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Michael Holtz:

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Speaker 2:

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 ever, it is me, your host, Michael Holtz from the Communications and Marketing Department at ORAU and regular listeners to this podcast know that on a fairly frequent basis, I get the opportunity to talk to NASA postdoctoral fellows because ORAU manages the NASA postdoc program, and this episode is no exception. I have the opportunity to talk to Chinmayee Govinda Raj, who is a postdoctoral fellow at NASA. Chinmayee, welcome to Further Together. I'm so glad to have you here.

Chinmayee Govinda Raj:

Thanks a lot, Mike. This is great to be here.

Michael Holtz:

So tell me where you are in your postdoc, what year and your location and what your research focus is.

Chinmayee Govinda Raj:

Yeah, so I am an NPP fellow with NASA Ames. So I'm here in California, Bay Area. I just started my second year of postdoc, so literally one month into the second year of my postdoc program.

Michael Holtz:

Excellent.

Chinmayee Govinda Raj:

I exclusively work on the LEIA project. LEIA is the Lunar Explorer Instrument for space biology applications, which is coming up on the Artemis Mission. It's one of the Artemis missions, actually.

Michael Holtz:

Awesome.

Chinmayee Govinda Raj:

Artemis two, I should say. So we are sending microbes to space. We're sending microbes to the Southern Hemisphere of the moon on a lander, and we will be looking at the microbial response to the lunar gravity, which is very different from what it is on earth. And also the radiation that we have on the lunar surface is different from what it is on earth. So those are the changes that the microbes will have to adapt to, and we're trying to see how those adaptations happen. We are trying to see how the microbial growth is changing when it is on a completely different atmosphere from what it is usually when it's on earth.

Michael Holtz:

Gotcha. Chinmayee, why is it important to understand why and how microbes are impacted in that kind of environment, in a different environment from earth?

Chinmayee Govinda Raj:

So NASA likes to do it one step at a time. We want to spend more time in space. We want to send humans to space. We want them to survive there. We want them to have a habitation zone there. But humans are complex organisms. We're multicellular and we're very complex biologically. So sending a human and trying to understand these environmental stresses on humans is a much more complex task than doing it on single cellular organisms and sending them to space and understanding what happens to their biology in space. So we use yeast microbes, which are commonly used as model microbes for humans. I'm not saying that yeast equals humans.

Michael Holtz:

Sure.

Chinmayee Govinda Raj:

It's just that if we understand yeast, we're moving a step towards understanding the human biology as well. And for us, it's definitely out of the scope for our project to bring in humans and try to make that correlation between the two organisms. For us, it's just that yes, this is what happens to yeast and this data should help you take you towards understanding what happens to humans in space much later. It's a long project. It takes time, takes a lot of effort, it takes a lot of personnel. Of course it takes a lot of taxpayer money, but it's happening in a logical progression.

Michael Holtz:

Gotcha. And it's one of those steps, as you said, with the Artemis project of going to the moon and then eventually to Mars, but there's steps along the way to get to that process and this is one of those steps, right?

Chinmayee Govinda Raj:

Yep.

Michael Holtz:

So Chinmayee, what was your trajectory to getting to the NASA postdoctoral program? Was science always in your DNA, so to speak? Is it something you've always been interested in?

Chinmayee Govinda Raj:

Science, I don't think it has been in my DNA because everyone in my family is an artist of some kind. My mother is a musician. My dad is a yoga instructor, he's a yoga therapist actually, and my extended family is into dance, drama, you name it, and they're into that kind of artistic career. I think I wanted a slight change of pace, and that is why I got into space science. I got into engineering tiny projects in the garage, kind of interest. I think I was eight when I decided I want to work at NASA. I was in India. I had no understanding of what that path would even looked like. I guess it is good to be naive sometimes to have those dreams that don't make sense right there and then, but have that aspiration to do something of that magnitude.

So I did keep that dream alive. I did pursue electronics and instrumentation engineering due to my bachelor's instead of aerospace engineering because I knew that if I do aerospace, it'll be more rocket propulsion kind of engineering, but I want to build instruments and to send them to space. So that was my logical step towards achieving that goal. And then I wanted to pursue bioengineering because there was a little bit of interest in astrobiology and space engineering right then. And so I came to the US to pursue bioengineering, and luckily I got into NASA when I was doing my master's in bioengineering because I had that profile where I could understand the biology and I could also understand the engineering aspects of the project. So I understood exactly what the biological questions are, what are the science questions I'm trying to answer with this experiment, and then have the expertise to construct that experimental setup and also to understand the data that's coming out of that setup.

I met my PhD advisor while I was at NASA Ames. So while I pursued bioengineering at NASA Ames, I met my PhD advisor and she was kind enough to offer me a position at Georgia Tech, which was hardcore astrobiology and space instrumentation. And right after that I got called back to NASA Ames for my postdoc and NPP application, and I got lucky that that got accepted as well. So it's a series of yes and lack of no answers from whatever I applied to. I got lucky and I also got the right kind of mentors, I think, and the right channels to go into. Yeah, I am where I am now and I'm happy.

Michael Holtz:

Awesome. And mentorship is critical. I mean, you mentioned your PhD advisor, I'm sure there were others who helped you get where you are today.

Chinmayee Govinda Raj:

Yeah, it's not just the PhD advisor, there's so many mentor figures around you, even people who come into the same classes you are in and they teach you exactly what you need to learn. They will give you ideas that you've never thought of. So that also counts as mentorship to me. It doesn't have to be a one-on-one every time. Even being in that environment always helps.

Michael Holtz:

And very collaborative in that environment but also, I know A, science is not a solo sport ever, and especially at NASA, collaboration is a huge part of how everything operates. And you mentioned there's a huge team involved in the project that you're working on.

Chinmayee Govinda Raj:

Yeah.

Michael Holtz:

Coming from India, I imagine there may have been significant obstacles to overcome to get from India to the United States, but it also sounds like there weren't a lot of no's, as you said, on the pathway. You sort of, this happened and then this happened, and then this happened. Chinmayee, were obstacles on the road to where you are today?

Chinmayee Govinda Raj:

There is a little bit of self-doubt every now and then because electronics and instrumentation is not a widely known field in India. It's not even in the US actually, people get more traditional degrees like mechanical engineering, electrical engineering, and then get into space instrumentation. But mine was focused on instrumentation. So it was a little bit of a dare move on my part that I rejected everything else and went into one singular path hoping that everything else will fall into place. But there are times when you feel like I am working so hard, I am doing so many things, I'm meeting so many people, I'm getting advice from so many people, but is this all going to work out?

Michael Holtz:

Right.

Chinmayee Govinda Raj:

So that was, I think, my interference into my own dreams was the biggest no for me, but I still chugged the along. I just kept at it and hoped and prayed and did everything I saw fit to make it work. So many proposals didn't get accepted. Sometimes some schools don't like you, they don't want to accept you into their programs. So those things always happen.

Michael Holtz:

Sure.

Chinmayee Govinda Raj:

But you still keep at it and make the best of what comes your way. I think that has kept me afloat.

Michael Holtz:

Awesome. Awesome. And I mean, considering you chose this singular pathway, did you ever go, "Oh my gosh, I've made a mistake. Maybe I should have done mechanical engineering or gone more broadly instead of more focus?" But it sounds like maybe even with a little bit of self-doubt, you just kept chugging along.

Chinmayee Govinda Raj:

So I think my story is slightly different because I did instrumentation and then I did bioengineering. So I was already, I had two pathways in front of me. I could stick to engineering, organic to biology, but I did a chemistry PhD. I did my PhD in analytical chemistry and space instrumentation. So those things, those all different pieces fit together perfectly well now at NASA, because that kind of interdisciplinary expertise is highly valued because you can understand so many people's languages. You can make them talk to each other. You can help them translate their languages. You can tell them, this is jargon, I will understand this, but nobody else will. So you need to change the way you say this. Right? Even pointing those things out is very important.

And this is not an isolated problem you to NASA. When you're in a team, you need to make yourself understood to people who are not coming from the same place as you. And especially given the complexity of space missions, it's highly important to communicate those ideas. It's highly important to make sure that everybody's on the same page. And that's mostly what I'm doing now as a postdoc, because I'm the only engineer on the science team. I'm the only person who can understand the hardware design. I can understand what the hardware team is saying are the requirements that they need to get from the science team and vice versa. And I'm that bridge that understands both those languages. I'm that bridge that is making sure that everybody is on the same page. And that branching out that I took every now and then with every institution I went into helped me. It did not hinder me or my progress in any way.

Michael Holtz:

Gotcha. It's interesting to hear you talk about the intercommunication because as a communications professional who works for a scientific organization, I focus a lot on how do I make your science understandable to a general audience, but there's also the how do I make the engineers understand the biologists, understand the chemists, right? Sort of that interdisciplinary communication that has to happen as well. And that's just from my outside vantage point, that's an interesting concept 'cause I hadn't really thought that scientists have to be able to talk to each other in the languages, and they're speaking different languages because of their different disciplines. Is there a particular aspect of science that you find empowering?

Chinmayee Govinda Raj:

I think any science that leads you to understanding of the grander nature of our atmosphere around us, everything nature around us or just earth or just the grand scale of how all of this is happening, any field of science that leads you there is wonderful to me. It could be physics, it could be biology, it could be just the chemistry of it or just the mathematics or even music for that matter. So any field that you pursue should lead you to understand that you are blessed, should lead you to understand that we're living in a grand design that I don't know who made it, but whoever made it did a really good job.

Michael Holtz:

They knew what they were doing.

Chinmayee Govinda Raj:

Having that understanding, attaining that level of appreciation, I think is the goal of anything you do. And if you're not living at that high frequency, I feel like whatever you're doing is a waste of time. You're just living. You're just surviving. You're not thriving.

Michael Holtz:

Gotcha. That makes perfect sense. Chinmayee, for folks who may be following in your footsteps, a young scientist in India, somewhere else in the world who says, "I want to do what she's doing," what do you tell them? What do you tell that person?

Chinmayee Govinda Raj:

I would tell pursue a foundational degree, pursue mechanical engineering, or if you want to get into this kind of instrumentation design, then mechanical engineering, electrical engineering, all those traditional branches that exist out there, pursue those. Get your footing in one field of science/engineering, you are the expert in that field. From there, branch out based on what you want to do. And even as a bachelor student, it's okay to not know what you want to do after your bachelor's. There's so much stress to make people, make these kids make that decision right now and pursue that without changing it whatsoever. And I think that's unfair because I never made that decision. I just went with, okay, I need to do this, so maybe if I do this, it'll work out. So it's okay to not know exactly what you want to do. Pursue something, be an expert in that, and then pursue relevant fields that compliment that foundational field that you pursued initially.

That makes you the world leading expert. So that combination is what makes you unique and pursue uniqueness. Don't pursue what everybody else is doing. What is the scope? What is the most high paying job? Okay, if money is something you're pursuing, then yes, then that is what you need to ask yourself. But if a type of role in the job market is what you're pursuing, then you have to have that path traced out. And if there are slight deviations, it's okay. It's completely okay. And always talk to people, read the relevant text, read books, and we live in a golden era of internet, I should say. Ignorance is just a choice. It's not a necessity anymore. You can read so many things. You can learn so many things, and without getting fatigued by the choices, just go with what grabs your interest.

Michael Holtz:

Right. Last question and I think this may lead a little bit from the previous one, is what brings you joy, Chinmayee?

Chinmayee Govinda Raj:

That is the last question. Oh my gosh.

Michael Holtz:

That is the last question. I come in from a area where I like to be on the bench. I like to see things happen. I like to watch how a physical process happens. I like to design things around it to make it work the way I want it to work. But as I am maturing, I guess, I see more joy and I find more joy in trying to see all the tiny pieces of the engineering project fit together to give me one big product that makes multiple people happy, that makes humanity happy. I like jigsaw puzzles. So I've done a lot of thousand piece, 2000 piece. I think the biggest is 5,000 piece that I've tried.

Michael Holtz:

Oh my goodness.

Chinmayee Govinda Raj:

It was a mess. It happened. Eventually it did work out. But I think that is the analogy to how I like to see things fit together, come together, compliment each other, and those things when they fit and when they make sense to a bigger audience that makes that big picture at the end of it when you look at it, that's what brings me joy.

And pursuing that is also joyful because you're seeing that so many things are happening in parallel. So many things are, oh, line A is changing because line B changed in the way it produces results. So all those cogs and wheels moving together to make one big machine work, that's what brings me joy. And of course, when things get launched into space, that is wonderful, I should say. So wow, this worked on earth. Will this work in space? We did everything we could. Now everything we can do is just raise our hands up and wait for it to work in space. So that is very fulfilling to me.

Michael Holtz:

Awesome. Awesome. Thank you so much for spending this time with me and letting me get to know a little bit about you. And I would love to have you back after your experiment goes to the moon and talk about what you've learned and what it tells us about what happens next.

Chinmayee Govinda Raj:

Of course, it was a pleasure meeting you and talking to you, Mike. This actually just brought me perspective to my own work. I just sat down and talked about what is important to me, so that's nice. That's a good reminder for me.

Michael Holtz:

Well, thank you so much for being here. I appreciate it.

Chinmayee Govinda Raj:

Thanks a lot, Mike.

Speaker 2:

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