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Speaker 2:

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Matthew Underwood:

Welcome to Further together, the ORAU podcast. My name is Matthew Underwood. I work in the communications and marketing department at ORAU, and we're super excited for this episode. We have one of the fellows in the NASA postdoctoral program with us today to talk about research, and all the fun, exciting things that they have going on. So, Bradley Gay, welcome to the program. How are you today?

Bradley Gay:

Thank you so much, Matthew. It's great to be here. I'm doing well. How are you?

Matthew Underwood:

Doing good. It's one of those days. We're making it through, and surviving, and technology's working. So it's always a good day. So, Bradley, first just talk about who you are, your background, and how you got to be where you are today.

Bradley Gay:

Sure. Well, my story is a long-winding topsy-turvy journey, but I guess I'll essentially start with my name, Bradley Gay. I came to know about the NPP program through a bunch of mentors at Goddard, and actually, worked with a project investigator affiliated with the Arctic Boreal Vulnerability Experiment campaign.

And I had been working with them for about five years, and it was through this permafrost modeling group where I came to become acquainted with my current mentor at JPL, Dr. Charles Miller, Chip Miller. And he is responsible for the airborne campaign. And so, one thing led to another, and we hit it off right at the get-go. And yeah, the rest is history.

Matthew Underwood:

That's awesome. So looking back on your pathway, have you always had an interest in science? Was it something that you got at an early age, or where was the point in life where you really decided, "I want to pursue a STEM career"?

Bradley Gay:

Oh, gosh. Again, a long, bendy, twisty journey. Honestly, ever since I can remember. The earliest memory of me being interested by the earth system, and all of its inner workings was just playing in the backyard. There was a creek behind my house, and as soon as I got home from school, I saved my homework for later in the evening. Which I still do now in terms of writing and stuff.

But I immediately bolted to the creek just to play in the dirt, and get my hands dirty. Honestly, ever since then, I was enthralled by how everything worked together in unison to create this microhabitat that I became fascinated with. Although, my research tendencies have shifted to the Arctic. I guess, my background, I always contemplate, and reflect, and go back to that period of time. And I miss it, I really do. The simplicity of just being in awe.

Matthew Underwood:

Absolutely. So you mentioned your Tundra interest in your research. So talk a little bit about your research at the NPP, and what you're focused on.

Bradley Gay:

Sure. So I guess the proposal itself was primarily focused on generating the circumarctic zero-curtain and soil respiration maps, and there's a lot of terminology there that I'm happy to indulge. Curiosities, if need be. For the past 30 years, we've been undergoing this climate crisis, and especially up in the Arctic. There's this phenomenon called the permafrost carbon feedback, and essentially, what we wanted to do was to identify the problem.

Which is this kind of persistence of this carbon storage within permafrost being thawed out, and released. Liberated into the soil. The microbes, essentially, ingesting the carbon, and then releasing methane into the atmosphere. So that was the gravitation, but also, I wanted to dig a little deeper. There's a lot of studies that look at permafrost, carbon stores, and just fluxes and stuff like that. And a lot of research with freeze-thaw dynamics.

And quantifying the rate, and magnitude, and extent of how permafrost thaw is progressing under a warming climate. So this particular research is focused on, again, generating the circumarctic zero-curtain maps, and the zero-curtain is this... I want to describe it as kind of a physical boundary that prevents the permafrost table from cooling. It's a lens, so to speak, below ground. And it's a period of time, too. So it's interesting. It's a phenomenon. It's an effect. It's this kind of dynamic between this freeze-thaw.

And it's actually a period of time when the temperature of the active layer of the soil, which is above the permafrost table, remains near zero degrees due to the release of latent heat from freezing water. And that progresses through the season. Pretty universally, usually it would freeze up around September. And now, we are seeing it actually gravitating more towards the cold season, which is actually allowing more and more carbon to be released into the cold season. Which is, essentially, extending the growing season, and amplifying that warming effect.

Matthew Underwood:

Awesome. That sounds like really fascinating research, and like you've seen, these studies have been showing over time that this is happening. So it's really interesting to hear about some of the research behind it, and the cause and effect of the whole situation. So during your fellowship, how would you say that your time at NASA has really impacted your career thus far?

Bradley Gay:

Oh, gosh. That's a great question. In these uncertain times, I can't imagine not working at NASA. I basically started my graduate program, my PhD program, in 2019. And the following summer in 2020, during the pandemic, I was essentially invited by Amanda Armstrong at Goddard to help out with her permafrost modeling team. I guess it's not really a permafrost model. It's an individual-based force gap model, but it essentially has a module that quantifies permafrost thaw. And I was invited, actually, about a week before the start date.

So it was very abrupt, and random. But I was super grateful, and said yes. And I worked with them for about three and a half years, and kind of integrated that work into my own research and dissertation work. And we can get more into that later on, but it's in my blood at this point, working at NASA. And it just seemed appropriate for me to gravitate towards, not only the NPP program, but utilizing my skill sets that I had learned essentially from NASA, and working with NASA colleagues. Again, utilizing my skill sets, and furthering their missions.

Matthew Underwood:

That's awesome. I love that. So you have this almost journey within NASA itself. So you mentioned a couple of the people that have made an impact on you. Such as, your mentors, and things like that. What role, would you say, mentorship has had in your career thus far?

Bradley Gay:

That's another great question. I couldn't imagine where I would be without them. I know that sounds corny, and cliche. But they've been there through the best of times, and the worst of times. And what's interesting just with mentorship in general is there's no real hierarchy. I felt like an equal, and it felt really humbling to actually... Not share that mentorship because there is ultimately the mentor, and the mentee.

But for mentors to feel comfortable, to be vulnerable, and communicate with me that things are busy and hectic. And it allowed me to actually see from a different lens, these senior researchers going through similar things as me. So again, that's kind of cliche and corny, but it just gave it a human element to experiences that I had during academia that were far from that. And again, without that, I don't know where I'd be, to be honest with you. I know that having this opportunity to be a mentee, and now, carry the torch and be mentors for other undergrads, and grad students. It's just been a humbling experience, and I couldn't have got here without them.

Matthew Underwood:

So you bring up that other piece of you being a mentor to other mentees. What is your role there, and what message do you really try to send to the people that you're mentoring?

Bradley Gay:

I'm a mentor for a number of students at George Mason University, and one or two at Caltech. And I say one or two in a gooey way just because there's not an official mentorship program that's associated with us, but I consider them mentees. And they come to me for advice, and guidance. And even people in the non-science field. I've got a couple of theoretical physicist students that we chat about different ideas in terms of proposal writing, and we actually just did an earth data musical by Caltech.

Matthew Underwood:

Oh, that sounds fascinating. That's awesome.

Bradley Gay:

So that all just got born out of just communicating with different individuals. Both students and faculty, and the drama department, theater department at Caltech. I mean, we talk about just this mentor-mentee relationship in terms of career aspects, but there's a lot of things that are going on in each other's lives that we can help out with.

And also, collaborate on. If we're talking about the EARTH DATA/THE MUSICAL piece, for me, it was kind of nice to bring me back to my other love, which was art. And again, that's kind of going back to the topsy-turvy life journey, and that's where it was nice to get back into that frame of mind. To combine art, and science. That's my wheelhouse. [inaudible 00:13:20].

Matthew Underwood:

That's so cool that you were able to bring that back around to two things that you love, and bring them together again. That's cool. I love the fact that you also bring up mentors in more of a personal aspect. People think of mentors as, "They're mentoring me about research, and science, and that kind of thing," but I love how you bring up, also, the personal.

You're having a bad day, or something's not right, or you're having trouble with something. Hey, they're also there for those reasons as well. So I love that kind of piece of what you mentioned. You also brought up collaboration, and as everyone knows, collaboration plays a huge part in science. So talk about your experiences with collaboration, and teamwork. Both at your fellowship, and in your previous stops.

Bradley Gay:

Sure. That's a great segue. Do you mean in terms of just mentorship in general, and the collaboration aspect? Okay.

Matthew Underwood:

Yeah, or even-

Bradley Gay:

So I learned a lot about...

Matthew Underwood:

... collaboration you've had with other scientists, or any kind of collaboration. How does collaboration really play a role in your day-to-day work?

Bradley Gay:

Oh, it's absolutely crucial. What I mean by that is I've been operating in this mindset since my postdoc. Well, during my academic career, it felt very much like a solo journey. I don't want to speak ill of anyone in my department, or anything. Ultimately, they got me to where I needed to be, and gave me the tools. But in terms of collaboration, again, going back to NASA.

I not only was able to network with a bunch of different team members, but I was given the opportunity to go and present at AGU, EGU, all these different conferences with this little minutia of research that I was contributing to their project. And able to present, and also, interject a little bit of my research. And that was not only a humbling experience in terms of being able to present, and lend credence to what we were doing.

But also, see how that collaboration factor factored into being able to not only network, but also, see synergies. Where there is other people doing similar things, and possible research where it could fill in gaps where we were stumbling. To me, that's the whole point of science is you can't do it all on your own. And for the longest time, I was trying to do that. Not because I wanted to, but because I just didn't have that sort of capability until coming on in the summer with NASA.

Amanda Armstrong was part of my dissertation committee, and she remains one of my mentors. But also, Chip Miller, again, has continuously emphasized the importance of collaboration. And every week, we have quiet hours where we talk about not only this research, but also, potential ideas. And even just off the cuff elevator pitches. Just not only to communicate our research to the scientific mass, but also, to a general audience.

So getting back to the collaboration aspect, I just think that you can't do this alone. And if you think you can, that's wonderful. But at the end of the day, it comes down to teams. And without a team, I really don't know. Yeah, you're pretty much drifting out in the ocean. And you need to be able to have a couple life rafts, or even just a couple of vessels around to knock ideas off of just to validate your methodology, your results. There's always going to be flaws, but make sure that it's valid and true.

Matthew Underwood:

Yeah, absolutely. Like you said, just having somebody to bounce ideas off of is always helpful when you're working on a project, or whatever it may be. So that's definitely a good take away from collaboration. Even if you're not directly working with someone, just someone to say, "Hey, what am I missing? Is there something that I'm not seeing?" Something like that. So I love that. So from an outsider's perspective, what advice would you give to an up and coming scientist who one day wants to work with NASA, or do what you're doing? What advice would you give to those people?

Bradley Gay:

My advice would be, do not be intimidated. Do not be afraid. Do not hesitate. There's always going to be work that needs to be done. And if you stumble across some research that sounds interesting to you, or maybe it's completely relevant to what you're interested in, and you want to get applied knowledge for what you're working on. There's no shame in cold emailing, cold calling. So yeah, that would be my advice.

Not to hesitate. Don't be afraid. Reach out to anyone that's doing really groundbreaking stuff that you're interested in, and I mean, there's no shame in that. And that's where I started off. It's hard to think about casting a wide net, but there's no shame in casting a wide net. But also, narrow nets. So that's my advice. And also, not to be upset if you don't hear immediately back from a lot of these researchers. They are busy, and I'm sure get a lot of emails. And again, I received my opportunity randomly, and within, again, a week of the project start date. So, yeah.

Matthew Underwood:

You're one of those case scenarios. You never know what's going to come up. Right?

Bradley Gay:

Exactly. You have to try. There's no shame in trying. And you need to keep trying, and try again.

Matthew Underwood:

I love that advice of don't be afraid to... If you see an application, or something. Don't be afraid to just try it. And if it's something that interests you, you just give it a shot. Right?

Bradley Gay:

That reminds me of this saying. I think it's actually a song. "Trust your cape. Always trust your cape."

Matthew Underwood:

Okay. I've not heard that. Yeah.

Bradley Gay:

Yeah. It's a nice motto to live by. Just basically taking the plunge. Just taking the leap of faith, and trust your cape.

Matthew Underwood:

Absolutely. So speaking of that, if others are looking for opportunities, why would you recommend applying for the NASA NPP?

Bradley Gay:

Why would I recommend applying to the NPP? First of all, the mentorship. It's one-on-one. I can't speak to all mentors, but I'll just speak to my experience. It's one-on-one pretty much all the time. The vast array of tools and knowledgeable people that are not only associated with NASA, but at ORAU. Even the Concur Travel people. This is kind of like an Oscar thank you ceremony because I can't speak negatively about it at all. I will say, there is some uncertainty.

I'm nearing the end of mine, so I've got about six months left in my second year. But I guess what I would say about the NPP is that it prepares you. You're permitted to actually do what you like to do. So what you propose in terms of your research proposal, you are going to work on. You're not going to be working on someone else's research for 10, 12 months. For me, it worked out really well. I was actually trying to finish up my second paper from my dissertation that led into this actual proposal, science-ready products, that I'm working on as well.

So it's very malleable. It's flexible. It has, again, so many tools. So many wonderful people that come to your aid that are very responsive. And ultimately, I think, prepares you for a career with NASA. We're in uncertain times, and everyone knows that. But I think, for the most part, it prepares you, and allows you to fine tune your skill sets. And also, work with so many wonderful people that are outside of your section, your group.

The world is your oyster, honestly. And people are very willing to take you on in terms of learning about your research, and you're like, "Oh, okay. Here's a gap filler." And it's just been a wonderful experience, and I'm very grateful to be given the opportunity to do this. I can't think of another program that has that amount of flexibility, but also, has the X factor. In terms of, sure, it's great on a resume, but again, there's a reason why it's great on a resume. And it speaks to the toolkits, and the people that run it. And also, the opportunity.

Matthew Underwood:

Absolutely. I love that. Bringing in all the different aspects. Some things that people might not even think about. The research, and then the mentors, and then down to the travel people that help coordinate things. There is a lot that goes into it that people don't think about. So it is good to mention all those different factors. So Bradley, final question. People cringe at this question sometimes, but that's okay. So either in your work, or outside in your personal life, what brings you joy?

Bradley Gay:

What brings me joy? I will answer that with two answers. Just because, in the spirit of the holiday season, being with my family grounds me. It's been a pretty stressful time right now. So being around family has allowed me to ground myself, and focus. And also, think about the future a little bit. But the other side, I want to say just in general, what brings me joy? It's kind of cliche, but the mountains are my chapel. I absolutely love hiking, and going out. Returning to my roots, and just getting my hands dirty, and listening to the wind, and just kind of getting lost off the trail.

Matthew Underwood:

So full circle from going to the creek behind your house all the way to the mountains?

Bradley Gay:

Yes, exactly.

Matthew Underwood:

Awesome. Well, Bradley, thank you so much for joining us today, and talking about your research, and your pathway, and your journey. We really appreciate you joining.

Bradley Gay:

No problem. Thanks again, Matthew.

Matthew Underwood:

Thank you.

Speaker 2:

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