Michael Holtz:

And it's like you're starting out on probation.

Ben Hord:

Right, right. He's like, "We'll see about you. We reserve the right to can you at any moment, so don't get too comfortable."

Michael Holtz:

[inaudible 00:00:13] things.

Ben Hord:

Right. Exactly.

Speaker 5:

You're listening to Further Together, the ORAU podcast. Join Michael Holtz and his guests for conversations about all things ORAU. They'll talk about ORAU's storied history, our impact on an ever-changing world, our innovative scientific and technical solutions for our customers and our commitment to the communities where we do business. Welcome to Further Together, the ORAU podcast.

Michael Holtz:

Welcome to Further Together the ORAU podcast. As always, it is me, your host, Michael Holtz from the Communications and Marketing Department at ORAU, and I am in the midst of a series of interviews with NASA postdoctoral fellows. ORAU manages the NASA postdoc program, and I get the opportunity once a year to talk to a number of fellows about who they are and the research that they're doing, and at the end of the day why it matters to us. So I'm pleased to welcome to the podcast this episode Ben Hord. Ben, welcome to Further Together. I'm so glad you're here.

Ben Hord:

Great. Yeah, thank you so much. It's great to be here.

Michael Holtz:

So Ben, you are a NASA postdoc fellow. Where are you in your fellowship?

Ben Hord:

So I just started my second year in my fellowship.

Michael Holtz:

Awesome, and what is your research focus?

Ben Hord:

Yes, my research focus is on exoplanets, exoplanets, other stars.

Michael Holtz:

Okay.

Ben Hord:

Currently, my day-to-day work is in support of NASA's upcoming Pandora SmallSat mission and Pandora is a mission that will launch in fall of 2025 and it's going to look at least 20 different exoplanets and their host stars in order to study the atmospheres of these exoplanets as well as how the host stars interact with the measured spectra of these atmospheres so that we can disentangle any contamination that the star is giving us in order to look for compounds such as water in these exoplanet atmospheres.

Michael Holtz:

Awesome. So Ben, why is it important for us to understand exoplanets and what's happening on their surfaces, in their atmosphere, et cetera?

Ben Hord:

I think that's a really great question. I think you could take it in an introspective direction and say we would love to know where we come from. We know that the earth is pretty special. It's the only planet that we know of that has life, which I think is very cool. I love all the life on Earth. But it's kind of a big mystery why it's the only one that we've found so far. The universe and the galaxy, they're so big, why haven't we found anything? Is there anything out there? And so it gives us a touch point to ourselves within the cosmos.

You could also take that question from a more outward-looking perspective and say, well, this planet is great, but there have to be other planets out there with life and so let's go find them. Let's actually try and do the work to look for the biomarkers and the compounds and the right conditions that could host life so that we can contact it if it's intelligent or hide or decide what we want to do, but just see what's out there. We don't want to walk through the woods and keep the woods dark. We want to illuminate the woods and see what every tree looks like.

Michael Holtz:

From your perspective, Ben, do you have one or both of those philosophies or are they both sort of exciting paths for you?

Ben Hord:

I think that they're a little bit intertwined. I think in order to do one, you have to do the other. I think it is really a matter of which one you care a little bit more about, but I do think that they are connected. In order to understand oneself, you have to understand what is not oneself, and so I think both are a bit exciting in that regard.

Michael Holtz:

Okay. Ben, what was your trajectory to get to the NASA postdoc program?

Ben Hord:

I think mine may have been a little bit more windy than some. I've always loved astronomy ever since I was young. Space is fascinating and the universe is wondrous, but astrophysics is actually my third string career. Originally I thought that I was going to go into film, so right out of high school I applied to a bunch of film schools. I really wanted to be an editor and I didn't get into any of them, which was a bummer at the time, but I ended up going to a normal four-year university and I fell in love with history while I was in college.

So I do have a degree in history. I ended up getting a degree in history, but not too far into my studies. I met with one of my favorite professors and I said, "I would love to follow history as a career path. I think it's fascinating." And he agreed. He said, "History is fascinating. However, if you want any shot at a middle-class lifestyle, you probably don't want to follow academic history." So that was a bummer to hear at the time, but history remains one of my great hobbies and I switched over to astrophysics because I had always loved the universe and I had taken an introductory physics course because I thought it would be interesting, and it was.

So the rest is history. I did some research in college during the summers and during the school year. I did all these astronomy electives and I was hooked. It was great. And from there I graduated with a double major astrophysics and history. I went to graduate school at the University of Maryland where I did my PhD in astronomy. And then right out the gate I ended up obtaining this fellowship at NASA and I have never looked back. I think that I would've been a very different person if I had done either film or history, but I don't regret the person that I am now. I think this is what I was meant to be doing.

Michael Holtz:

Awesome. As a history hobbyist, is there a particular aspect of history that you enjoy most?

Ben Hord:

Yes. So I ended up writing a thesis for my history degree, not for my astrophysics degree, mind you, but I did write a thesis for my history degree that was on pirates during the golden age of Piracy. That was Pirates of the Caribbean type pirates.

Michael Holtz:

Sweet.

Ben Hord:

Specifically the ones that were operating out of Port Royal, Jamaica. And how an earthquake devastated Port Royal, Jamaica and how that changed all of their dynamics and the economics of it. And it's something that I find fascinating. I love the movies. They're not too bad historically, minus the magic, but-

Michael Holtz:

Right, right.

Ben Hord:

... I'm a sucker for pirates.

Michael Holtz:

Very cool. I love that. Ben, is there a particular aspect of science that you find empowering?

Ben Hord:

That's a good question. I have been thinking a lot recently about how much of science nowadays has become very public-facing. I think that NASA's trend towards fully publicly accessible data, crowdsourced ideas and public feedback on missions, it is really inspiring and I think that it drives home the point that anyone can really be a scientist. A lot of us have all these fancy degrees and go to these institutions, but I'm involved with quite a number of projects that rely on citizen science, just people with telescopes in their backyard. And I think it's very empowering for someone who might not have had the opportunity to follow the normal academic path that I and others have to still engage with it. Because just because you're not doing it for your nine-to-five job doesn't mean it goes away.

And I think understanding how it works and what's out there and how the universe affects us down on Earth in our day-to-day lives or even on a global scale, I find that really empowering and I think that that's an aspect that I really hope to see grow as NASA continues on into the future. And I think with increased connectivity, it only will grow. But this democratization of science, I think can be not only empowering, but I think could be a really powerful tool for unlocking new discoveries. Who knows what people might notice that professionals don't pick up on? People are great at recognizing patterns, and if you get in the weeds with the data, sometimes you lose sight of the bigger picture or you skip over something. And so this idea that anyone can do science, I really love that.

Michael Holtz:

Awesome. You mentioned citizen science. Talk about the role of citizen science in the work that you do, if there is one.

Ben Hord:

Absolutely. So one of the collaborations I'm part of is called Exoplanet Watch, and it's a network of individuals around the world who have telescopes in their backyard or even don't have any telescope at all. And what these citizen scientists do is if you have a telescope, someone like me could say, "Hey, I am studying this hot Jupiter, or I want to catch a transit of this exoplanet. I don't have any telescope time, nor would it necessarily be a great use of a giant multi-meter class telescope to just check on this transit. Could you all look at it?"

And they get excellent data and they all go out with their telescopes and they know way more about actually observing with a telescope than I do. And they look at all the data. And this is particularly useful for updating the transit time. So when exactly does a planet cross its star? We think we know, but there's some uncertainty to it. And the longer you let it sit, the greater that uncertainty goes until you end up getting time on the James Webb Space Telescope and you look at the planet and then you miss it and you've completely wasted all of this JWST time.

And so this is really important to do, especially because these users are throughout the world and they can catch different parts of the sky during different parts of the year, and they can see all these things that my favorite observatory or the observatory I have time on doesn't necessarily see. So that's useful, but for all the people who don't actually have a telescope, there is data available from a robotic telescope that they can just take and analyze and look at, and it helps parse what's good data, what's bad data, what's worth follow-up.

Again, refining what this transit time is when these planets transit. If a star is variable, seeing the change in brightness of a star, not just from a planet, but from things like star spots or the rotation or flares. Having people that can dig into this data is a huge boon for something like what I do on the Pandora mission because Pandora would love to know when these planets transit. Pandora would love to know if the star is active and variable because these are core aspects to what we want to solve. We want to know how is the star affecting the atmosphere of the planet that we measure.

Michael Holtz:

Gotcha. That makes perfect sense and that sounds really exciting for people who are citizen scientists or may want to get involved in a project like yours. So that sounds, again, to go back to my earlier question about empowering and exciting to like, "Hey, you can be part of this and you don't have to work for NASA necessarily to be part of the project."

Ben Hord:

Absolutely, yeah. And the project is recruiting new members, so shameless plug for Exoplanet Watch if anyone listening wants to participate, it's low commitment.

Michael Holtz:

Exactly. That sounds great. Ben, you've talked about having a couple of different potentially film school history degree. Were there obstacles that you had to overcome to get to where you are just in addition to just changing of interests and that sort of thing?

Ben Hord:

Yeah, I think there some. I don't think that I had a very robust physics education growing up, so I think it was a pretty steep learning curve. My first semester of introductory physics, I got a C+ and I was devastated because I was like, "Oh my gosh, really? I thought that I was doing so well. I'm so interested in this." [inaudible 00:14:27].

Michael Holtz:

I'm supposed to be doing this, right?

Ben Hord:

I want to be doing this. This is not a huge vote of confidence. And then second semester I'm like, "All right, let's buckle down." C+ again. And third semester, believe it or not, C+. But then it's like, "Okay, well let's take a step back. What's actually going on introspection? What are the strategies that I need? Is it like an attention span thing? Is it an environment thing? Do I need to change something in my life?" And there was a lot of personal growth in confronting this type of challenge that the thing I want to do might not be for me. And overcoming that through working on my mental health or strategies to tackle problems or work-life balance and things like that.

And every single semester I did just a little bit better and setting that goal of just as long as I'm doing better than I was before in all these classes, that was what was important to me. And by the end of college, I was getting A's and doing research on the side as well. I think the research is where I really shown not the classroom stuff, and I think being in this system where you have to exist in this classroom environment and the classroom environment is just one metric of success. That was tough for me and it was discouraging, but I think the research is where I really shone, and I'm glad that I got the opportunity to do both.

So I know that that's not a particularly unique challenge that many people in the field have faced, but I do think it was fairly formative in my path to getting to where I am. I think I received a lot of no. I think I received a lot of people telling me I can't do it, I shouldn't do it. And I've realized that it really only takes one person saying, "Yes, I do believe in you," or, "I would like to hire you," or, "Yes, you can take this class." I think it really only takes one, and that's a lesson that has stuck with me this entire time is that you got to fight through the no's and you got to see why they're saying no first, but fight through the no's till you find that yes, and you'll end up where you're meant to be.

Michael Holtz:

So for you, Ben, what or who was that first yes?

Ben Hord:

That first yes was, it's actually a funny story. That first, yes, was a faculty member in the Department of Physics at Columbia University where I did my undergrad, Chuck Haley, shout out to Chuck Haley. I cold-emailed people asking for research opportunities over the summer, and I was so clueless. I was emailing people way too late. Positions had been filled and people were either not answering or telling me no, and he was actually one of the only people who responded to me saying something other than no, but he didn't say yes either. He emailed me to say that I'm doing this completely wrong, that I didn't even have a correctly formatted CV, that I am in the game way too late that I'm asking about the wrong things, was kind of like a chastisement more than it was an answer.

And so I was like, "Oh my God, I'm so sorry. Here's everything formatted. Here's everything you asked for." And he's like, "Okay, fine. We can meet." And I was really intimidated at this point, but I met him in his office and I will never forget after the nice to meet you's and the pleasantries, the first thing he said to me is, "So what's your defect?" I thought I had misheard. I was like, "I'm sorry?" He's like, "Yeah, what's wrong with you?" I was so taken aback. I was like, "I don't know. I don't understand. What do you mean?" He's like, "Well, why don't you have everything? I've seen your CV. You're clearly a driven person and you have the technical skills to do this. What are other people seeing in you that I'm not seeing in you that are causing them to not hire you?"

I had to be like, "I don't know. Everyone just keeps saying, no, maybe I'm emailing it too late. Maybe I'm not asking the right people. I'm not sure." And so he said, "Okay, fine. You can work with me this summer, but essentially you're on thin ice." And it ended up working out great. I worked with him for many summers and throughout the year, the school year, and I was on multiple papers including one in Nature. It was a fantastic research experience, and I talked to him and another research scientist that I worked with after the fact, and they were like, "Yeah, we had such low expectations for you, but you blew them out of the water." And I was honored, but I thought it was just so funny that from such a kind of awkward, terrible situation, something so great could come out of that, but it was one of the best research experiences I think I ever had.

Michael Holtz:

That's amazing. And it's like you're starting out on probation, right?

Ben Hord:

Right, right. He's like, "We'll see about you. We reserve the right to can you at any moment, so don't get too comfortable."

Michael Holtz:

[inaudible 00:19:55] things.

Ben Hord:

Right, exactly. But I look on it fondly. I think it was very formative and I did great work.

Michael Holtz:

He was great in that A, he helped you shape your CV. And then after that met with you, but then even with that whole thin ice, he was the person who saw the potential.

Ben Hord:

For sure. Absolutely. And it didn't occur to me at the time that he saw that potential, and it was only after I went through the wringer and I had to buckle down and be like, "All right, okay, this is it. This is my one shot. We're going to make the most of it. We're going to do it. We're going to work hard." It was really only after the fact that I was like, "Oh, wow, okay. I might've had more lee way. Like they are actually kind of impressed." Maybe I shouldn't have been as scared, but I wanted to do such a good job.

Michael Holtz:

Right. Absolutely. Ben, for, and I guess along the lines of what we were just talking about for young up-and-coming scientists who may be listening to this and want to follow in your footsteps, be a NASA postdoctoral fellow, work in physics, what advice do you have for them?

Ben Hord:

Yeah, I get asked this question fairly frequently and I have kind of two answers. One's helpful, one's not helpful. The helpful one is don't ever give up, but know when to quit. And that means always go for what you want to do, persevere in the face of adversity, but if a particular situation's not right for you, it's okay to throw in that towel and say, "I need to move on to something else." Know when to be done with something, but never lose sight of the overall goal in a more realistic kind of realm.

I would say don't be afraid to just ask people to do research. There's plenty of opportunities out there. There's things you can even do on your own. This field is so research-driven, so technical skills-based that it's a great idea to get your hands dirty with some data, get your hands dirty with some code, with some math. It's daunting, but get in there and play around with it. That's what saved me on more than one occasion is I was just the person who was willing to get into the data or had the most experience in just sitting down and trying to figure out this code.

It could be terribly documented. You could have no idea. It could be written in a language that no one's used for 20 years, but if you can just fight through it and just use it a little bit, I think that really goes far in finding a place for yourself in the field because it is so research-driven assuming you want to get a job. If you want to just love the universe, no one's stopping you. Love the universe. Who am I to tell you not to do that? Look up at the sky every now and then. There's honestly nothing better than that. I need to do that sometimes to just remind myself how cool this is.

Michael Holtz:

Right. Absolutely. I love that. Ben, have you yet had the experience of someone dashing off a note to you saying, "Hey, I read your paper and I really want to learn more about your work or anything like that?"

Ben Hord:

I have, and it was a really surreal feeling that one, my work would be read by someone else, let alone admired or appreciated. I was at a conference not long ago and I was kind of just wandering through and chit-chatting, making small talk with people, and I met someone and my name tag was turned backwards, so I took it the right way, and they're like, "Oh my God, you are Ben Hord, the mastermind of WASP-132 c," WASP-132 c being a planet that I wrote a paper discovering, and I was like, "Oh, I don't know if I would say mastermind. I think that's maybe too much of a compliment. I'm just Ben. I sit down at my laptop and I make the computer go beep boop, and I see the numbers. Mastermind. I appreciate it, but Mastermind seems like a bit above my pay grade if I have to be honest."

But it's true. I think it's very humbling to talk to even peers. I'm in awe of my peers and they're in awe of me. Everyone's doing such cool stuff that it's a humbling experience not only to do it, but to talk with them to see what they're doing and for them to appreciate what I'm doing. And one of the things that I love to do is actually outreach, talking to elementary schools or senior citizens or doing public observation nights or things like that, because everyone loves to come up and everyone who comes up has the one question they've always wanted to ask someone from NASA. And that person, I guess is me, and never in a million years would I have thought that that person is me, but they all really want to ask their one astronomy question to the person from NASA, and it grounds me, and I think it rekindles my excitement in space and in the field. It's a really great feeling.

Michael Holtz:

I totally get that. And I like that description of, "You're the guy."

Ben Hord:

Right. I don't feel like the guy, right?

Michael Holtz:

NASA [inaudible 00:25:47] right?

Ben Hord:

Yeah. Oh, yeah, "He's the space guy. Go ask the space guy."

Michael Holtz:

Right, right, right.

Ben Hord:

"Oh gosh, really?" Okay.

Michael Holtz:

Ben, last question for you. What brings you joy?

Ben Hord:

What brings me joy? That's a good question, and we might need a whole other half hour to unpack that, but if I had to give a really quick answer, one of the things that brings me joy is I think seeing people's faces light up. Whether I think I see that in life giving a gift or making someone telling a joke or putting on a show that people enjoy, but I see it professionally in explaining something to someone and then they get it.

I saw this when I was teaching. I see this when I do outreach. I love that moment where people themselves feel joy because they've just figured something out or they just learned something, or it's like they've thought about something in a new way, and it's that moment of their own kind of reflection or growth that I think keeps me going and gives me a lot of happiness because it's like a candle, right? I'm happy to burn, but if I can like someone else, my own joy isn't diminished, but I get to help someone else with theirs, and I think that I really like that a lot.

Michael Holtz:

Oh, I love the candle description. That's really amazing. I like that a lot. Ben, thank you so much for spending this time with me. It has been a joy getting to know you and talk about your research and your work, and just I'm so glad we got the opportunity to do this today.

Ben Hord:

Yeah, thank you so much for having me on. This has been a blast.

Michael Holtz:

Absolutely.

Speaker 5:

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