So the interesting thing is that by far the most common types of planet that we have observed so far are these planets. We physicists aren't the best at naming things.

We named them after things we already know. So they're things called super earths and subnetchines. So things bigger than earth is smaller. And they orbit their stars in maybe 10 days.

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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.

Welcome to Further Together: The ORAU podcast.

As ever, it's me. me, your host, Michael Holtz, in the communications and marketing department at ORAU. I've had the pleasure of meeting a number of NASA Postdoctoral Program Fellows, and I'm thrilled to talk to you, another one of those fellows today. His name is James Rogers. Dr. James Rogers, welcome to Further Together: The ORAU Podcast.

I'm so glad you're here. here.

Thank you very much. It's really nice to be here looking forward to it. So James, tell me a little bit if you would about how it came to be that you are a NASA post doctoral program fellow.

Yeah, so I did my undergraduate and postgraduate degree in London. I'm I'm English. I grew up in the countryside of the southwest of England.

And very early on, I realized that it's fun to ask lots and lots of questions, and just to keep on asking why. And I'm sure I annoyed my parents and my teachers at times asking these questions all the time.

And I think physics, for me, physics was the natural progression. And so I went on and did it. did a degree in physics And then carried on and did a PhD in astrophysics and then moved over to Los Angeles.

So I'm a I'm an astrobiology fellow and I work out of UCLA Uh, yeah now and I started the NPP fellowship, uh,

just over a month ago actually, so I'm Into the fellowship, but having a lot of fun Yeah, awesome Talk to me if you would about what your your project focuses on.

So I study extra solar planets. So these we typically call the exoplanets. So right, we have eight planets in our solar system, plus loads of other smaller bodies like asteroids and things like that.

But we know of and we've in the last couple of decades we've detected thousands of exoplanets these are planets that orbit other stars in our galaxy and I'm very interested in trying to understand and trying to unpiece the information that we can learn on things like planet formation and planet evolution and trying to piece together where our solar system fits into this picture are we weird are we not weird I think the

answer is that we're definitely... Is that a question? These are the fundamental questions I think that it does boil down to is, you know, are we alone? Is there life in other places in at least our galaxy and even our solar system?

And yeah, so I'm very interested in information and I work a lot on theoretical knowledge. of Planet formation and particularly the atmospheres of planets is what I'm really interested in and think about how the planets evolve Yeah,

that's the kind of Yeah, so it sounds like from from your introduction that science has always been a fundamental interest for you if you're if you're asking why and Maybe irritating your parents with the question.

Yeah. Yeah. There was a time that I wanted to go into medicine and be a medical doctor. I think the goal for me was to,

I think I just wanted to do the hardest thing. That was always my choice. I just wanted to go into the hardest path. But then I remember that actually the questions that really kind of stuck with me and I found the most fascinating were the questions.

questions. You know, what are atoms made of? What are stars? What planets? Where do they come from? So that's how I kind of eventually hone down into astrophysics and from their exoplanets and things like that.

That's awesome. I love that. I have to imagine that in a world where you're studying exoplanets, that collaboration is a huge part of the world. work that you do because you can't know all of that without using the optical device and other things that other scientists have developed.

So you have to work in a sizable team, I would imagine. What's collaboration like for someone who studies exoplanets? Yeah,

well... I'll start by saying that the field of exoplanets is still quite young. It's only been around for decades. And so in terms of scientific fields, it's still very young.

And so the field is filled with lots of young people with lots of passion. And I think it's a really exciting field to be part of. We're still, as a field, we're only really just finding our feet.

We're still, there's discoveries that are just coming out on a monthly or even weekly basis. basis of just new things and rewriting textbooks and things like that. So it's really fun to be part of such a young,

passionate and diverse group of people. I guess I work more on the theoretical side of things, but because the field is moving forward so fast,

the observers observers and the theorists have to have to talk to each other a lot. And so that's kind of where the collaboration really comes in. We,

you know, there have been some amazing NASA space missions like Kepler and tests that have gone out and detected thousands of exoplanets. And, you know,

we're really trying to, as theorists, I'm sure the observers would say we're trying to keep up with those observations. observations and trying to explain what's going on, but we as theorists obviously say that it's the other way around and it's actually observers trying to keep up with us,

but I'm sure it's a little bit of a tough word, sort of jumping there now. I know it's so important that we keep communicating and kind of,

us as theorists, we can say, well, this is where we think something might see you. or this is something we might expect to see in the populations of ex planets and so we might say to observers can you help us try and go and detect this and then observers at the same time can come to theorists and say we've seen this what what does it mean how do you interpret this and sometimes for our theories this means well

our theory something needs to be changed in our theory and sometimes we're like yes our theories our theory is right so So proves what we've got. Yeah. But like I said,

it's such a young and diverse group of people that work in this field. It's really, it's a real privilege to to work with them and and share the share the discoveries that we're that we're making.

Yeah, it has to be exciting and also fulfilling to be kind of on this leading edge of knowledge.

I mean, you're theorizing and learning things that we didn't know before. Yeah. Yeah. And it's, I think, one of the things in my research that I do, I try to do a lot of is learning about exoplanets and in our solar system to learn from.

And yes, we have the amazing opportunity that we can go and send probes to them and hopefully land some people on them one day and touch them and take samples to a laboratory and say,

"Oh, it's made of this. It probably came from this." So we can't do that with exoplanets because they're hundreds of light years away, but the difference is that we have thousands of them instead of just, you know... eight or plus the smaller bodies in our solar system.

So the thing you can do is you can look at the thousands of, thousands of planets. You might not know specific details about all of them, but together they paint a picture like a broad brush stroke picture.

And it's from that that we're really starting to learn a lot about things like planet formation and our place in the future. picture of the array of solar systems out there.

And does it help us better understand to even what we think we know about the planets in our own solar system? Yeah, I think, yeah,

absolutely, I think, well, so the interesting thing is that by the planets in our own solar system, and I think it helps us to understand what we think we know about the planets in our own solar system, and I think it helps us to it helps us to understand what we think we know about the planets in our own solar system, and I think it helps us to understand what we think we know about the planets in our own most

common types of planet that we observe have observed so far are these planets We physicists aren't the best at naming things we name them after things We already know so the things called super earths and subnet tunes so things bigger than earth it's more than right,

okay, and They orbit their stars in maybe 10 days so their year takes 10 days days. Our comparison,

our closest in planet Mercury takes about 88 days to go around the Sun. So the vast majority of all planets that we observe orbit way closer to their star than Mercury does to our Sun.

So they're in a completely different environment and particularly something that I think about a lot is what happens to their atmospheres. They're so close into their host stars that actually their atmospheres can be completely different.

removed from by the star. The radiation is so intense, you know, thousands of degrees they can be at their surface, that the atmospheres are completely ripped. So I think when we first started going out and detecting planets,

the goal was to try to understand, try and measure and detect other Earth -like planets. around sunlight stars. That was one of the goals of actually the Kepler mission.

But we actually, in fact, we found exactly zero. Because that's not because we're out there. That's because we didn't have the sensitivity to actually detect.

Really, Earth is a very small planet in the scheme of things, compared to the others, and it's quite far away from our sun. Well, we're very good at detecting planets that are close, very close.

to their stars. And so we kind of had to shift and think, okay, let's hold out for a second on trying to hone down Earth -like planets around sunlight stars and let's try and understand the super Earth and these subnet genes,

which about 50 % of all sunlight stars have at least one of them. So they're really, really strong. Suddenly we need to understand them and how they formed. formed and you know why don't we definitely don't have one of these in our server system and why is that yeah yeah good question so lots of lots of questions still to be asked and answered absolutely yeah yes so James how does a kid from southwest England come to

NASA NASA. Yeah, so like I said, I grew up loving science and kind of had a little couple of years where I wanted to go into medicine.

And then decided that physics was really the questions that I would become the most obsessed about, you know, not quite keeping me overnight, sort of thing.

And so I did my degree in theoretical physics. And then I got a really amazing opportunity to do a PhD in exoplanets, again in this really young and exciting field,

and where all these questions are being asked and answered. And then through my PhD, I started working with some scientists here at UCLA,

and they are... part of the astrobiology program for the NASA postdoctoral program fellowship. So I started collaborating with them,

working on some theory of planet evolution and then through meeting them I was invited last year to apply for the NPP fellowship but I was very fortunate enough to get it.

So I started a month ago and it's coming from a very very small village in the southwest of England. LA, Los Angeles is a bit of a change but it's been a very exciting and very fun to come and see new part of the world and work with new people and yeah it's been a lot of fun.

Gotcha. It sounds like to get to make those changes get to where you are, you've had some really great mentors along the way.

Talk about those folks. Yeah, absolutely. I think going all the way back to school when I used to ask all those questions and really fantastic science teachers that wouldn't just say,

"I'll answer you later." For because. Just because. took the time to say, you know, well, that's a really good question.

Here's some ideas and you should go and find out yourself. And it's kind of really stimulating that curiosity to go and work things out for yourself and do your own research. And then really,

really great undergraduate. That was at Imperial College London. London. And then my PhD advisor was someone called James Owen. He was a fantastic mentor and has really set me up for for having a lot of fun in this field and has taught me so much.

And then like I was saying, through collaborating with people at UCLA, I'm now my current mentor, Hilker Schlickting, who again is just such a fantastic role model and and I've learned things daily from them.

And it's a real honor to be able to work with them and continue to learn things from them. And then, plus all the other people I work with as well, that we're just always trying to learn off each other and learn more stuff.

Yeah, right. On the flip side of that, James, have you had the opportunity to be a part of this? mentor for younger scientists? - Yeah, I think as I'm now progressing from my PhD to my postdoc,

I'm starting to mentor undergraduate students and master's students. And I really enjoy, and I really enjoy trying to give people the opportunities to try and realize their own dreams of work.

working in science and, you know, not everyone chooses to go and work in science. They might go and apply their skills in different things, you know, science, technology, engineering,

things like that. But it's really fun when you're meant to someone that shares your passion for something that you work on. You immediately get on with someone and you'll,

you'll, you'll, you'll get on with someone both have that drive to kind of try and answer something fundamental So I really enjoy I really enjoy mentoring and passing on the lessons that I've I've learned myself.

Awesome. Yeah, awesome. I like that In your path to get to where you are James, have there been obstacles you've had to overcome?

I Think I'm I'm very aware that I've had Really so many I've been given so many opportunities And I actually I've had a very fortunate upbringing lots of support and lots of you know opportunities to to really explore the the passion that I have and And,

you know, the challenges for me were things like moving to the other side of the world and, you know, moving here out on my own and trying to, you know,

that question of the passion that I have for this subject, is it enough for me to move across the world for, I mean, as it was obviously, is he all right? I mean, Yeah,

you know, science is a working in science is an interesting vocation. There are sometimes sacrifices you have to make in terms of where you want to be and how you want to do it.

So, but again, every time I think about those sacrifices you sometimes have to make the it always comes down to the fact that that I feel so passionate about what I do and I've it's such a I'm so lucky to be able to wake up and just think about planets it still doesn't really seem like a like an actual job description.

So great privilege and I will continue to take any opportunity I can and to continue working on it. Awesome. If I'm a young and up and coming.

-coming scientist who wants to follow in your footsteps, James, what advice do you have for me? Um, oh,

good question. I would say, again, as I've, I probably sound like a broken record, um, you need to, you need to pick a topic that you feel passionate about,

that you have curiosity, I think. I think I would say I have or I've been able to develop a healthy level of obsession about what I work on.

Sometimes you need to get to the, or at least get towards the truth. You need to be able to get a little bit obsessed about it.

Not, not to the point where it's unhealthy, right? But, but you know, it needs to drive you need to be able to get out and look forward to going and working things out. And yes, there are,

there are very difficult times when you're stuck on a problem and you're banging your head against the desk, not literally, but you're trying to work out what's going on. So I would say the most probably the most important thing is,

is pick a topic that you really find fascinating. Try to surround yourself with people that you aspire to work with and the way that they approach science.

You want to surround yourself with good role models if you can and reach out. If you're struggling, reach out and ask people,

have you ever experienced this? Have you ever had struggle with this? I think I think a lot of us, and this is something that I've also done as well, reaching out and asking people who are more senior than me,

have you got any advice for me at this stage? What would you do? And I think anyone, the vast majority of us are so open and keen to help those more junior stages help them get through with whatever queries they have.

It's, you know, it is a community and I think take advantage of that and take advantage of the experience that other people have. And yeah,

just make sure you're having fun as much as you can. Yeah. Well, that's, you know, I think being passionate about something makes it fun,

you know. in and of itself because you're driven by your interest in the topic area so you're going to be asking the questions and looking for the answers. Absolutely.

Last question James what brings you joy? Besides science and working out.

and being lucky enough to work on all these topics and try and answer these questions. I really love my sport, play a lot of tennis, do some mountaineering. I really love my music.

I love playing drums and I actually just bought a piano last week and I decided to learn piano from scratch. Really awesome. I guess I love learning new things would probably be the punchline.

I love. Exposed to learn something new and try something that I might be awful at. Right, right. Actually, that piano thing is on my list too,

or something. Really? Yeah, I was playing some Beatles at the weekend. It was great. Cool. Not very well, but the tune was just a bit.

You have to start somewhere, right? Yeah. Yeah. Awesome. Well, James Rogers, thank you so much for spending this time with me. I really appreciate it. Thank you very much.

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