Andrew Saintsing: Hi, you're tuned into 90.7 FM KALX Berkeley. I'm Andrew Saintsing, and this is The Graduates, the interview talk show where we speak to UC Berkeley graduate students about their work here on campus and around the world. Today, I'm joined by Marianne Brasil from the Department of Integrative Biology. Welcome to the show, Marianne.

Marianne Brasil: Thanks for having me, Andrew.

Saintsing: You're an evolutionary anthropologist. Is that correct?

Brasil: Yeah, that's, that's about right. I'd call myself a biological anthropologist with an evolutionary bio twist.

Saintsing: Interesting. So, why the distinction?

Brasil: Um, so evolutionary anthropology is a field that encompasses a lot of different things that extend just beyond thinking about, kind of, anatomy in the fossil record, so a lot of people who fit in evolutionary anthropology are also focused on – pretty, pretty closely on behavior and psychology, and those are things that I find fascinating but haven't really honed in on. And, I'm more on the fossil evolution side of things, so I call myself a biological anthropologist because I fall broadly into that field. But, that's why I'm kind of within evolutionary biology, because I'm focused on evolution of anatomy more so than behavior or psychology.

Saintsing: Okay, so you're studying bones. You're looking at bones and how they change over time?

Brasil: Yeah, yeah, really old bones mostly. Some recent bones. So, my research is kind of, I think of it as twofold. So, on one side, I work on kind of recent modern humans. So, a lot of humans that have lived over the last, I would say, 5000 years and some of those very recent, like a collection in Portugal that I visited where the individuals in that collection have actually all died since the year 2000. So, very, very recent people. Yeah, so that's kind of one, one fold of my work is working on really recent humans, recent people trying to figure out how the anatomy varies.

Saintsing: Quick question about the recent human?

Brasil: Yeah.

Saintsing: So, these were all people that were buried, and…

Brasil: Yeah, yeah, yeah. Most of it is on people who were in cemeteries or like some of the collections I've worked in, in, that are actually held at the Smithsonian Museum, the Natural History Museum at the Smithsonian, are from Egypt and Jordan. Those are from archaeological deposits, so like the collection from Jordan was actually, those, those

people were excavated from tombs, these secondary tombs, which were really, really cool to look at and see all the kind of archaeological material that was included with those was really fascinating. And then, there's also some, some amount of the collections that I work on are what we call cadaver-derived. So, they usually come from medical schools where medical students are dissecting cadavers to learn about anatomy as part of their medical studies. It's like there's a huge, really exceptional collection down in South Africa that I went and visited last summer. That's one of my comparative populations of modern humans to try to figure out, you know, how anatomy varies within a population and then how that differs across people who span geography for the more modern humans.

Saintsing; You're kind of confined to skeletons that have been donated to science?

Brasil: Yeah, pretty much. Yeah, so I have on, on the recent side, there's obviously kind of the curse, which is that we are confined to what's available to us and that becomes even more true when you start to look at the fossil record where you know you have all of the contingencies from what you actually recover, what gets preserved, where the deposits are located. So, there are kind of a lot of factors that affect what we're actually able to recover, so we get this really incomplete glimpse of what was happening in the past and that's both really exciting, it's really frustrating as a paleontologist.

Saintsing: Is that just like the whole experience of being an anthropologist? Like it's – you never have all the things you want in whatever research you're doing?

Brasil: Yeah, I mean I think I feel like that's true of science, right? Like, even if you're like in an experimental setting, even if you're working on a wet lab, you know? You never necessarily have all the resources you need or you don't get the results you want, you know? There's – science is definitely not for the faint of heart. The challenge is part of what makes it fun.

Saintsing: I see. I interrupted. You were talking about how you study more recent findings, and then you also look at more distant past.

Brasil: Yeah, yeah, so part of that work focused on recent modern humans is like I said kind of trying to get a sense of ranges of variation and what you expect within and across populations, and part of that is to kind of to inform how we interpret variation that we see in the fossil record where our samples are much less complete, and my dissertation work actually focuses on some early modern humans that are from deposits dated to about a hundred thousand years old in the northern part of Ethiopia from what's called the Afar Depression, and I'm working on a partial skeleton and some other isolated post-crania, which just means bones that are below the head and neck, trying to kind of characterize what, what these people looked like and how they relate to modern humans and other closely related groups like Neanderthals and Homo erectus, that are quite a little bit older in most parts of the world, so trying to characterize that anatomy

and figure out what it can tell us about the evolution of our species and closely related ones.

Saintsing: Okay, so you look at these bones, and you have the capacity to know that it's a human as opposed to a Neanderthal and what part of the – how small are the fragments?

Brasil: Sometimes, sometimes you just get a tiny scrap of, you know, long bone shaft, and in that case, you really can't say very much about it, you know? You can say, "This is likely something that is human or closely related to human based on things like the bone thickness and the shape of the cross-section." You can basically, by process of elimination, say, "It's none of these other things. Therefore, it kind of has to be, it fits this human anatomy." But, I'm, I'm very fortunate that my dissertation is focused on a pretty complete partial skeleton, so I have almost all, all of the bones in the skeleton represented in this one individual, and they're definitely not complete. They're really kind of broken up, and especially when they were found, there was a lot of really careful work and cleaning them and putting them back together that other project members and museum scientists worked on, and I'm very grateful that I kind of came in at a point where it was mostly ready for me to start working on, but they've, they are complete enough that I can take measurements to compare them to moderns, which is great and that's definitely not always the case. Sometimes, you're kind of, like I said, cursed by these really fragmentary pieces that you want to do more with but you just are limited by what you've found.

Saintsing: That's really cool that you got this skeleton. I mean, is that just like, does that happen often?

Brasil: No, I was, I was very fortunate in that I was kind of at the right place at the right time. I took an undergraduate course here at UC Berkeley. I was also an undergrad before I was a grad student here. Berkeley just caught me and held on, so I've been here almost nine years now, which is kind of crazy to think about, but yeah, I took an undergrad course called Human Paleontology that was taught by Professor Tim White here at UC Berkeley, and then I took Human Osteology the following year, and then I graduated, and I decided to stay on for graduate study, and I had made my interest in human evolution really clear and was very fortunate to be in a position where I was invited to come and work on these fossil remains that had been recovered by the Middle Awash Research Project, which is the established project that I work on, and it's co-directed by three Ethiopian scholars: Dr. Berhane Asfaw, Dr. Yonas Beyene, and Dr. Giday WoldeGabriel, along with Professor Tim White here UC Berkeley. And, this is a project that's been running for over three decades in the Afar region, which is in, in northern Ethiopia, and they have just established incredible infrastructure both in the field and also in the museum, and so, I was really lucky to be brought on to work on, on this skeleton. So again, it was kind of a right place, right time situation.

Saintsing: Is that kind of – I feel like that's kind of anthropology, right?

Brasil: Yeah, again, kind of just science in general.

Saintsing: Yeah, yeah, definitely. So, you spend a lot of time in Ethiopia?

Brasil: Yeah, yeah, I do. I've spent probably somewhere between six and eight months there total over the course of my five years of graduate study, and I've done two full field seasons, so two 6-week field seasons out in the Afar region of Ethiopia, and then during our summer I usually will go back for anywhere between three weeks to two months to actually do the curatorial and then the, the research work that happens in the museum in the lab there and Addis Ababa, in the, in the capital of Ethiopia.

Saintsing: What kind of things do you actually do in the museum?

Brasil: Yeah, so it depends what I'm there to work on. So, actually kind of in parallel to the humans, to the human work that I do, I've also got started in the field of paleontology and biological anthropology working on monkeys. So, I'm actually also involved in working on just enormous and amazing monkey samples that have been recovered recently by the Middle Awash Project, and a lot of the work that you, you don't really hear about or you don't see because it's not really flashy or sexy science is all of the ground work that needs to happen to get the fossils to the place where you can actually take measurements and scan them and actually do the science that most people, you know, you hear about in the New York Times. “Oh, you know, this, this human that we found or this new species.” So, you hear about this kind of end result, but what you don't see is all of the planning that went into getting out into the field, figuring out where to look for the fossils, all of the logistics and the finances behind that, that I've been very fortunate to mostly not have to think about because I've been working with an established project. But then, once you've actually found those fossils, which is no small task, getting them back into the museum and then all of the work that follows, which includes cleaning them. It means sorting them so some of the monkeys in particular, you know, you're in the field, and you're collecting things as quickly as you can, and you get back into the museum, and you figure out, “Oh my gosh! They're actually three partial skeletons kind of mixed in.” And so, you have to sort these things apart, clean them, put them back together, label them, organize them. All of that stuff needs to happen before you can actually work on them in terms of like measurements and research and, and taking notes and things like that. So, I've, I've spent a lot of time in the museum there working on the monkeys in particular on kind of that curational side, and I'm actually leaving on Monday to go back for three weeks where I'll do a little bit more curation and then start to do some of the, the measuring and the taking notes and figuring out what we can learn from these monkeys. And then, the other part of that is actually doing some of the data collection. So, a lot of that looks like taking photos, taking laser scans, taking measurements, so basically all of the data that I can collect that allows me to compare those fossils to recent and other fossils as part of a broader kind of comparative analysis in my dissertation.

Saintsing: Dang, a lot of stuff.

Brasil: Yeah.

Saintsing: Do you enjoy like the parts of it that are, you know, the logistics, the cleaning, the measurements?

Brasil: Yeah, yeah, I absolutely do. I, I love the, the museum work. I love it all, but I especially love the fieldwork even though it's really hard. It's really hot. It's really dusty, really tired for most of it, but something about actually being out in the field and walking around an outcrop and seeing these fossils eroding out of these deposits and actually being able to look back in time – like, that's the closest thing we get to time travel, you know, as humans living today, I think. So, there's just something that's really, really incredible about that experience and that's what I think will keep me going back out into the field and collecting a bunch of amazing fossils.

Saintsing: Sure, did you get to do any sort of fieldwork in undergrad?

Brasil: Um, let me think. I think that the only field work that I had done in undergrad actually was kind of more archaeological and focused here in California. So, as an undergrad, I was an anthropology and integrative biology major here at Berkeley, and as some, as part of some of my anthropology classes, the fields and methods, methods courses, I got to go out and work on a couple of sites in the northern Bay Area, like Sonoma area, some shale mountains that were being excavated by one of Professor Lightfoot's students, who's here in the anthropology department. And, as part of like an archaeological field methods course, we actually also excavated the Old Student Observatory up on campus which is close to Northgate.

Saintsing: Interesting. Sounds cool.

Brasil: Yeah, yeah it was really fun. So, yeah, I mean I guess I did have a little bit of field experience, but nothing like going into the Middle Awash for the first time. That was definitely, that was a new one.

Saintsing: How is that the first time?

Brasil: Oh, man. I was hot and dehydrated, but it was, I, I mean, it was incredible. It was like nowhere that I'd ever been before. There was definitely a lot of kind of anxiety about going out there because of scorpions and snakes and all of these critters that could kill me that I'd never had to deal with, but going out and working with the project, so that includes, you know, the directors and then all of the project members who live in Addis. And, some of them work in the museum during the year, work on kind of prepping and putting the fossils back together and curating them and all of that. And then, getting out into the field where we work with the local people in the area. So, the Afar people who are one of the ethnic groups who live in this region, and they, the project has had a long-standing relationship with a lot of the leaders of this group, and so, when we get

out there we usually will – I say we, but the project – will hire some of the, the local people and train them to do this work with us. And, it was part of what was so interesting and one of the things that I think was so exciting and so fun was – I mean, I got into anthropology because I was interested in human cultures and different, different people and ways that people interact with their world differently – and it was, it was really interesting to see this group of nomadic pastoralists who are completely living off of the land and meet them for the first time, and, you know, I have no Afar and they have no English, and so, we're trying to communicate through gestures, but they were just some of, some of the kindest people, and they, I know they thought that I was hilarious because I was usually like completely covered up, you know, to protect from the sun. And then, they thought it was totally unnecessary.

Saintsing: Alright.

Brasil: Yeah, yeah, but yeah. It was, it was just like nothing else that I've experienced before.

Saintsing: It sounds really cool, sounds like a lot of fun.

Brasil: Yeah.

Saintsing: And uh, do you ever take undergrads on this?

Brasil: I don't think that undergrads have ever been taken on this particular project. It's, it's not super common that graduate students go out even just because it is kind of, there's, there's a lot that can go wrong, and fortunately things haven't gone wrong, but we're in a really remote part of Ethiopia, and there are kind of a lot of potential health risks, so it's, you have to be really, really careful when you're out there. I mean, we're, we're two days driving, usually, at least outside of Addis, and a lot of that is kind of off-road getting out to the fields, so it's pretty remote area.

Saintsing: Do you – have you ever actually like encountered any of the, like the dangerous things, like the scorpions and stuff?

Brasil: Oh yeah, oh yeah definitely. I've not had any encounter encounters with snakes fortunately.

Saintsing: Nice, um, is that like your biggest fear?

Brasil: No, no, I mean, snakes don't actually really bother me. They probably should more given how venomous the ones out there are, but yeah, definitely lots of scorpions out and about. Fortunately, the ones – I'm not sure if this is true of all scorpions or just the ones that we have out in the Middle Awash, but they fluoresce under UV light. Yeah, so at least you can shine a UV light and make sure they're not, like, under the dinner table before you sit down, gonna crawl into your boots. But yeah, there have definitely been some run-ins with scorpions. I've never been stung or anything, but they're definitely

around, and there are some very large spiders which I was not excited about the first time I went out. I've made my peace with them now, but…

Saintsing: Are those, the, the things that aren't spiders: solifuges? Those are terrifying. Listeners should look up a picture of solifuges.

Brasil: They should. I warn you: they are terrifying. They are the stuff of nightmares, but yeah, those are out there. I've never actually seen one in real life fortunately, but yeah, I know that they exist, which is enough to keep me up a little bit at night.

Saintsing: This is just a reminder that you're listening to The Graduates. I'm Andrew Saintsing, and I'm speaking with Marianne Brasil. So, what kinds of comparisons are you actually making between the ancient fossils and the modern fossils?

Brasil: Yeah, so…

Saintsing: Modern skeletons. I guess, they're not fossils at this point.

Brasil: Yeah, yeah, there's a lot of arguments, a lot of that in general. Kind of depends on what you've recovered in the field, so the comparisons that you can make are necessarily constrained by, you know, what you have available to you, but fortunately for me, like the, the partial skeleton that I'm working on, like I said there's quite a lot of it preserved, so I have taken 400 measurements on each individual for the recent modern humans as comparative data for those, those fossils that I'm working on describing for my dissertation, and that spans most things. That spans long bone lengths, where I can get them, that spans, you know, the breadth of the articular joints, what we call articular facets where the bones are actually in contact with each other, spans the long bone end. So, it's kind of all aspects of morphology that can be reliably measured using, you know, standard metric equipment and then those comparisons allow me to get a sense of, you know, how body size compares across, between these fossils and moderns, how things like body proportions compare, and what that might tell us about how that's changed over the course of the last hundred thousand years and, again, how it relates to these other fossil groups. So, it's a lot of measurements, and then, there are also laser and CT data that allow us to get at some of the 3D aspects of morphology and things like long bone, like, thickness, what we call cortical thickness, how thick the bone in the long bones actually is, like, the mid, mid-shaft, the mid-section.

Saintsing: And so, why would we want to know how body proportions are changing? I mean, so what exactly, what kinds of questions are you trying to answer?

Brasil: Yeah, so on a first pass of what the descriptive work is, it's basically, to put it very, very generally, what does this look like and how does it relate to other closely related groups? So, that's kind of just how paleontology proceeds on a first pass of how you do that descriptive work to get the, basically get those data out there so then other researchers who are focusing on, on specific questions and specific parts of the anatomy can also

work on those more specific questions. So, what I'm doing is kind of big picture right now, but one of the, one of the things that I think is really interesting, and I can't say too much about this because the analyses are still in progress, but this, this, this partial skeleton is really similar to a lot of the other fossil material that's been recovered from this time period, and that it's very large, it's a very what we call robust skeleton. And so, what's interesting about that is that it looks quite different from the people who currently live in eastern Africa, and so that raises some questions about, "okay, well what's going on with these populations? Is it the same group of people that's existing in eastern Africa and they've just changed significantly over the course of a hundred thousand years, or is this picking up on some population movement?" And, that's where the interface between what we're working on with the fossils and the anatomy gets really interesting with these really burgeoning, this really burgeoning field of genetic studies and trying to figure out what modern genetic data tell us about these past population histories and how populations are moving, so it'll be really interesting to see how that interface plays out in the, in the next few years.

Saintsing: Yeah, so that's another point about science, right? How long it takes.

Brasil: Right. Yeah, yeah.

Saintsing: So much time between, I guess, the – when did the first parts of these fossils start getting found?

Brasil: I think they were first starting to be recovered in 2003 I want to say. Yeah, and so, it's been a long time, and, like I said, I mean when they were, when they were first found, unfortunately none of it was found in situ, as we call it (basically like in the sediment in which it was originally encased). So, it had all eroded out and been sitting on the surface for a while where you know the local Afar people are moving their goats and camels from one place to the next, and so, they're getting trampled over and over, and they're getting rained on, so this skeleton was just smashed to pieces and a lot of the initial work that had to happen was just putting this back together, which was quite the undertaking. And fortunately, like I said, a lot of that was done by other project members and I basically just had to kind of finish up that part of the, the curation of the skeleton and then get to work on it.

Saintsing: Do the Afar people like call with tips, like, "Oh, we see this skeleton." Or, are they just – do they not get in touch about the skeletons?

Brasil: Yeah, so most of the, most of the Afar people, it's just kind of part of life, which is so fascinating, that they probably just walk around and they see these fossils and they don't think anything of it the same way we walk around and see like native Californian plants and it's just a normal part of life.

Saintsing: They'd be so weird.

Brasil: Yeah, but it's funny because there are a few, a few of the local Afar people who we work with now that they have been trained and it's, it's kind of funny, it becomes a little bit of a competition in the field. Everyone, you know, wants to find the humans. Everyone's, you know, kind of running around trying to find the best fossil – not running. There's no running in the field, but…

Saintsing: To keep from trampling?

Brasil: Yes, there's very careful surveying in the field, but yeah, it's a little bit of a competition. And so, sometimes, you know, one of the project directors will get a call from someone, one of the finders out in the field who has come across, you know, some, some fossil that they think might be human, and then, and then, it's kind of a patient waiting game of, you know, having, having to wait to get back out there to check it out and trying to preserve it as best as possible until then. Yeah, but one of the things that is really interesting to watch is how quickly a lot of the local Afar guys are just amazing fossil finders. They're the ones who are finding so much of the best stuff, and they just pick it up so quickly, and so, it's kind of funny that most, most of the Afar that I know – which is very, very little – is constrained to body parts and animal types because that's kind of the most useful vocabulary for when I'm out in the field.

Saintsing: Sure. So, somebody gets a tip, like maybe an Afar person or whoever's out in the field sees like a skull, and so, how'd it, who gets to be the one, "I'm gonna publish on this skeleton," you know? What, I mean…

Brasil: Yeah, yeah, so that, that comes down to permitting really. So, the Afar region is, is very, very large and in, in terms of field sites and field coverage. So, probably you've heard of Lucy as have most of the listeners. That comes from a site called Hadar. That's actually kind of just to the north of the Middle Awash region, so where we're working is really close to where Lucy was recovered, and Hadar is a separate project that has separate project leadership and a separate project permit, and so, basically anything that's found within the Hadar field area falls under the purview of that project and the same is true of the other projects working in the area like the Middle Awash, Gona, Woranso Mille. So, there are a lot of different projects that have, kind of have purview over different regions of the farm.

Saintsing: But then, with ownership, it – anything that's found in the nation of Ethiopia would just be Ethiopian?

Brasil: Yeah, yeah. They're all, they're all Ethiopian antiquities, and even anything that's collected by the projects they all get accessioned back into the National Museum of Ethiopia and held there as Ethiopian antiquities.

Saintsing: So, I know there, historically that was like a problematic issue, right? That…

Brasil: Yeah.

Saintsing: All these governments got to keep their own antiquities. So, has that been a recent development that, or like how, how long has Ethiopia been able to maintain ownership over its antiquities?

Brasil: Yeah, I can't, I can't really speak so much to that history, but I do know that it's, it's quite different than what's happened in a lot of other African nations, like Kenya for example. Because Ethiopia was never actually formally colonized in the same way that like Kenya was by Britain. Ethiopia, other than a run in in the 40s with the Italians, has been an independent nation and, so, more so, I think, in control of its antiquities than a lot of other nations where there was this colonial power that felt that they had some right to these antiquities and often unfortunately exported them and a lot of that is kind of still in progress of getting those antiquities back to the countries in which they were originally recovered.

Saintsing: Does the exporting – it must have made… I assume like not everything was exported, you know, by scientists who were keeping careful notes, right? Has that made it really hard to, like, follow all these fossils?

Brasil: Yeah, so I could actually give an example that's kind of near and dear to my heart and especially to the heart of my adviser, who's Professor Leslea Hlusko here in the integrative biology department. She undertook this very large ambitious project called the Comprehensive Old Divide Database Initiative. So, you might have heard of Olduvai Gorge. It's a field site in Tanzania that was worked on by the Leakey family for decades, and it's yielded some really important, really influential fossils closely related to humans but quite a bit older mostly, and these, these fossils were kind of exported and sent everywhere, all over the world. Some of them are in Tanzania, a lot of them ended up in London. I actually got to go to the Natural History Museum there as an undergrad to work on some of the kind of inventory of what was there, but these are kind of just spilled all over the world at this point, these fossils from Olduvai of all different kinds of animals. And so, my adviser, Professor Leslea Hlusko, basically formed this initiative to figure out where all of these fossils were and try to get them into one database online so that researchers working on, you know, birds could figure out where all of the birds that have come from Olduvai, “Where do I have to go to work on these?” And, trying wherever possible to take photos of the fossils and museums so that researchers have that information available and can see actually what's there for them to work on, which is really useful if you're trying to plan research trips, trying to figure out kind of what exists and what's worth making a trip to go see. So, that's been a many-year-long project that's still in progress and just gives you a sense of an example of kind of the mess that came out of some of these early practices in the field of just sending fossils everywhere and then today trying to figure out where they, where they ended up and get them into one central place.

Saintsing: All right, so I guess the real message from everything you said is science: it's very hard.

Brasil: It's not for everybody, but I do love it.

Saintsing: Yeah, there's like the, the natural processes obscure things. People obscure things.

Brasil: Yeah.

Saintsing: It takes so much time. You're kind of working with all of these layers that you have to peel back.

Brasil: Yeah, yeah, definitely.

Saintsing: Well, so you do a lot in the field. Do you have time to enjoy life back here in Berkeley?

Brasil: Yeah, yeah, I do. Um, yeah, I, I just got a puppy which I'm very excited about. That was, that's kind of a big move in the work/life balance category, which I've not been so good at through most of grad school, but one of the things that has, I think, kept me sane and kept me grounded in grad school is that I run trail. So, I run and preferably very slowly and long distances. So, I actually did my first 50k last year on a trail up close to Redding, and it was, it was beautiful, and I, I think it's been, like I said, really important for my mental health in grad school, and I think it's, it's really important to have those outlets. And for me, trail running has a lot of parallels to grad school actually. There's a lot of endurance. There's a lot of kind of just put it in low gear and grind and get over the next climb, and then, there's a little bit of a relief from there, which, you know, there are a lot of milestones in academia that kind of fit that profile. But, it's also for me the closest thing that I can get to meditation, so it's kind of the, the best way for me to turn my brain off, other than sleep. And so, I'll find that if I go out for a run especially, if something's kind of nagging me or I can't make sense of some result that I just got, I go out for a run, and it's almost like my brain is just working on it in the background, and it just provides this kind of clarity and this grounding that then I can usually get back to my work in a much more focused way.

Saintsing: So, you said you took those two classes as an undergrad. Is that kind of when you knew? How long ago did you know that you wanted to be a scientist? Was it before undergrad or here?

Brasil: Yeah, that's a great question. It's hard to point to kind of one specific thing. There are a couple of things that I think were pretty formative in that sense. One is that I always was kind of the kid who just liked being outside. So, I grew up in the Central Valley of California, kind of out in the country next to a walnut orchard, and I remember loving to just spend afternoons out there whenever I could, and there would be coyotes running around out there, and I actually remember coming across this coyote den that had a fully skeletonized coyote in it and digging up parts of it and taking it home, which my mom was less than thrilled about. She should have known that I was going to be a paleontologist. Yeah, so there was always kind of this, this innate fascination with just

being outside and being animals. I have really loved animals, but I think in terms of kind of realizing that, that was science and that I wanted to do science, my first exposure to that was taking an AP biology course when I was fifteen. And, that was really the first science course that I had ever taken, and I should preface this with that I grew up in a pretty socially and politically conservative household and area of California and a very kind of old-school Catholic upbringing. My parents are, they immigrated from Portugal, and they're very traditionally Catholic, and so they had never heard of the theory of biological evolution, which meant that I had never heard of the theory of biological evolution, and the first time that I was exposed to that was when I was fifteen in this AP biology class and there was something about that that clicked for me. It was really, it was, it was, it just, it made sense. It was a really satisfying answer, and so, it was also the first time that I remember walking out of a class and wanting to learn more about something not because of the grade or, you know, doing well in the class but just being so fascinated by it. And, I think that was kind of the first inkling of this is, this is the thing that you're really into and this is the thing that you're, you're gonna do, and so, ever since then it's been some flavor of evolutionary biology and the focus on humans kind of happened later in undergrad when I happen to find the anthropology department here on campus and kind of bring those interests in humans and human cultures and how humans are different and alike and marry that with evolutionary biology and studying that from an evolutionary framework.

Saintsing: Well, as we come to the end of the interview, we usually have a segment where the guests can say anything they like about their field or any issue. So, are there any like final thoughts you'd like to leave listeners with?

Brasil: Yeah, there's, there is one thing, kind of in terms of the broader impacts of what I do and some of the things that I've been thinking about. There obviously is a lot of cause for concern with the current political and social climate and thinking about a lot of the rhetoric around race that has kind of come to the surface, and a lot of it is really ugly, and I think that a lot of the science has the potential to be misused and it's important to be careful about interpreting results and, especially as a scientist, how you communicate your science. And, I just want to kind of underline or underscore both something that has become apparent to me and in my work working on these fossils that you know are from a hundred thousand years old and they're ancestral or closely, closely related to the ancestor of all modern humans living today. So, when we put it in that context, all of the differences that we perceive across modern humans are pretty recent, so we're all really, really similar, and there's a lot of fuss being made about differences in drawing lines between groups of people and what we overwhelmingly see not so much in my work but especially in people who are working on modern humans living today is that there are, there's no ability to draw clean lines between groups of people, so you don't see these discrete racial units, and so, when you see these claims about there being fundamental biological differences between different groups of people, I would just urge your listeners and people out there to be really critical of those and to be kind of careful to follow sources that are putting out good, good science, and so, they are kind of looking for outlets that will regularly correspond with scientists who are leading in the

field and getting their input and getting, you know, their, their perspective on things is really important and just to remember that you know we're making a big fuss about these differences that are really, really small in the grand scheme of things and that we're all quite similar.

Saintsing: Great message. It's a good point about always making sure to check about maybe political or any other reason why somebody might publish something and not just take it in.

Brasil: Yeah, and there are a couple of sources, like, I can point your listeners to. Like Sapiens.org, which is an outlet that is, it's an independent news outlet through I think with the Wenner-Gren Foundation, which is a foundation that funds a lot of anthropological research, and they have contributions from scientists on different topics. There's also The Conversation, which is another outlet that will often take kind of public facing pieces from the scientists who are actually publishing the work, so that's a really good outlet as well, just to point people in a couple of places that don't, hopefully don't have any political spin on them.

Saintsing: Right. Nice. Okay, great resources to check out. So, today I've been speaking with Marianne Brasil from the Department of Integrative Biology. She's been telling us about her work as a biological anthropologist describing fossils from Ethiopia. It's been so much fun talking to you.

Brasil: Likewise.

Saintsing: Thanks for being on the show.

Brasil: Thanks so much for having me. It was really fun.

Saintsing: Tune in in two weeks for the next episode of The Graduates.