Kinetic Salticidology with Sebastian Echeverri
Ologies Podcast
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Oh heeey, it's that boba you forgot to specify non-dairy and you're drinking it anyway, despite intestinal protestations, Alie Ward, back with an episode of *Ologies*. It's got a lot of surprises around a lot of corners. Also, that boba thing happened to me, today.

But first off, okay, first off, yes, we're back, we are back. The last two weeks there have been some surgeries, and some cadaver tendons implanted into my husband's knee, some oozing, some healing. So, we have had some spooky encores for bats and crow funerals. And our entire Spooktober catalog has everything from bones, to demons, to death, to pumpkins. It's all there for you. But this week, it's Spooktober, what better time to get a fresh episode in your face? So, let's get all up in spider business, or rather, let's let the spiders get up in our business as we talk about the movement of jumping spiders or, Kinetic Salticidology. Salticidology, I think… Salticidology.

So, *Salticidae* is a family of spiders, they're commonly known as jumping spiders, they hunt during the day and yes, they dance. So, *Salticidae* gets its name from the late Latin word for dancing, and dance they do! Love them, you will.

So, I've been aware of this ologist for quite some time. He works with the American Arachnological Society, he has a website, SpiderDayNightLive, where he makes and sells spider merch. He's appeared on Crash Course's Zoology series. Oh, and he earned his PhD at the University of Pittsburgh in spider behavior. He also sports a very dapper curly mohawk and when he talks about the objects of his study, his whole face illuminates with love. So, this conversation is an utter joy. Stay tuned also until the very end of the episode because we made the best secret surprise we have ever concocted. This episode is cooking out a day late because of it so, please enjoy, it's the end of the episode, oh my god.

But before we get there, a quick thank you to patrons who support the show at Patreon.com/Ologies. You can join for a dollar a month and submit questions for the ologists ahead of time. Also, the secret surprise will be downloadable to patrons, just saying. Also, thank you to everyone who keeps us up in the science charts by telling a friend and by rating the show and leaving reviews, I read every single one so I can pick a new one, such as this one, which reads:

> *I was so stressed out by all of the news-related podcasts I was listening to, I needed something that was a beacon of light in dark times. This podcast is it!*

Signed, Deeply Saddened User. I hope less deeply saddened user, or even just moderately, intermittently saddened user, thank you for listening. Thank you to everyone else who left reviews, which I read.

Okay, on to spider dancing, get ready. Sexy choreography, we got mating motifs, twitchy legs, fancy knees, deep beats, hungry ladies, spider eyes, spider icons, why jumping spiders have just made off with your heart, with scientist, nature lover, professional Arachnologist, Araneologist, and Kinetic Salticidologist, Dr. Sebastian Echeverri.

Alie: Hellllllo?

Sebastian: Hello, is this working?

Alie: Hi, it is! Can you hear me?

Sebastian: Okay, wonderful. Yes, I can.

Alie: We're both a minute early.

Sebastian: Perfect.

Alie: How excited are we if we're both here a minute early to talk about spider dancing?

Sebastian: Incredibly. [*both laugh*]

Alie: I've never been early to anything in my life except for spider dancing.

Sebastian: You know what, like, legit, kinda the same. [*both laugh*] Spider stuff, I'll show up. Anything else… It's questionable.

Alie: Kinetic Arachnologist, could we call you that?

Sebastian: So, I was thinking about it. Kinetic Arachnologist is accurate, but Kinetic Araneologist might be more accurate in that it's spider-specific because all my research at least is in spiders, even though arachnids in general are my favorite type of animal. I don't know as much as, say, Lauren Esposito, on scorpion dancing and things like that.

Alie: [*laughs*] Good point.

Aside: After this, of course, we learned that Salticidology is plenty-sided. So, jumping spider experts, they're all over the world. Oh, and as long as we are naming names…

Alie: First thing I'm going to have you do if you could say, your first and last name, and your pronouns.

Sebastian: Absolutely. My name is Sebastian Echeverri and my pronouns are he/him/his.

Alie: And now, you're a doctor, correct?

Sebastian: I am. Yes, as of last… May, I want to say. It gets to the point where you forget when you defend your PhD, thanks to all the stuff that's happening. But yes, doctor, doctor.

Alie: Did you dance during your PhD defense?

Sebastian: [*laughs*] It is on YouTube so you can watch. And yes, whenever I describe the dance of my study species, I do a human imitation of it, which is very difficult because I do not have enough legs. It's not the same as the real thing.

Aside: His dissertation title, "How spatial constraints on efficacy and dynamic signaling alignment shape animal communication." And of course, yes, I will link his video PhD defense on my website.

Alie: Well, let's reverse a little bit to your history.

Sebastian: Please.

Alie: Have you always loved spiders? Have you always loved bugs? Was it nature?

Sebastian: Yeah, that's a question I get a lot. Because for a lot of people, spiders are this thing that they've maybe not had the best relationship with throughout their lives. But I was lucky enough as a kid, my family was always very nature positive. I didn't fear spiders growing up, but I didn't really know much about them. They were just kind of like, "Oh it's an animal, it's there." I'd see one every now and then and be like, "Oh that's kind of cool." Even when I was

in undergrad and I was kind of deciding that I wanted to be a researcher, I was studying birds and I did my undergrad research with these birds in Namibia.

It wasn't until I was actually interviewing for grad school where I was talking to a professor, not even the lab that I was originally interviewing for, and they were like, "Oh by the way, here's a project that I've just kind of been thinking about, it's not on my website yet." They just pull out their laptop and hit play on some videos and it was a video of a jumping spider, dancing. [*DJ* airhorn] Like, up close, macro, super zoomed in. It was the first time I'd ever seen a spider that way. I'd seen them as these little specs hopping around, or in a web, but never up close where you could really appreciate them. And I stood up in the meeting being like, "Oh my god, what is this?" [*Alie laughs*] And that kind of was the start of it. It was just this transformative moment when you see these animals for the first time and see what they actually look like and what they can do.

Alie: Mmhmm. Did you get the job immediately? [*Sebastian laughs*] Did you have to apply still?

Sebastian: It turned out that the lab I had originally applied for had already picked a student and then this person didn't have anyone that they recruited that round so they were like, "Would you like to join my lab instead?" And I was like, "Yes. Yes, I would like to become a spider scientist."

Alie: Yes, a resounding, "Hell yes." Eight thumbs up, for sure. [*Sebastian laughs*] Tell me about spider dancing. I did not realize that spiders danced until some peacock spider footage kind of went viral a few years ago.

Sebastian: They're the famous ones.

Alie: Yes. I didn't know that other spiders did that.

Sebastian: Yeah. So, a lot of spiders have these courtship displays that they have to use; typically, it's the male using them, though in some species it's reversed where the females are the ones that are courting. Because spiders are these excellent predators, right? They're a super diverse group, like 50,000 species or so, been around for hundreds of millions of years, and they've stayed around and gotten so diverse because they're really good at their main thing, which is hunting things that are about their same size or smaller. And that includes other spiders.

So, they've had to evolve these ways of talking to each other and saying, "Hey. One, I'm the same species. Two, I am a mature individual that would like to mate. And three, please don't eat me." And that has turned into, I think, in a lot of spiders, it's very vibratory, there's a lot of playing of these like… drumming sounds you see in, like, tarantulas and plucking of web strings. But in some spiders that have evolved really good vision, like the jumping spiders, you get this evolution from a song to a song and a dance; a choreographed performance that can get really, really elaborate.

So, jumping spiders are the most famous, but other well-sighted spiders like wolf spiders for example, also have a dance, though it tends to be less involved than jumping spiders. Even when you see a tarantula doing their drumming display, it looks like dancing though the tarantulas very likely cannot perceive the visual aspect of it. But yeah, involved arm movement courtship display is a typical spider thing. It's just a few of them that have elevated it to this artform.

Alie: And you mentioned a song and dance. Was that theoretical or is there actual…?

Sebastian: No.

Alie: What?!

Sebastian: It is wonderful. There's a couple of researchers that do this kind of work. The one that does it on the group that I work with, the paradise jumping spiders, is mostly Damian Elias and his lab, he has some videos on YouTube.

Aside: So, this UC Berkeley Salticidologist offers a wealth of free video resources with just-the-facts titles like "Spider Fight: Male and Male. Jumping spider mating dances, with sound: *Habronattus anepisus.*" What are the sounds? Okay, the video captions explain that they are substrate-born vibrations produced by the male spider and recorded using a laser vibrometer which translates vibrations into buzzing noises. Wait, what? Sebastian, break it down.

Sebastian: So, let me back up and explain how this works. They are singing through the ground, so they are vibrating their abdomens, sometimes they have little rasp instruments, like those washboard kind of things, between their head and their abdomen, they use to make music. And it's these vibrations that travel through the ground that the female is listening to with her legs and with hairs on her legs, while she's watching the dance.

Because a spider can both dance with their legs and vibrate their abdomen and they choreograph it. The really cool thing about a lot of them — the peacock spiders do this, the paradise spiders do this — where, dance moves are matched up to motifs in the song, that's kind of the scientific term that's actually being used. And it like, follows like a pattern; there's an introductory movement where they move in a certain way and they make certain types of sounds, and then they'll slowly get up close to the female and change their posture and change the types of sounds that they're making. That gets more elaborate, more elaborate. And then right before they are going to try to mate with the female, they do this really big, over the top, arm vibrating, [*Alie laughs*] they're flailing their arms over her head.

Aside: So, they are flailing their arms, they're drumming on the ground, and just getting bigger and bigger until they are closer. And in the group that Sebastian studies, it's not just the arms, they've got a little something… [*whispers slowly*] extra sexy.

Sebastian: They have these really fancy knees on their third legs, [*Alie laughs*] they show those off and they make these really loud thrumming sounds. When you hear them as a person it's weird because it's a vibration, so you have to translate the vibration to human hearing, and it sounds really experimental. Like, I really want somebody to take this and use it as a beat for something. I need someone to do that for these guys because it's going to sound very strange, but I really want to hear it.

Aside: So, from Dr. Damian Elias' YouTube video, "Jumping spider mating display: *Habronattus pyrrithrix multimodal* display" [*sound clip from video, a thrash followed by rapid tap-tap-tap*] Okay, and you know how at the end of each episode, I burden you with a secret from my soul. Stick around until after the credits, because this episode has the best surprise we have maybe ever pulled off. You're going to lose your mind; a hard-core bop awaits. Mm! That spoiled the surprise, but… you're going to love it.

Sebastian: It's an experience.

Alie: Oh my gosh, please. I haven't closed my mouth for like the last five minutes [*Sebastien laughs*] just understanding that they are drumming through the Earth, that they drop a beat and also drop it like it's hot. I just can't… [*"It's literally impossible to can."*] The other thing… I mean, obviously very different in mammalian species but spiders do have glorious badonks, but that's not what they're using necessarily in their dance, they're using their arms.

Sebastian: The rule that's going to come up with spiders is there are so many, they are so diverse, that there's always an exception. So, most of the time it's their arms. But the peacock spiders for example are the really famous one, where they have these flaps on their abdomen that open up and they make this beautiful picture display, and they shake that around.

But there are other groups that do that. So, in the paradise spiders, the genus *Habronattus*, there are a few species that show off their abdomen. The most famous is *Habronattus decorus*, which looks really cool, the decorated paradise spider, I guess, would be the common name. They're called that way because their abdomen is, like, metallic pink nail polish, that is the exact shade. And what they do is they lift that up, they do very little arm movement, it's almost all booty shaking, and they do a back and forth, back and forth. When the sunlight hits it right, because it's metallic, it's got this slightly iridescent property to it, it's beautiful.

Aside: Okay, so I needed to know if this spider's metallic, rusty orange, fuchsia shade has a nail-colored match. The closest I found was an OPI color called PCH Love Song, I appreciate that as someone who lives in Los Angeles. Although, I never go to the PCH, it's just too far away; it's on the west side.

But as long as this is an aside about nail polish the color of a spider's ass, I just want to tell you that I just learned, OPI nail polish stands for Odontorium Products Incorporated. What? Odontorium? Yeah, the company once sold dental products. And the cofounder, Suzi Weiss-Fischmann, gets to name all the shades. And one day, I hope that they truly match this glorious color of this decorated paradise spider, or *Habronattus decorus*. I hope that they call it something like Habwenodus Decorum… or Deco-Rate Me a 10, or maybe just… You Look Like Vermillion Bucks.

Sebastian: So, there's a few that do the abdomen shaking, mostly its legs and pedipalps. So, the pedipalps are like the spider equivalent of arms. Imagine if you had arms like right under your… like, right next to your face. [*Alie laughs*] Because all of a spider's limbs are attached to its head. So, they've got the eight legs and they've got the two pedipalps. In males, the pedipalps can be really big, with tufted hairs and they can look really, really cool. And a lot of them shake them around like pompoms when they're dancing. There's a lot of stuff that's come out of the evolution of these dances.

Alie: Do different species have different motifs and beats and dances? Or is it generation to generation? Like, will a son spider's dance be similar to his father's but different than his cousin's? What kind of commonality? What kind of patterns?

Sebastian: Yeah, I'm so glad you asked because there's some cool stuff happening in there. So, in general, these dances are an instinctive thing. It's not like in, say, birdsong, where, in some birds at least, they will learn the song and improvise it and mix it up. It is a stereotypical dance for each species. So, it is a way that you can kind of identify an individual.

But there is some really cool things that happen when there are hybrids. Another cool thing about jumping spiders in particular is that the males are not how you would say, very selective in who they will dance for in that, [*Alie laughs*] is it a *Habronattus* female of the same species, of a closely related species? Is it a dead female on a stick that a researcher is using to get the male's attention so that they can film it for their PhD project?

Alie: [*laughs*] For example.

Sebastian: Is it actually like a very badly painted model of a spider that looks terrifying because it's barely a spider? They will dance for a lot and most of the time that goes nowhere, but every

now and then there is hybridization, especially in these really diverse groups of jumping spiders, the paradise jumping spiders. And I don't know how much it happens in the peacock spiders. I know in my group, the one that I study, there's a lot of hybridization.

Aside: Okay, and when he says there are a lot of hybridizations, that is a very diplomatic way of saying that there are a lot of males throwing down moves and getting hornt up for spiders that are not even the same species, and they are out there making all new fluffy, hairy outfits and some sick moves.

Sebastian: There's a whole group that I like to call the Fancy Knee Boys. Because all the other ones, it's mostly first pair of legs, face, and pedipalps that are like the fancy parts. But in the Fancy Knee Boys, which is like a dozen or so species that are all kind of clustered together, the third pair of legs has these really ornamented segments that are like expanded, and they're big, and they have colors, and some of them are elaborately shaped, and they do these knee pops where they move them into the female's field of view up and down, and that's their thing. The females love to look at the knees and the males love to show off the knees. And that's that lineage's specialty. You can trace the evolution of the dance by looking at the family tree.

Aside: Okay, I looked this up and I find a 4K video that Sebastian made, featuring a pair of *Habronattus pyrrithrix*, this is a type of paradise spider, and the ashy brown female just stands there grooming her bulbous posterior as this green-armed male keeps two front legs up in the air, twitching just the tips and then alternates lifting his right and left middle legs in rhythm to show off… Mm, some orange knees. He's got a sense of style, romance, confidence… At this point, *I'm* ready to mate with this guy. I mean, he's looking good. But his potential lady, you know what she does? She just turns her back on him. Doesn't care! Continues to pick dust off of her own butt. But she did not eat him, so he's having a good day.

Alie: Do different moves signify different things? Like, if you're showing off, you have really chunky knees, does that mean you are really good at capturing prey? Do you find any commonalities that female spiders will be like, "Yes, very into that. Glad you showed me that."

Sebastian: That's a question that I think a lot of jumping spider researchers and, like, animal communication people in general have been trying to figure out. When an animal does a signal, how does it encode the information that they want to actually tell the other animal, into what they're doing? There's a lot of hypotheses about how that could happen.

Aside: Okay, here's what they came up with, which is amazing.

Sebastian: It's very often just the overall effort that the male puts into it. [*Alie laughs*] So, the elements of the dance themselves are not specific, as far as we can tell. It's not that you wave your arms this many times and it means that you are faster or something. But the overall effort and energy and how vigorous they are at dancing and potentially how choreographed it is, seems to be what females are picking up on, at least to make decisions about who to mate with.

But a lot of these other aspects of the dance might have evolved for other reasons. So, there's some ideas that some colors might be helping males, first of all, to show that they're the same species, if the colors are consistent within a species. But also, some of the males, or quite a few of them, have a really bright red face, like their face is this beautiful, beautiful red. There's some research on both sides that this might actually be kind of trying to trigger

the same sort of reaction that females might have to aposematic prey. [*robotic voice: "aposematic"*] So, prey that is toxic that also uses yellows and reds and oranges to say, "Hey, don't eat me." The males might have evolved this bright red coloration to send that same message of, "Hey, before you do anything, don't eat me. And now look at my dance and please allow me to mate with you." Because the predatory response of these animals is super, super quick.

Aside: So, planning a first date as a spider is just as simple as suggesting, "Okay first, let's not cannibalize me and then you can maybe, I thought, watch me dance? And then we'd bone it out? I'll smear sperm on these leglike things growing near my mouth, I'll jam it in you, consensually. Thought maybe you could have 135 of my babies. Nobody commits spidercide. What do you think? Mm? Yeah? [*whispers*] Yeah."

Alie: Well, I was going to ask, how many of these spiders are doing their final performance? [*Sebastian laughs*] Is this their great bow into the unknown. I understand that the Australian redback widow spiders will do some sort of, like, elaborate gymnastics where they will fling themselves into the mouth of the mother of their children. Anything like that?

Sebastian: Yeah, the ultimate sacrifice. So, in the jumping spiders in general and I believe also in the other big dancers, so wolf spiders, in general, the males are not trying to get eaten. They're very much trying to dance, successfully mate, and then get out of there to do it again. [*"I'll see you around, babe."*] That doesn't mean that they don't get eaten. Females are often, in a lot of spiders and including these groups, larger than the males and they can almost always overpower them. And so, males, they're very… What's the right word? Tightly wound. And if something starts to go wrong, they might just hit the eject button. And I've seen a male just like, fling himself, without aiming — they usually aim before they jump — just jump like, get out of there as soon as possible. [*"Bye, have a great time." "Bye!"*]

The rate of how often they get eaten varies a lot with, like, how hungry the female is, if she's mated before, how much space the male has to get out of there. But it does happen relatively often that females will at least be aggressive toward the males and the males will then have to choose to leave. And there are times where like, yeah, the male will be eaten before or sometimes the male will be eaten after. Like, the female will let him mate and then be like, "Okay, I want some food now, I've got to make these eggs," and she'll just grab him right there while he's still copulating and so can't really get away.

It happens. There's a reason that whenever I was like focusing on writing a paper or something, I would keep playing this one song called, "Dance or Die" by Family Force 5. [*Alie laughs*] If anyone knows it, that is my mental jumping spider dance soundtrack. [*"Dance or Die" plays, "One, two, three, four, I declare a dance war..."*] Because it can get to that level, they are very much trying not to die but it is a high-stakes performance. [*record scratch*]

Alie: Oh my god. What about your life… Has studying dancing spiders made you more of an extrovert when it comes to wedding dances or cutting a rug?

Sebastian: You know, that's the sad part. I'm not a great dancer. [*Alie laughs*] It has made me an extrovert in the sense that if you count being willing and able to talk about spiders forever as an extroverted trait, then I'm an extrovert. In that, yes, if that's the conversation you want to have, we will have it as long as you'd like. But the dances don't translate super well to humans. [*laughs*] I've done some of it. I remember one Halloween I dressed up as my species and I tried to do some of the dances. But the parts that people can do are not that

interesting because it's mostly just waving your arms. And in terms of me actually dancing, I think the last time I did was like high school ballroom dancing class which was…

Alie: Really?!

Sebastian: Yeah, I'm not that much of a dancer, I just love watching these spiders… You know, it's like art, right? I am not good at many forms of art, but I do enjoy looking at those forms of art, and it's similar with these spiders.

Alie: But one thing I have learned so far is, it really is A For Effort in some species. If you look like you're putting effort into it, that's really the most impressive thing. And I feel like that might change the way that I get down.

Sebastian: Yeah, it's about the sincerity. If your heart is into it, your audience will be able to tell.

Alie: Yeah, and that's really all that matters, rather than the size of, maybe, my movements, or how on-beat I am. Maybe I just need to strive for passion over perfection in some ways, if we can take a lesson from this at all.

Sebastian: Absolutely.

Aside: Passion over perfection, people. Tattoo it on your neck! Or maybe someplace you can read it. Or just on a Post-it Note on your desk is fine. Passion over perfection.

Alie: You mentioned that part of your work involves putting a corpse on a small stick and waving it around someone horny.

Sebastian: Yeah. Yeah, yeah, yeah. [*Alie laughs*] There are a lot of goofy things that I've done to spiders in order to figure out what they're thinking. My PhD was on why and how these jumping spiders get their audience's attention when they're actually about to throw down their sickest dance moves. [*Alie laughs*] Because just like us, animals have both mental limitations, like how much stuff they can think about at any one time. But also, sensory limitations, like how our eyes can't see everywhere at once, jumping spiders have similar and in some cases more extreme versions of that. And the takeaway is that, like, if they're not paying attention, they're going to be missing out on part of the male's dance.

Aside: Okay wait. So, if a female spider is distracted or just turned at an angle, she's missing some of her soulmate's advances. What is she distracted with? Eight tiny phones? Don't spiders have a pretty open schedule and, like, a dozen eyes?

Sebastian: And in certain cases, they're actually missing out on all of the color because of how their eight-eyed visual system works. If the females are not looking directly… Facing toward the males, they actually can no longer see them in color.

Alie: Wow! How does that work?

Sebastian: Yeah, it's really cool. So okay, crash course on jumping spider vision. [*"Bring it on."*] Jumping spiders have some of the best vision, in terms of resolution, of any animal on land without a backbone. Actually, better than many animals ten times their size, better than many vertebrates. For example, if you gave a jumping spider a human vision test like you do at the DMV or in school, the little letters on the pyramid chart thing, many animals that you'd think are much bigger, have bigger eyes, would fail. So, some songbirds would fail; elephants just barely fail; cats are, like, borderline. Jumping spiders, at least the ones with the best vision, just barely pass or at the very least are not legally blind. So, their vision is within the normal human range of variation for resolution, of how sharp that image is, even

though their eyes are 100 times smaller than ours, their vision is only about ten times blurrier.

Alie: Wow.

Sebastian: It's really impressive.

Aside: So, if you can see a jumping spider, they can see you. [*softly*] Is that nuts? Like, they're maybe looking at you, and admiring your bold haircut, or wondering if you're going to be an evil landlord that evicts them from summer home… Also known as your shower.

Sebastian: And especially if you see a jumping spider, because they are very, very small animals. I mean, I have a photo of one sitting on my fingertip that I took, and her body is like 15 to 20 ridges of my fingerprint long. Her head and eyes are like, I don't know, ten fingerprint ridges long… To give you a sense of that. And the way that they've managed to pack in all that vision into a head that is that small is, they've kind of cheated, in that they've evolved to have like, telescopes or binoculars [*Alie gasps*] for one of their pair of eyes.

Alie: Wow.

Sebastian: If anyone's worked with cameras or anything like that, the smaller the camera, the blurrier your picture is going to be, just because it's smaller. So, these guys have evolved basically a second lens in the back of their primary eyes. If you're looking at a jumping spider head-on, it's the really big, super cute, puppy dog eyes that make them look adorable. But those two are actually these really long telescope-like tubes because that's the only way that they'll fit in their head, if they give up on being a sphere and actually just become a tube with a second lens in the back and then behind that, they have this layered retina. Because again, they can't fit it all flat, so they've had to stack the cells to get all of the photoreceptor cells in there. And those are the only eyes that see in color.

Aside: So, the giant eyes on a jumping spider magnify things, like in high resistance, and they see color. Meanwhile, I, a human person, need contacts in my eyeballs to function on planet Earth.

Sebastian: And because they work like binoculars, imagine walking around with a pair of binoculars strapped to your face, [*Alie laughs*] they actually have a really small field of view for how big they are. They can move around a little bit, but it's about like a 60° cone in front of their face. And only those eyes have the ability to see in color. The spider's other eyes, including the ones that look… The two on the side and the two on the back of their head, see only in black and white and they're actually much blurrier than the primary eyes.

Alie: Are they like a backup cam? What are the ones on the back of the head for?

Sebastian: They are like an always-on backup cam. So, the spiders can see around themselves at all points in time. The field of view is basically continuous; where one eye cuts off, the next one picks up. So, they're really motion detectors in that they can see things moving… The way they use them is they use them as motion detectors, they can see stuff like, moving over there. Those eyes actually have a connection in their brain that feeds, partially, directly to the muscles that control the legs and the primary eyes. They say, "Hey, there's something at your 7 o'clock and it approximately looks like this shape and it's approximately in this part of your field of view when you turn to look at it," and the spider will swivel in, like, a split second, and lock their primary eyes onto that. And *then* they can see what color it is, and then they can see it in higher resolution and get all this information.

Alie: Wow.

Sebastian: There's a lot of stuff going on. I could talk about their eyes for a long time; they're very cool. [*Alie laughs*] They evolved their own way of seeing color that is both completely unique and also kind of bad. So, what they do is they have in — this is in the paradise jumping spiders, the genus *Habronattus* and their very close relatives — they basically have a filter over part of their retina. So imagine, if you've ever played with a flashlight and you put colored paper, like cellophane, in front of it, and it changes the color of the beam. What that's doing is that it's not changing the color of light, it's blocking everything but, say in our case, red light. So, in these jumping spiders, they have a red filter that only allows red light to pass. If you put those cells directly behind a filter that only allows red light to pass and those cells pick up any light at all, the brain of the animal can infer that it is looking at something that is red.

Alie: Oh my god.

Sebastian: That is how they've evolved to see the difference between red and green. It's cool, it's really inefficient. They actually cannot do it when it becomes too dim. In the shade, they lose this ability because there's not enough light entering their eye. But it works for them, and they've used it to, you know, see all these colors and evolve all of these colors to talk to each other, so it's working. But it is very goofy.

Alie: Oh my gosh. Now, I'm glad that we are talking also about their eyes because… Can you tell me just a little about spider eyes? Some of them have eight eyes, some of them have six. And also, this is a good time to address the elephant in the room, which is like, why are jumping spiders the cutest spiders?

Sebastian: Oh, that's a great question.

Alie: We all know. I mean…

Sebastian: They are. It's objective. They are the cutest.

Alie: We know they're the cutest.

Sebastian: Yeah, they're amazing.

Alie: Everyone knows.

Sebastian: Yes.

Alie: Can you explain to us why they're so cute?

Sebastian: Yeah so, I'll start from the cuteness. So, I think the reason that a lot of people fall in love with jumping spiders and the reason that they're this great, like, ambassador spider, right, [*Alie laughs*] is that they've got these traits that we've evolved to think are cute. So, these really big eyes, they are colorful, they are fluffy because they've got these colorful hairs and some of them have tufts. Things that are starting to overlap with mammal traits; having tufts of hair and fur, big eyes, say on a baby.

And that is really interesting because we kind of have a parallel evolutionary history in that humans evolved to be visual predators; we have some of the best high-resolution daytime vision of most animals. So are jumping spiders. They are these amazing visual predators, they don't use a web to catch their food, they are out there hunting, spotting prey in the distance and doing that, chasing it down, sneaking up on it, ambushing it. [*"Badass!"*] And so, they've evolved to have these really big eyes in proportion to their head.

And because humans have evolved these, kind of, maternal or paternal care requirements, where we have to feel attachment to the things that are similar enough to us that we want to take care of them, and evolution for visual hunting selects for similar traits, at least in

terms of eye size… That makes it really easy to like, put yourself in the jumping spider's mind because for the most part, they're interacting with the world in the same way that we do. So, it's easy to… I think for a lot of people who may not easily do this for other animals, see them as a little person, see them as a little cat kind of looking around, because they will look at things that they're interested in, they will tilt their head, kind of like a dog will, they will sneak up on stuff, they'll react to your movements. Our brains are wired to tell us that that's cute. It's just a perfect storm of adorableness.

Alie: Oh man, they're one of those animals that as soon as you see a macro photo you really could never squish another.

Sebastian: Yeah, yeah. And they're the ones that got me into macro photography. I started doing a little bit of it for lab work, because we just had to look at the spiders. That kind of turned into this huge interest in macro photography.

Alie: Oh my god!

Sebastian: Yeah, it's been a lot of fun.

Aside: If you've been wanting to get up close and personal with tiny animals, may I suggest the Aperiology episode, all about macro photography. I'm going to link it on my website via the show notes… I wonder if he's heard it.

Alie: If you haven't listened to Joseph Saunders…

Sebastian: I have, yes. I was about to say, I was so excited when he was the guest because I met him over Twitter both as people of color who are really interested in invertebrates but also as photographers. Yeah, his photos, I have yet to take something that I think is as good as his. I like my photography, but he is incredible. Yeah, that episode is really good, if people haven't listened to it. Yeah, it's fun.

Alie: And he makes calendars now which I'm so excited about.

Sebastian: He does, yeah.

Alie: So, I'm like, yay! If you need a calendar for 2022 people, get into it! I have a lot of questions from listeners, and I haven't read all of them; I had Jarrett sort them for me. Are you ready for some curveballs for the both of us?

Sebastian: Very ready. Yes.

Alie: Okay, cool! Oh also, we donate also to a charity of your choice, do you have one top-of-mind?

Sebastian: I do. Is it possible to pick two?

Alie: Yeah, we can split it.

Sebastian: Okay, so the first one that I really would love is called Entomologists of Color. Because one of the things that you learn really quickly as a person of color studying, particularly invertebrate animals, is that there is very few of you. What this fund does is it pays for the dues to join professional societies for scientists of color who study insects, arachnids, and other arthropods.

Alie: Awesome!

Sebastian: Because for a lot of people, that is like, you know, a $100-200 fee to just be part of a community that you need to, you know, grow your career, and meet other people, and to make a change in your field. And that is, a lot of the times, a prohibitive thing. They also do

these cool mentoring programs at professional meetings and stuff like that. So yeah, they are @EntoPOC on Twitter if anyone would like to follow them. That would be great.

The other one would be one that I know has gotten some love from the show before, The Xerces Society. I always called it "Zerk-sees" and then you pronounce it "Zer-sees" and I'm like, "I'm going to trust Alie on this one."

Alie: Oh no, I hope I said it right. [*laughs*]

Sebastian: I genuinely don't know. But it's a group that supports invertebrate conservation across the world. But the cool thing about arachnids is that if you help conserve insects, arachnids are almost always… They're like, really good predators of insects so the conservation efforts for one of those groups will help the spiders as well.

Alie: Oh, that's great! Those are amazing. All right, you ready for some Patreon questions?

Sebastian: Yes, please.

Aside: So, we will split the donation thusly to two great causes. Those donations were made possible by sponsors of the show who you may hear about now.

[*Ad break*]

Okay, your Kinetic Salticidology questions. No more dancing around 'em… [*whispers*] Let's jump in.

Alie: Okay, RJ Doidge says: DadWard, this is the niche shit we live for. [*both laugh*] Do they learn the dance from their elders or do they just feel the beat deep within their souls?

Sebastian: It's all from their DNA… tells them the dance. Once they are mature adults it's like, "Okay, I know this." And they will just go. Yeah, it's part of who they are.

Alie: Does it ever make researchers wonder, like, will we get to the point where we'll figure out like, where this information might be stored genetically? How can we even figure that out?

Sebastian: That would be so cool. I mean, it is genetic, so it has to be in there. And I mean, you can look for genes that vary between species and try to match them with aspects of their dance, but it's a lot to take that apart. There are some really cool people doing really, really cool work in jumping spider genetics. Wayne Maddison and a bunch of his students, in particular, are the ones who do a lot of jumping spider work, especially in the paradise spiders. But we're still figuring out how some of them are related to each other and finding out new species. We're unfortunately not at the point yet of like, breaking down dance elements by genes. Even though that would be so cool.

Alie: I mean, it's got to be in there somewhere…

Sebastian: It is.

Alie: But, you know… Sid wants to know: What do you think of "Lucas the Jumping Spider" videos? Aren't they just the cutest?

Sebastian: They are.

Alie: I do not know who Lucas is. What is it?

Sebastian: Okay. So*, Lucas the Spider*, I don't know when it came out, but I started seeing it… Like, people would start sending it to me. It's these videos that an animator made of this jumping spider with really exaggerated eyes and it's voiced by his child. *[clip from Lucas the Spider: "Hi, m-my name's Lucas. I have too many* eyeballs*."*] So, it's like… I think the kid is just maybe

making up the script as he goes and then the animator animates around it. And the impact that I've seen it have on people in general has been so wonderful because they have this point of contact for what a jumping spider is, what they do, and that they're really cute, fun animals. And I love that. Anything that gets people to start questioning the cultural message of, "Oh no, scary spider," is an incredible thing in my book.

Aside: Okay, so there you have it, Lucas-loving patrons including Alexandre Catulle and Kate Rampy. But yes, the animator, Joshua Slice, had his nephew, Lucas, voice Lucas. And after a few years of making internet videos on YouTube to wide acclaim and people loving and crying over them, *Lucas the Spider* became a TV show and it just premiered on Cartoon Network and HBO Max like a few weeks ago; I just found that out yesterday. So, get your babies some loveable, salticidological content. It's so cute.

Why? Why is it so cute? Well, Shannon Ray-Dattolie, Isa Brillard, Natalie, Sarah Maas, Danielle Larmon, and Jessi asked, in Jessi's words: *Why* are they so ding dang cute? And Lauren Cooper needed to know: Do they know I love them?

So…

Alie: First-time question-asker, Brianne Lovins, bunch of questions that stem off of, "why are they so stinking cute?" But they want to know: Do they really wear water drops as hats? Because if they do and dance at the same time, I will be so happy. Do they wear waterdrops as hats??

Sebastian: I'm unfortunately going to not have to make you that happy. Because that is getting into one of the uncomfortable things about a lot of viral animal photos in that it's a posed thing that has been, like, artificially done by a person and pushed off as this natural thing of like, "Oh isn't nature so magical?" That really misrepresents what's going on.

Aside: So, Sebastian says in the case of water droplet hats, it's not natural. But it's not harmful, really. And yes, it's very cute. It can help people see that spiders are adorable, and they are your friend. But other photography practices do cross the line. He says some animals are even partially frozen and then manipulated. Or their dead bodies are posed in really unnatural relationships like with a predator and prey sitting down to tea to fulfill some of our human narratives. So, would you do this with two formerly alive humans who had opposing religious or political views? I hope not, sickos. So maybe, leave the fiction out of the wildlife pics.

Sebastian: I think there's so much like, of what's actually going on in nature to wonder at and marvel at that we don't need to embellish it. We just need to look for the really cool behaviors that the spiders are doing. Because they have some really fancy dance moves that… Like, I mean there are ones that do these peekaboo arms where they hide under a leaf and peek one leg out at a time for the female. And that's adorable and that is completely unembellished, that's just what… It's the genus *Jotus,* I think, though I think the genus *Saitis* also does this. But they're very, very cute. Yeah, just enjoy the spiders for what they are.

Alie: So that brings us to Kate Rampy's question. Says: Hi, animal lover here. I like to keep little jumping spiders I find in my showers and corners in boxes like an AMAC box? A-M-A-C box?

Sebastian: Oh yeah, I know, I've got some of those, yeah.

Aside: Yes, I looked it up. And an AMAC box is a clear, rectangular, display box, you can get them at The Container Store or whatever. And a lot of folks use them to house little, small spideys, or slings, which I just learned via a spider-person forum is shorthand for spiderlings, they're called slings… Those are babies. And if baby spiders, imagine, if they

were the size of a newborn human, you could carry a sling in a sling. And then you could get your own row to sit on in the subway, because you would have a giant baby spider in a bjorn, it would be killer. Anyway, Kate Randy, casual spider keeper says…

Alie: "I do coconut soil, a cork, a stick, and a fake flower for them and I mist them every day for water. I'll get them a few small crickets from the pet store I work at once a week and then I release them after a few weeks. I was wondering, AM I DOING OKAY FOR THEM?"

Sebastian: [*laughs*] Yeah, I will say your setup sounds pretty nice. Depending on the size of your spider, depending on the size of your AMAC box, they don't need that much space to survive, especially if you're letting them out after a few weeks but they are very active spiders, so if you're keeping them for longer term, they will use the space that they're given to move around and stuff. But other than that, your setup sounds pretty good.

What I would do is check your ventilation. If you're misting them every day and your boxes, your enclosures, have low ventilation, you might get a build-up of humidity. It really depends on the species that you have. There are some species that are adapted to really humid environments, there are some species that are desert jumping spiders. And then just make sure you're feeding them small enough crickets. That is one of the difficulties in keeping certain species in that the spiders are so small that you can't buy a cricket that's small enough and then you have to breed crickets and that's its own [*deep breath*] can of worms.

Alie: [*laughs*] Small worms, very small worms.

Sebastian: Very small worms. But yeah, the setup that you've got there sounds pretty good. Especially because you're releasing them after a few weeks, that is, they're going back out to nature and they're going to be part of their gene pool and everything, so that I really like too.

Alie: Okay. Stephanie Broertjes wants to know: Relative to size, what's their hop game like? If there was a rabbit-sized jumping spider, how far could it hop? Would it match the bunny's hops? And Jenna Palermo wants to know: When did they start jumping evolutionarily? And can all spiders jump and they're just not letting us in on the fun? [*Sebastian laughs*] Jenna wants to know.

Sebastian: Okay, lots of good questions. So, let's start with just jumping ability. So, jumping spiders are pretty good at jumping forward, they're less good at jumping straight up. So, they'll usually telegraph where they're going to jump, they'll aim and then jump forward. It really varies with how heavy the jumping spider is. There's a sweet spot; if it's too small of a spider, they don't have enough muscle strength or hydraulic blood pressure strength, because that's how they flex their legs to jump off the ground. If you're the sweet spot jumping spider, the right size, you got long legs — or I guess not too long, they're bulky enough — it's 40 times their body length…

Alie: Woah.

Sebastian: …is the upper limit of what I've seen reported. Most jumps are smaller, but 40 times your own body length for like a human is getting close to… [*voice fades*]

Aside: Sebastian math-ed a bunch here.

Sebastian: Yea, about 100 yards maybe, I think, if I'm doing math right?

Aside: That's right. To recap, jumping spiders have sweet dance moves, they have binocular eyes, hydraulic legs, and they can leap the equivalent of a football field to come steal your girl. But also, they know how to strut very casually.

Sebastian: Their typical jumps are shorter, but they do a succession of them. So, they will jump, jump, jump, jump, jump to like navigate things really quickly. And those are usually only like, a body length or two in front of them, depending on how far of a gap they're trying to cross.

Alie: Like hoppity, hoppity, hoppity?

Sebastian: Yeah, so they can outjump a typical rabbit just based on my memories of having a pet rabbit as a kid, it didn't jump that far forward. If they're like, trying to get away from you, that's when the big jumps come up, and that's when you get the huge distance.

In terms of the question about who, in the world of spiders, can jump? There are many species of spider that can jump. You'll see wolf spiders jump; you'll see lynx spiders jump. I don't think tarantulas can jump. They can push themselves off of things, they can run really fast and kind of throw themselves forward, but I don't think they can jump. So, there is a, probably a body size cut off.

But a lot of spiders can do that thanks to, kind of, how their muscles work. They have regular muscles like we'd think of them, but they also use their blood pressure to rapidly extend their legs. So, they use a muscle to flex their arms — so, pulling my arm in toward my shoulder — they have a muscle that does that, but when they're extending their legs, that's like a hydraulic pressure. So, they can get a lot of energy stored up and that's how they can move their legs really fast.

Aside: So yes, death means the hydraulics on the leg machines ain't running. And we have mentioned this in a previous episode but that is why dead spiders are folded in, like a sad, broken umbrella.

Sebastian: And what was the other question? The evolution of jumping spiders. Okay, so this is a cool one. But we've got jumping spiders as old as 50 million years and I think it's likely that they've been around before then. But they are a relatively recent type of spider. So, spiders have been around for like… I want to say like 300-ish million years.

Alie: Oh my god.

Sebastian: You know, older than the dinosaurs, survived multiple mass extinctions; they're really good at what they do. Jumping spiders are a bit newer.

Alie: Augh, I had no idea their backstory.

Sebastian: It's a good backstory.

Alie: And how long they've been on the planet! And speaking of their narratives, Andrea Negrete wants to know: Do they have to build up to bigger jumps, or are they just straight out of the womb, ready to dunk?

Sebastian: [*laughs*] The baby jumping spiders, adorable, they do need to work up to it. So, if you think an adult jumping spider is cute, you have not seen a baby jumping spider. Because just like human babies, the proportions of their bodies are different in that their eyes are much, much bigger for their head size and so they look even cuter. [*laughs*]

There's actually some research done by an undergrad that was in the same lab as me, looking at how their eyes, the size and shape of their eyes, changed from baby to adulthood. When they're babies, their eyes are way bigger percentage of like, the size of their body. And

that's because when they're that small, they're working at the limits set by the physics of light on how well you can see at that size. So, their vision is blurrier than the adults and their limbs are pretty short, and they also have less blood, because they're smaller, to use in their hydraulic pressure system. So, they don't jump as far, they can't see as far, they can't plan their jumps as well. They are awkward little, tiny baby spiders that are, for some species, very hard to keep alive because they eat incredibly small things that are hard to buy commercially.

But if you get to see them grow up, you'll see them become more and more experienced. And they do learn from experience in terms of maneuvering and getting around the world. There's evidence that they can learn associations of like, color, they can learn how to do things, how to navigate different challenges. So, their dances are very instinctive but a lot of their other behavior, they can learn from experience.

Alie: Oh my gosh, I love the idea of them being like, "Oh, I've picked up a new move. I can do this now!" That's so cute and exciting. Timothy Hwang, first-time question-asker, wants to know, "Does the Tarantallegra have anything to do with tarantulas or is that just a weird coincidence?" Have you heard…?

Sebastian: Taranta…?

Alie: It's like an Italian wedding dance.

Sebastian: Ohh, okay. So, I think this goes back to the origin of the term tarantula. The term tarantula is a European term referring to like, large spider on the ground. And the large spiders on the ground in Europe were wolf spiders. There's a specific wolf spider called, I think like… *Lycosa tarantula,* is the species name; that was the original tarantula. And there was this kind of urban legend/thing that happened back in the day of the tarantella fever or something, but basically the idea that if you were bit by this spider, it would cause like, uncontrollable dancing.

And so, my guess is that that's the kind of historical connection. Yeah, tarantism, that's the name of the thing. So, maybe that leg shaking is also part of the connection? Maybe someone watched the courtship display and was like, you know, spider shaking its leg, maybe if it bites you, it would make you shake your leg, I dunno.

Aside: Oops! Timothy Hwang, it was your first time asking a question and I did not realize until way later that you're asking about a *Harry Potter* spell and not a southern Italian folk dance. So, the "Tarantallegra" is the fictitious dancing feet spell, but the tarantella is a very real jam they play at weddings. It's kind of like the Hava Nagila, in that there's a big circle of people running around, and it gets more and more damp and frantic and it's the best part of a wedding except for the cake.

Also, the tarantella, the Italian kind, was once prescribed as therapy in medical textbooks in the 18th century. It was used as a prescription for spider bites and for neurotic women suffering hysteria. So, when in doubt, I guess, just sweat it out. [*festive music plays, man announces, "Everybody circle to the right, to the right." "Hey!"]*

Alie: A couple more listener questions, That Ryland Guy wants to know: Are there spiders with eight left feet? Are some of them just really bad at it?

Sebastian: At dancing?

Alie: Yeah.

Sebastian: Hmm…

Alie: Like, do they just suck?

Sebastian: I mean, that's the problem is… I'm not a female jumping spider, so I have trouble [*Alie laughs*] being like, "Oh, that one's bad." I've seen ones that give up really easily. Where they're like… They'll just be like… The female will kind of look at them sideways or face them really quick and be like, "Okay I give up," and just leave. So, there is definitely effort differences.

I haven't experienced a spider that just, like, does not know what it's doing in terms of a dance. Except for one very, very old male that was so old that he had trouble moving some of his legs but was still trying to dance and it was very sad. But he was 100% effort and very little actual skill and execution. But the ones that I've seen, they do a pretty good job. And maybe that's just me not being able to see like, jumping spider vision. Because they can also see at a higher frame rate than us so they can pick up on smaller differences in movement than we can. So, maybe if you've got jumping spider vision it's really obvious but for Sebastian vision, you know, they're all impressive.

Alie: [*laughs*] How old was the older male? Like two and a half weeks or something?

Sebastian: No, he was like… Okay, I want to say he was getting close to two years. We had had him in the lab for a while and that dude… I have videos of him dancing as a younger male and then as an old man and the old man is very sad. You know, jumping spiders in general tend to live for, I would say, on average, about a year or two. Somewhere between a year and a half… Some of them will have a winter, some of them will have just one year depending on where they live. But in captivity, I've had a few that made it to like, three and they were *very* old at that point. Like three and a half? I had an old female that was one of my outreach spiders, she made it to, like, I want to say like three and a half.

Alie: Well, speaking of ambassador, last listener question. Alessandra Kempson wants to know: Why do I find spiders so scary? Especially if they're dancing? Why do they make me want to burn my house down? Laura Lemon wants to know: Not specific to dancing spiders but why are people so afraid of spiders? And Sarah Meaden asked: How do I help my kid and my partner not be so afraid of jumping spiders because they are cute? (Both the people and the spiders.) So yeah, how do you convince people that spooders are fronds?

Sebastian: Yeah, I mean, that's a thing that I've been thinking about and learning how to do as I became a scientist, a spider scientist, and then I started doing a lot of outreach. And what I've learned in talking to people and looking at the research that's actually been done on this is that for a lot of us, for the vast majority of people, this is a learned fear. So, this is something that we see a lot where young children below a certain age are either ambivalent to or maybe interested in arthropods — so insects and arachnids and those types of animals — and then there's a certain point where they start learning from their parents, and from culture, and from their peers, they see someone have a negative response and see that that is how you should respond to that animal.

And it's just this thing that's really hard to get away from because for a lot of people, the only real connections or interactions they have with spiders are negative and they're either surprising or they're completely constructed by the media. So, you have cases where, like, it's nighttime, you go to your basement to get stuff from the laundry machine. You turn on the light. A spider that was on the ground is scared and it scurries really fast across the floor. That is a startling experience, whether or not you are scared of spiders, that is

something that is startling. So, you remember that like, "Oh, the one time I remember seeing a spider, it scared the shit out of me." And that's your connection to them.

Then you see movies where the spider bites someone and it kills them, and you see these viral news articles that contain no research, essentially, or are like, quoting from a pest-control website of, "Oh yes, this evil spider is here and it's invading the world." You know? That sort of thing that is there to get attention but not to be realistic or accurate, which is unfortunately a big problem in journalism.

So, it makes a lot of sense once you think about it; we don't have positive interactions with them, what we've learned is all negative. So, the thing that I often try to tell people, especially if they're interested in overcoming that fear, because spiders are incredibly successful animals, they are everywhere across the world, you are going to run into them, so it is helpful for you to be able to see them and be like, "Okay, whether or not I'm afraid, I can handle it."

Aside: So, what do you do?

Sebastian: What I say is to try to build positive interactions on your terms at the level that you're comfortable with and move on from there. So, for a lot of people that is looking at maybe a picture of a cute jumping spider or watching a video of it in a documentary that's portraying it in positive light and showing it being cute and dancing. And then that makes you curious, why are they doing this? Learning about them.

Actually, some of the best arachnologists that I know, including many famous jumping spider scientists, started out as arachnophobes and as they learned more about these animals, they were like, "Oh, wait a minute, these are really cool, and they actually are incapable of hurting me and they are really fun to watch." And so, that kind of learning experience can become a snowball of like... At first, you're like, "Okay, I know about them, I'm okay with them, I'll just let them do their thing." And then, "Oh wait, they did something cool, what was that? Oh wait, that one looks different; why is that one different?" And it becomes this kind of fascination for a lot of us.

Alie: Augh, and I love that you are out there changing minds with your own love of spiders.

Sebastian: I'm trying to. They changed my life, honestly. Everywhere I go, I can find a new spider that I've never seen before, that's the coolest thing. They are super accessible animals, super accessible, diverse wildlife because they're everywhere across the world. I can go literally to the slopes of Mount Everest, and if I look closely, I will find a jumping spider. I can go to the shorelines of New Zealand; there are spiders there. You know what I mean? And they're all new! I've never seen this animal before and they're all doing their own different take on being a spider and it makes the natural world feel a lot more magical and adventurous. You know what I mean?

It's really easy, I think, nowadays to feel like, "Oh, we kind of generally know what's happening. Yeah, those are the animals, there's like birds and tigers and whatever." And you kind of have a vague sense of, "This is what animals are." But, when you start looking at spiders, and insects, and other arthropods and smaller animals, the diversity of what they look like and what they do, and how they've evolved to live, is staggering. And you don't need to go anywhere for it. You can just go to your yard, or down the street, or to the park and you'll find dozens of species that are super weird and super fun to look at.

Alie: [*laughs*] That's so inspiring. Just get a loop, go out, look for some spiders. But there's got to be something that sucks about them. What is the worst thing about spider dancing? Studying spiders? Being an arachnophile, being a Kinetic… Araneologist…

Sebastian: Araneologist, yes.

Aside: Or, jumping spiders, salticidology.

Sebastian: The worst thing about spiders… Okay, so the worst thing about, I would say, jumping spiders is that sometimes they are very hard to catch. If you need to catch very many of them for research, they can move very fast, they can see you coming, and they are able to hide in very tiny places. They are also kind of a pain to, like, compared to other types of spiders in particular, or a lot of other animals, they're just a pain to keep in the lab because you can't keep them together, they are very good at eating each other. So, you have to keep them all in their individual house and feed them all individually. [*Alie laughs*] And there is a tedium of after you get to hundreds in a room that you have to all feed multiple times a week, it can become like its own part of your life. So, that's definitely the part of the research that I think got me in certain points.

Aside: Imagine having 100 kids and they all need their own locked bedroom or else they'll eat each other… raw, with their hands. But just like kids, the pain is outweighed by the beauty and the love. I mean, I don't know, I don't have a kid… or 100 spiders.

Alie: What about your favorite thing about spider dancing? Good luck dude, there's no… How are you going to figure this out??

Sebastian: That's not fair.

Alie: It's the hardest question I've asked.

Sebastian: It is the hardest one. Okay, my favorite thing about spider dancing… Okay, can I…. I mean I could tell you my favorite dancing spider…? But my favorite thing about spider dancing—

Alie: Your favorite aspect… Your favorite aspect about your work or about dancing spiders… Good luck.

Sebastian: I know. I'm trying really hard. Umm… [*Jeopardy music plays*] Oh no… Like, I've listened to the show before, [*Alie laughs*] I knew she was going to ask this, I should have prepared for this. I have other notes but they're not for this.

Alie: I love it.

Sebastian: What I really like, I kind of said it… It's how they changed how I go out in nature. And how I see wildlife and where I can find wildlife. Because I really cannot exaggerate how much fun it is. I don't need to go anywhere exotic; I just take my camera, I don't even need my big camera, my fancy camera. I just take my smartphone and the clip-on lens and wherever I'm at, if I'm at a conference, if I'm traveling for this, if I'm at… I think one time literally at my friend's wedding, during the rehearsal, I can just look over there and, "Hey, there's a really cool jumping spider, I'm going to go see what it's doing." I am never bored because spiders are everywhere and all spiders are cool and so therefore, it's just… permanent entertainment, you know?

Alie: I am never bored because all spiders are cool. [*laughs*]

Sebastian: It's true!

Alie: Needs to be the name of your memoir. [*laughs*]

Sebastian: Yeah, that's actually pretty good.

Alie: It's wonderful. [*laughs*] Oh my god, I can't thank you enough for being on. Thank you for opening up a world that most of us did not know existed.

Sebastian: Absolutely.

So, ask friendly folks, earnest questions because when they're into it, they want you to be into it too. And also, we're all going to die, so what? Nothing matters, in the best way. So just, cut the bangs, text the crush, read about spider butts, look at the world a little different. Appreciate it as long as we're all here.

Okay, so get more of Sebastian at his website, SpiderDayNightLive.com. There will also be links up at my website to his "iPhone Invertebrate Photography course through the Arachnology Society. He has Crash Course Zoology series he's in. Links to his sci-fi trivia with Catherine Scott and more. You can also find Sebastian online at the handle @SpiderDayNightLive. His socials are linked in the show notes. More links all up at AlieWard.com/Ologies/DancingSpiders… I made the spelling easy for us all.

We are @Ologies on Twitter and on Instagram where we post pictures of you in your *Ologies* merch on Mondays and we show off listeners' art on Fridays. And all of October, you have been drawing ologies. Look up #drawlogies2021 and your mind will be bent by the beauty. People are drawing so many cool things.

Thank you, merch ladies, Shannon Feltus and Boni Dutch of the podcast, *You Are That*; you can check out their "Wedding Stories, Part 2" episode this week where I give all the exclusive details about my July COVID wedding with your pod mom Jarrett Sleeper, we get real about it. Thank you, Erin Talbert, for adminning the Facebook group so wonderfully, thank you Noel Dilworth for all the scheduling and social help. Susan Hale for handling *Ologies* business. Emily White for making transcripts, her company is called The Wordary, they are linked in the show notes. Caleb Patton bleeps episodes. Zeke Rodrigues Thomas and Stephen Ray Morris help make *Smologies*, bite-sized episodes we de-filth for the sake of your children, more of those will be up in a few weeks. Kelly Dwyer makes my website and is available to make yours, she's linked in the show notes too. Nick Thorburn composed the theme music.

Happy belated birthday to the fanciest Nancy of the Ward variety, love you Mom. And finally, big thanks to my only husband, Jarrett Sleeper, who not only edited this episode, but also, as this week's secret… Here it is!

So Jarrett, behind my back, commissioned a song by renowned film and television composer who has tracks on Netflix and HBO and is an electronica artist who works with Ultra, Jason Scardamalia, who literally sampled the spider vibrations captured using laser vibrometry by salticidologist, Dr. Damian Elias' Berkeley lab, featuring the beats of the *Habronattus pyrrithrix,* [*short, static sound*] *cognatus,* [*higher pitched, pulsing static*] *dossenus,* [*deeper vibration sound*] *pugillis,* [*deep static sound*] *schlingeri* [*deepest vibrations*]… That sounds like an incantation but those are all species names of *Habronattus*, paradise spiders. So, Jason Scardamalia has made an EDM track called "Habronattus Multimodal Display" for us.

I'm going to give you a minute right now to adjust your volume. I need you to know, I've been driving around listening to this all day with the bass so heavy that my rearview is throbbing and your rearviews, hm, are going to throb with this. It's the horniest goopiest, sickest, fucking track commissioned just for this episode, available for free to patrons. I'm going to post it tonight to

download, available to buy at Ologies.Bandcamp.com with proceeds going to spider research. Buy it at the link in the show notes, you're going to want it, it is so sick. So, hold onto your twitching posteriors for this still wet, fresh track, by Jason Scardamalia, "Habronattus Multimodal Display."

[*track plays, experimental-industrial-EDM with various spider beats and spoken/warped snippets about dancing spiders*]

Oh my god, so good. Buy it at Ologies.Bandcamp.com. Okay. Berbye.

Transcribed by Aveline Malek at TheWordary.com

Some other links you may enjoy:

Donations went to Entomologists of Color and The Xerces Society

Salticidology is a word. I promise.

Dr. Damian Elias's YouTube

PeacockSpiderMan

Dr. Echeverri's PhD Defense

Pink nail polish butt: *Habronattus decorus*

More pink-bottomed *Habronattus decorus* pics

Nail color: PCH Love Song

"Dance or Die" Family Force 5 song

Lucas the Spider

Water droplets on bugs

Watch the Italian Tarantella

Jumping spider mating display: Habronattus pyrrithrix multimodal display

More spider water droplet hats

Fancy knee boys