go bad and how to get the most out of your air-fryer. Stay tuned!

[CTOR Tag]

Maggie:
So to start out, why don't you introduce yourself and, uh, you're actually changing roles right now. So, uh, let us know what you were doing before and then the new role you'll be moving into.

Danielle:
Yes, my name is Dr. Danielle Twum. I am a trained cancer immunologist, and I currently work as a molecular science liaison for a cancer diagnostics company, but I'm currently transitioning into a business development management role. So that's fun.

Maggie:
So, uh, what kind of work were you doing as a science liaison?

Danielle:
So a molecular science liaison is the face of the company between the company and the client, which in our case, were doctors. So I worked for a cancer diagnosis company and what they do is they take, uh, tumors from patients and then profile them and then make drug associations based on the biomarkers that they find. Now you would ask what is a biomarker? If you ever looked at your t-shirt, you know, if you buy a t-shirt and you look at the label, it always tells you, Oh, 100% cotton. So wash cold. Um, it says silk. So don't wash with water, you know, dry, clean that's that's what sequencing actually gives you. Sequencing gives you a tumor label, just like a clothing label so that you know, what the tumor is made of. And because you know what the tumor is made of, you know how to take care of it. So what I do is once a doctor sends us a patient's tumor and the company sequences it, they release a report. And if the doctor needs any insight into the report, if there are any questions they have, that's where I come in. I also help the doctors run research projects. If they have research questions, I help them design the experiment. Usually they have it designed. I just help them refine it because it always helps to hear a different outlook on something. And yeah, so that's what I do. And then I go to a lot of meetings.

Maggie:
That's so interesting. So it sounds like there's a lot of communication in your role.

Danielle:
Absolutely, absolutely necessary as the entire tenant of my role is how can you communicate and

meet different doctors at their different specialties? Because cancer is in every organ, you know, it can, it can show up in every organ. So you meet different doctors doing melanoma, gynecology, you're meeting everyone. So you have to know what their field is studying right now. You know, what latest things are. So that means that you also have to read papers, you have to go to conferences so that you're able to talk to them because if you know, at the end, what you and the doctor's trying to do is you're trying to cure the patient's cancer. Overall, the patient is what matters. So how can you best help patient is by putting your best foot forward. And that's, that's, that's what the role is

Maggie:
How difficult is it if you're, you're working with so many different types of cancer, um, do you find it difficult to sort of change gears or change your perspective when you're going from client to client?

Danielle:
The thing is cancer is not that um smart. And what I mean by that is a lot of the biomarkers, you know, the tags they're kind of the same across multitudes of cancer. So what, you know, in one cancer, you can apply to another. The fun and scary part is when a tumor takes a biomarker and then flips it on its head. So what is a biomarker that would help cure somebody in one cancer can be the exact opposite in another. Um, so that is where you have to stay on the ball because just because, you know, Oh, I know this biomarker, no it doesn't. You have to always review. And so, yes, before meetings, I need, I have, I have, I have many spreadsheets that are called cheat codes and I review them, okay. So this is what here it is. And you know, the more you do it, the easier it gets. But also, as I said, the field is constantly updating. And so you need to you know be checking the papers and making sure that what you're saying is actually true and has not been, you know, is not obsolete. So it is, it can be challenging.

Maggie:
So, uh, tell me a bit about this new role that you're moving into.

Danielle:
Yeah, so it is a really, uh, amazing company. Um, they use, they actually provide human skin that is donated during surgery to companies, for them to test their drugs on. And so you're not- what you're doing is you're bypassing the need for using mouse models, because a lot of, a lot of drugs, whether they're injectables or whether they're topical are tested on mice before they move into humans. Um, and so my role as a business development manager is going to be, we call it consultative selling. So what it is is that you position yourself in a way that you understand the experimental question the client has, and you're able to see where your company's product fits in your question, and you're not doing a one-time sales thing. You're positioning yourself to be a partner, you want them to think of you as the first thought, whenever they design experiments. So it is, it is a little different from anything I've ever done, but I mean, at the end, science brings us all together.

Maggie:
Definitely. Um, why is a, a skin model better than a mouse model?

Danielle:
So the difference between a human skin model in a mouse model comes down to the fact that they're different species. And so the way a mouse will react to a drug is very different from the way a human reacts to a drug. And so, um, the, the good thing about mice is that you're able to use them to kind of roadmap what it would look like. And then when you scale up to a human, you have to make room for surprises because mice have different metabolism. Um, the kinds of, even though the kinds of cells they recruit to the skin are the same. It is a whole different ball game when you're going from a small animal, like a mouse to a huge, uh, you know, organism like a human. So that's why, you know, you don't approve drugs after they've been tested in mice, you approved drugs after they've gone from mice to sometimes, um, to chimpanzees before they move to humans, and then you approve them. So it's very important to always test it in humans before you approve it for everybody.

Maggie:
How are the skin samples to work with?

Danielle:
So I have only interacted with the skin samples once when I interviewed with the company. Um, and I can tell you that it's fascinating. Uh, I don't know if that makes me sound kind of creepy, but as somebody who used to work in mice, uh, I worked with a lot of mice when I was in graduate school. It is a very different feel. I got to inject the skin, I got to cut through it, and it feels very different. Cause I used to do surgeries on mice when I was in graduate school. And it, it feels very different. So it, you can tell that it's not a mouse skin, so it's good.

Maggie:
That's so interesting. So in your role, what's the perspective that you're bringing, what's really your, um, your center of focus?

Danielle:
So what I'm coming in with is scientific expertise and the ability to, um, to listen. So the thing about being a scientist is you're trained to critically assess what's there. And then to question what's not there, and that skill is definitely going to come in handy because sometimes people might not even know what their ask is. They don't, they might not even know what they're looking for. So you have to be able to intently listen, and then analyze it pretty quickly and say, this is where I think we will fit. Um, and I think that, you know, working, I used to work as a field application scientist, and then working as a molecular science liaison that has all, you know, kind of baked me, I think, for this role. So I'm pretty excited. I mean, it's going to be a learning curve, very different from anything I've ever done, but Hey, evolution is where it's at. So

[Transition Music]

Maggie:
Speaking of that, I'd love to zoom out a little bit and talk about how you first became interested in science.

Danielle:

Wow. Yeah. Um, you are making me go all the way back to childhood. I was a very, I was a very inquisitive child. I was your quintessential "why, why, why, why this?" But you know, I'm from Ghana, West Africa. So I know how to ask why and be respectful. Um, and my parents' very smart way of keeping me quiet was to give me, um, I'm dating myself here but the Encyclopedia Britannica used to- it used to be a solid book. And they're like, here, you know keep quiet. And read that. I mean, they didn't say keep quiet, but they were like, you'll find your answers here. Cause my parents are not scientists. Well, my dad is kind of a scientist he's a software engineer and my mom's a lawyer, but they weren't, you know, they weren't, they didn't know all the answers to the questions I had.

So their response was to put a book in my hand. And it's funny how my sister also does that to my nephew. Now it's like, here, here's a book. See if you find your answer there. And that was the greatest gift my parents could ever have given me, because then you learn how to search for answers. And that is what being a scientist is, is being able to ask a question and then figure out a way to answer it, uh, or find the answer or if there's an answer out there. So that is, yeah, that's my earliest memory of being interested in science. I, like every child, wanted to be an astronaut and I mean, there are no astronauts in Ghana yet. Um, but you know, everyone wants to go to space. I wanted to see, you know, this pale blue dot that we live on. I wanted to see it from space. So yeah, that was, that was that's my earliest memory of being into science is space, shuttles and Encyclopedia Britannica.

Maggie:
So at what point did that sort of become an interest in biology?

Danielle:
Oh girl. Um, so in Ghana, Ghana, when I was growing up, did not have a huge research field or if they did, I wasn't exposed to it. So in Ghana I assumed, and I was told that your love for science translates into your love for medicine. So for the longest time I thought I would become a medical doctor when I immigrated to the United States and eventually went to college, I went to Vassar college in Poughkeepsie, New York with the intent of becoming a medical doctor. And then I so I was a biology major. And because Vassar is a liberal arts school they make you do something else, so I was a French minor, um, which is great because then you get to, you know, use both sides of your brain. Um, and so I took one class, I took a bioinformatics class cause I thought it would look really good on my med school applications. And it was dual taught by a computer science professor and a biology professor and the biology professor, Jodi Schwarz. She did research on corals. If you've seen Finding Nemo, you, you know, Nemo lived in an anemone, Jodi worked on anemones. She was using corals to understand how rising sea temperatures contributes to coral bleaching. And so I did a summer project with her and that was it. That was when my life changed. So this is all Jodi's fault.

Maggie:
That's so cool. So you started out in a more of like a Marine biology setting.

Danielle:
Yeah. Yeah, I did. I was convinced I was going to become a Marine biologist. I was like, I love everything. I want to go on a sea semester. Um, which is you take a semester out at sea, on a

boat. You do research out in the open ocean and yes, sign me up, I might be a little scared of the ocean, but sign me up. Um, but Jodi said, you know, pause, you like research in my lab. You don't like research in general. So how about for another summer? So I worked with Jodi my sophomore year, summer. She said for junior year, summer, go do research somewhere else. See if you like it. And so that required me to sit down and think, what else do I like? Like, what else have I been curious about? So me, like everybody else, unfortunately has had a family member or a friend or somebody they know affected by cancer.

And my uncle passed away from a brain tumor when he was very young in his early thirties. And he's a very special uncle to me because we share a birthday. And so I said, you know what, let me just go see what this cancer thing is about. Cause I've always wanted to understand how it took him so fast. Um, I didn't get placed in a brain tumor lab, but I got exposed to the world of cancer research. I did my summer program at Roswell park, comprehensive cancer center. I went there with one question. I came back with millions more and Jodi said, you know what you want to do now? So that's how I ended up getting my PhD in cancer immunology.

Maggie:
Wow. So did you go into grad school directly after undergrad or did you take some time?

Danielle:
I went directly after undergrad and I should have taken some time off. Oh, I should have. I was actually on academic probation the second semester of my first year, because I just could not hack it. And instead of asking for help, I thought I could figure it out on my own. I was relying on a lot of college, uh, coping mechanisms. Um, and so what happened in my second semester was I you know. I have to get really serious. I, I made a plan. I, it was really hard to stick to it, but I made that plan. I asked for help whenever I, you know, I needed it. You know, the pride is such a stupid thing cause it can get in between you and your success. And so I, you know, asked for help. I asked my friends who were doing better. I was like, can you quiz me? Can you teach me how you learned this? And that has definitely gone a long way. Um, yeah. I ended up getting off academic probation and eventually got my PhD. So yeah, don't, don't be scared to ask for help.

Maggie:
That's really good advice. Uh, who were the people in grad school who helped you the most?

Danielle:
Oh my gosh. My core group of friends in my cohort. So, um, Du Wei, Adaobi and Amy, um, three women, they were in my cohort and I'm still in touch with them uh to today. And um, apart from them, you know, they really helped me academically, but also it was good to have people that you could do stuff outside the lab with. And that really mattered. Um, in addition to that, I had, I grew a family in Buffalo, um, because my family wasn't nearby and that really, you know, my aunt Tonia, just so many people in Buffalo came to support me to make sure that I, I, you know, I succeeded and that's, that's something that I will never take for granted. And that's what I always tell people, surround yourself with people who want you to succeed and who are dreaming further for you, because then they see what you're capable of. And won't let you talk yourself out of opportunities that could advance you. So I will forever be thankful for everyone

who wanted my success in Buffalo. Seriously.

Maggie:
That's really wonderful. Um, can you talk a little bit about the research that you were doing during your graduate school studies?

Danielle:
Yeah, I was playing with switches. So, you know, the immune system is a very I'm biased, but I think it's the coolest thing ever. And so it's made up of two arms. Like, you know, if you're a left-handed person and you can't do something with your left hand, you have your right hand to come help. And that is how the immune system works. You have the innate immune response, which is the first one. And then you have the adaptive immune response, which comes in when the innate can't do it all. And within the innate immune system, there are these cells called macrophages and their name translates literally into "big eaters". I really identify with macrophages.

And so, um, what I was studying was the thing about macrophages is that depending on the environment you put them in, they can be one thing or the other they're quite like humans in that way, where their environment really influences their behavior. And in cancer, we found that there are some macrophages that actually help the cancer grow instead of killing the cancer. So these cells that are part of your immune system, that's supposed to attack a cancer, are actually flipping and helping the cancer. And I was trying to understand why, and one of the things that macrophages have, are they have switches in them also called transcription factors. And depending on whether the switch is on or off you have a "good" macrophage and I'm putting that in quotes or a macrophage that is helping the tumor grow. So I was trying to understand how to flip some of these switches to make sure that the macrophages you know attack the cancer instead of help them grow. And I was doing this, um, in breast cancer and also in melanoma.

Maggie:
Wow. So what kinds of things can flip these switches?

Danielle:
Oh man. So the transcription factors, it depends on it literally is about the environment. So what kind of environment do you have, um, around the macrophage and how much of an environment? So it's not just the kind it's like how much is here to push them, to help the tumor grow or to push them not to. And what we found was that in the macrophages that helped the tumors grow the switch I was studying, interferon regulatory factor eight or IRF8, I R F eight IRF8 was actually switched off. So what I was trying to show was that if you actually have macrophages where, IRF8 is switched off, you have breast cancer spreading from the primary, which is the breast to the lungs faster than if you have IRF8 switched on and overexpressed, which means there's more of IRF8 around. So that was what I was trying to show. So I, you know, we used the mouse models. We manipulated them in different ways, but yeah, that's that's what I was doing.

Maggie:
Wow. That's really cool.

Danielle:
Thanks.

Maggie:
Uh, how was it working with mice? Did you like it?

Danielle:
You know, mice are necessary, but, um, I won't lie and say that my first month working with mice was, was, you know, it was a ball. It wasn't, I was terrified because mice bite, um, and they're scared, you know, you're this big human and they're in this, you know, they're in this cage, they're really small and you're coming in and trying to grab them. But you know, after the first couple of months you just, you get used to it. Um, they stink, but they're necessary because a lot of, um, medical advancements have been made because of mice. And, you know, you do what you, must. Patients need to be cured.

[Transition Music]

Maggie:
Following grad school, you know, I know in academia, there's sort of this perception of like the track that you go on, where you go be a post doc and then you started a professorship somewhere, but, uh, you have sort of forged your own path. So I want to talk a little bit just about navigating those career changes and sort of deciding what your next step is going to be.

Danielle:
So when I was in graduate school, I had a moment, um, I can actually tell you the exact date, but if I told you the date, it would, you would do some back search and you will figure out what conference I was at. And then I could get into trouble. But I was at a conference and the speaker was giving a talk and it was so inaccessible. And I was so upset. I don't know why I was so upset. I was just like, why are you talking about this in such a dull way? Oh my gosh. And I said, you know, I'm going to make science accessible to people because science makes the world come even more alive. Because if you understand why leaves are green, if you understand why we need earthworms, if you understand why we need vaccines, then you can go through life feeling a little bit better about things that are going on. And so I challenged myself to, uh, take part in a TEDx Buffalo talk. That was also kind of, um, it was kinda selfish because I wanted my parents to understand what I did.

So I gave a TEDx Buffalo talk. And from then on, I said, I wanted a role after grad school that would allow me to still use the scientific training I had, but also communicate science, um, to different people. And honestly, at the end of grad school, I was very burnt out. So I didn't want anything to do with cancer. I said, I need a break. Cause it took me six and a half years to finish. And so I applied to a company that used magnetic levitation to separate cells based on their density, if you can believe that. I thought they were having me on. I said there is no way, what? Magnetic levitation was in Black Panther! This is not real. But yeah, it ended up being real.

And one of the greatest experiences of my life was working at this company. I learned so much and it was awesome to transition into that company because it was a small startup. So I had my

foot in industry, but it wasn't like overwhelming, you know, working in like a big corporation. So it was great to learn, you know, the ins and outs of how decisions are made it's way faster in industry than academia. Um, I was very, I had access to the CEO. I had access to the vice president of R&D. So then that kind of access gives you, you know, a chance to be in the room where decisions are being made, which is something that you don't get in academia for a very, very long time. And so was it terrifying? Absolutely, but I relied a lot on my friends who had also left academia and I, you know, I asked them, you know, how do I navigate this? You know, I've never experienced this issue, come up in academia, but it's here. So can you tell me how you have done it? And you know, I can go on from there. So it's really important to have to have in your pocket people who've done it before. So that it's a little less scary. Um, and you know, that you can use them as a resource.

Maggie:
So I have also been in talks that were very boring and inaccessible and I'm, I wonder why is it so difficult for scientists to communicate their work effectively sometimes?

Danielle:
Hope I don't get in trouble for this - but it seems as if people think that the more complex words you use, the more intelligent you are or the more you know your stuff. I think it's the opposite. I posit that if you can break your science down to a regular person, and when I say regular person I mean a non-scientist on the street, that's proof that you actually know what you're talking about and you know, there, but there is a time and place for, um, you know, making a talk complex or not. But even if you have to give a complex talk, you still have to tell me a story because every experimental question is a story. So take me through the narrative. Don't just throw data at me, I'm like, how, like, how does this fit?

And you know, we're humans, one of the, you know, ways we pass along knowledge from generation to generation is through storytelling. And I think that that is very important. It's a very easy way to learn. Think about all the facts you know. If somebody put it in a story, you're more likely to remember it than if somebody just threw the facts in the air and somehow you're supposed to catch it and remember it, it's not going to happen. So that's why I, I, I remember that exact talk and oof it is, I had to take, I walked out, I said, let me go have a little tactical cup of tea and calm down. Cause I was like, this is such interesting work. And you're not selling it at all!

Maggie:
Yeah. I think, I think scientists could definitely benefit from a storytelling class here and there.

Danielle:
Because all we do is storytelling. I mean, all the cells we study, they, you know, not to anthropomorphize the cells or anything like that, but everything we do, you know, there is a, there was a sequence to it. You know, there was a scaffolding, there is a building of something. And if you're able to bring that to life, then you show people what the science is not tell them what the science is. People learn easier if you can show it to them, because then you walk them through. It's like, you know, murder mysteries kind of thing you when you walk people through, they like, Oh, Oh, this makes sense. And that makes sense oh so that's why vaccines are important.

[Transition Music]

Maggie:
So I'd love to pivot now and talk a bit about your work with mentorship, because I know you're very involved with the mentorship organization. Uh AAAS with IF/THEN, so, uh, tell me a bit about the work you do with them.

Danielle:
So the AAAS IF/THEN initiative, also an ambassadorship, it was geared at increasing visibility, of women in STEM as role models for young girls. And so what that platform has given me is a chance to, you know, visit classrooms all across the country from my, my room here in California. And just talk about, you know, my journey as a scientist, especially as a black woman in STEM, because a lot of, a lot of kids, you know, when they think of scientists, they don't think of a black woman with blonde hair and purple lipstick, which is what I usually have on most of the time. So it's a way to influence the incoming generation and show them that, you know, you can also be a scientist and that there is no mold for what a scientist looks like.

You know, you make your own mold. And so what I have taken from that is, you know, there are 125 women. And so I have 124 women doing so many diverse things with their STEM degrees. And if anybody says, Oh, do you know any woman who does AI stuff? I'm like, yeah, I do. Here's an ambassador. Do you know somebody who has mixed their love for art and drawing comics with science? Yes, I do. This person Dr Jaye Gardiner let's go. So what that has given me is also it's shown me what else is out there that, um, you can do with your STEM degree. And if it's shown me, imagine what is doing for the young girls who- young girls and young boys who have varying interests, but don't know, you know, what you can do with it. And what we're hoping to build is a, is a legacy where people can reach out to us and ask us about our roadmaps as templates that they can build on for their journeys into STEM. And, um, yeah, I'm hoping we're doing that

Maggie:
That's really cool. So, uh, how did you first get involved with this organization?

Danielle
Good question. I applied. I'm a AAAS member, which is the American association for the advancement of science, um, fantastic nonprofit. And, um, they had a newsletter. I saw the, you know, the call out the call for it. And I said, Oh, this sounds like a really cool idea. And so I applied and I think they had over 600 or something applications and they had to choose a hundred, but because they said everyone's application was too good, they extended to 125. Um, but it's being funded by Lyda Hill, who is a millionaire that has vowed to give away all her money before she passes. And one of the initiatives that is really near and dear to her heart is, um, increasing women in STEM as role models for young girls. So I'm very, very proud to be an honored, to be a part of this amazing movement.

Maggie:
That's really fantastic. Um, so do you get to sort of connect with the young people individually?

Or is it more of like giving talks and things like that?

Danielle:
It's more like giving talks. So I, most of the time, the interesting thing is the high school students, they will reach out to you on social media, the young kids, they, you know, they don't have access to social media or anything like that, but if they do have questions, they ask their teachers to, you know, ask the question. And so the teachers will send emails and say, Oh, what do you think about this? Or, you know, come talk to us about that. My favorite so far, and I'm not supposed to have favorites, but I actually have a lot of favorites, but the one I can remember most recently I gave a talk somewhere. And instead of the host interviewing me, they had the students interview me. And so the questions they had were very valid and quite insightful. Um, and I thought that was so it was necessary because then you're not asking the questions that, you know, you're not asking trite questions. The students were asking questions that were on their minds, and I really, really appreciated that. So sometimes I get one-on-one, but most of the time it's, it's giving a talk and then liaising with teachers to, you know, answer questions or plan classroom visits.

Maggie:
That's really cool that, um, some of the older students can reach out to you on social media. Um, do you value those connections?

Danielle:
I really do because, um, there was this girl who reached out to me on Instagram and said, you know, you're really inspiring to me. I want you to know all about my wins. And every, like every six months to eight months, I get an update from her. Like, Hey, I applied to this and I got, I got into, thank you for encouraging me to do it. I'm like, Oh my God, this is fantastic. And so that kind of, that kind of connection really matters to me. I, I'm not in it for that, but if it's happening, I'm loving it. And you know, the cool thing, the coolest thing about this whole ambassadorship is we have statues. They 3d scanned all the ambassadors when we went for a summit in 2019, and we all have statues. It's going to be unveiled at some point, um, because you know, the pandemic got in the way, but I think they're going for the Guinness book of world records for the largest gathering of women, scientists, statues in one spot.

Maggie:
Wow.

Danielle:
It's going to be cool. But when you, when I think about those statues, I think about legacy. I mean, you think about all the statues you've seen and how you always step up to read, you know, the, the plate on it to see what they've done. And just the thought of being able to influence after I've gone, being able to inspire somebody after I'm not, I'm no longer here. It's very humbling. And it's a very powerful thing that keeps me going. So, yeah, I I'm, I'm thankful for all the connections I've made and will make even when I'm not here.

Maggie:
Yeah. Wow, I think to be a part of something like that would be so rewarding,

Danielle:
It is, it is a hundred percent.

Maggie:
So, um, yeah, I think we're getting towards the end of my questions here. Uh, but you are not just a scientist, you're a whole person. So what are some of the things you like to do outside of science?

Danielle:
I love dancing. It's a very interesting way to see how far your body can go. So I do hip hop, central dancing and that kind of thing. I also love to eat, which is why I can really relate to macrophages. Um, yeah. Point me to an Indian or Korean restaurant. I'm there. Um, otherwise I'm, I'm quite a square. I'm learning how to play like the electric guitar. Cause I love rock music, so yeah. And I, I, you know, I bought an air fryer during the pandemic, like everybody else and I'm obsessed with it. So yeah, if I'm not, you know, in science, you know, doing science behind my computer, I'm learning to play my guitar. I'm dancing, um, you know, babysitting my nephews cause they're really cute. Yeah. Pretty chill.

Maggie:
What do you like to make in your air fryer?

Danielle:
Oh goodness. I have perfected this fried chicken recipe that I just, it hasn't failed me yet. And I think I've made it almost every week the past, like, I don't know. I'm not going to tell you how many months. Um, yeah. And also whenever I bake vegetables and you know, in the oven and I, you know, I make a whole pan right. Using the air fryer to reheat vegetables after you add a couple more spices to it. Um, yeah. Always ask them paprika to your vegetables before you, you know, put them in an air fryer. Reviving them in the air fryer is the most rewarding thing ever.

Maggie:
Oh, interesting.

Danielle:
Yeah. Get an air fryer. It's worth it.

Maggie:
So is there anything else that you, uh, haven't gotten to talk about today that you'd like to say?

Danielle:
Um, no. I feel like I've hit it all. I just, you know, if there are any, if there are any children out there listening I just want you to know that if you are, you know, if you love science and people are calling you a nerd, please turn and tell them that nerds rule the world literally. And that, you know, there is no mold for what a scientist looks like. You can be a scientist and you make your own mold. You bring so much to the table and we really need that diversity of thought because that's how the world will advance into a better place. So please don't give up on your dreams and

if you need help, always reach out, always reach out and ask for a 15 minute meeting just to talk to a scientist about how they did what they did. Yeah. So stay yourself. It's the best way.

[Outro Music]

Maggie:
Amazing. Well, thank you so much for taking the time to talk. It's been so great to hear about your research and your journey. Um, where can our listeners find you if they want to know more?

Danielle:
Absolutely. So you can find me on Twitter and Instagram. Uh, it's funny how you said I forged my own path because my Instagram and Twitter handles are @forgedonyx, F O R G E D O N Y X. And so just reach out to me there. My website is coming soon. It is coming soon. I promise.

Maggie:
Great. And we'll put all that information in our show notes as well.

Danielle:
Awesome. Yeah. So yeah, please feel free to reach out and I, if I can be of any help, I'll try.

Maggie:
Great. Thank you so much.

Danielle:
Thank you.

Maggie:
This episode was produced by me, Maggie Colton, with help from the rest of the team at Carry the One Radio. Thank you so much to Dr Danielle Twum for taking the time to speak with me. You can connect with her on Twitter or Instagram @forgedonyx. Music for this episode is by Valentin Sosnitskiy.

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