

Mammalogy with Dr. Danielle N. Lee

Ologies Podcast

September 14, 2020

Oh heeey, it's that mark that you get on your chin when you're wearing lipstick, and then you take a bite of a giant sandwich, Alie Ward, back with a back with a warm blooded and informative hour of chuckles that I just can't wait to get to. So thank you up top to everyone on Patreon who submitted questions for this episode and who supports the show, and to everyone keeping *Ologies* a top science podcast with all of your ratings, and word of mouth, and your reviews, which I read on purpose - every one - so I can pick one such as this one from KathPort, whose review on Apple was submitted in the form of this haiku:

Interesting folks

Bright lights in their Ologies.

Dad Ward, my friend, too.

KathPort - I loved it, thank you. Also thanks ThatOneCarGuyNamedFrank and Anonymous718 for leaving your first ever podcast reviews. And Lizzy, thanks for dreaming about me next to a campfire, it sounded fascinating!

Okay, Mammalogy. Mammalogy comes from the Latin word for titties, gentlefolks, and we're gonna get so into that, I can't even tell you. But technically this is an -alogy, it's not an -ology, and I only realized that after spelling Mammalogy wrong approximately one billion times in a row.

This Ologist is a big deal. A TED Talker, multiple times a Nat Geo Explorer, a long-time science writer, an advocate, a researcher, a professor, a tweeter, an icon, an idol of mine. I sent my first breathless, very sycophantic pleading message to her in January 2018, two-and-a-half years ago, and she was on another continent, busy with research. And I had been hoping for a time I'd be anywhere near St. Louis and she would have an hour to spare, but time and remote recording finally brought us together.

She hails from Tennessee, and got her Bachelor's Degree in Animal Science at Tennessee Technological University, got a Master's from University of Memphis, and a PhD from University of Missouri - St. Louis. She did post-docs at Oklahoma State and at Cornell University. She's currently an Assistant Professor of Biology, Urban Ecology and Mammalogy at Southern Illinois University in Edwardsville and is also an organizer of this week's Black Mammalogists Week, which runs September 13-19. So you're definitely going to want to follow @BlkMammalogists on Twitter and get ready. They've got #TechniqueTuesday, #WeOutHere Wednesday, #ThreatenedMammals Thursday, #ForageFriday, and #SeaMammalSaturday this week. There's more info and links up at BlackMammalogists.com. There's a link to that in the show notes, get excited!

So we talk about that, we also talk about this biologist's work on animals of all kinds, especially the furry, milky ones, and we chat about her field work, platypi, furriness, parenting styles, and nipples of every stripe. I was so excited to talk to her that I honestly was kind of speechless and starstruck and I just wanted to get out of the way and listen because she's just wonderful, and insightful, and informative so please get ready to meet one of the world's coolest professors and mammalogists, Dr. Danielle N. Lee.

Dr. Lee: I'm ready.

Alie: Oh, yay. Of course I want to talk to you about all these warm blooded, furry little creatures. First thing I'll have you do, if it's okay, if you could just say your first and last name, so I make sure I pronounce it right, and pronouns.

Dr. Lee: Thank you. My name is Danielle N. Lee, and my pronouns are she and her, but I also just don't care. And I'll tell you why: in the process of doing my research in Tanzania and learning Swahili, there are no gendered pronouns in Swahili.

Alie: Really?

Dr. Lee: Mm-mm. They don't exist. They just don't exist. I kept asking, and I realized that because people who speak English would constantly get their pronouns mixed up. They would say he and she interchangeably. And I thought, "Oh, it's because they don't know English very well." No it's because those words are the equivalent. 'He' and 'she' are equivalent in Swahili because 'he' and 'she' don't exist. And so that's why I'm just like, "This is all a construct, it doesn't matter!"

Alie: That's so beautiful. That's so good to know. And this is the first time I've asked that up top because I had a listener say, "Hey, could you just start asking? Because that kind of normalizes it."

Dr. Lee: It does. But I also realized it's a very English thing. It's not just English, but I suppose it also matters in Latin languages as well, but like that's very language-specific. This doesn't mean anything in parts of the world where there's no gendered pronouns at all.

Alie: Oh! That makes my day.

Aside: By the by, thank you ThatQueerJana on Twitter whose partner goes by they/them. Jana says that cis folks can help normalize using and asking pronouns and that the acknowledgement really means something. And I would never have learned that about Swahili! So, aces!

Alie: Can you tell me a little bit about your research that you did in Tanzania?

Dr. Lee: Absolutely. I study giant pouched rats. For those who get the reference *Princess Bride*, I study ROUSes. [*clip from Princess Bride: "Rodents of unusual size? I don't think they exist." then a roar from ROUS*] They are large rodents that look like rats. They're not rats proper. They look like rodents... They are rodents. They're rat-like rodents, and... I'm holding my hands up across my body, but from tip to tail, they can go anywhere from 1.5, to 2, to 2.5 feet long.

Alie: Aaaaah! What was it like the first time that you saw one?

Dr. Lee: The first time I finally got to see one, I was just like, "I can't believe this thing!" It's big. It's the size of a cat, like a nice-sized house cat. They're very strong. They're very fast. They are smart. They are the rats of NIMH. [*"We can no longer live as rats. We know too much..."*] They are they, and I mean that! The first ones we got, we got a shipment from Ghana and we housed them in rabbit cages. [*"Nice place. Spacious."*]

Alie: In hutches? They're that big?

Dr. Lee: Yes, they're that big. We house them in rabbit cages. They have a lot of dexterity in their hands, they can grab things very easily. And when we get them we have to process them because they're actually not allowed in the United States. There's a moratorium on shipping African rodents and this rodent in particular, because in 2003 there was a monkeypox outbreak and this species is responsible for it. They're on the no-fly list. So to

get them you've got to have all the special permissions, and you're tracked by CDC. And we have to do all these tests and submit them, and you have to submit saliva swabs to make sure that they don't have monkeypox.

Alie: Ooof.

Aside: Okay, I know you're like "What's monkeypox?" It's a virus that was first discovered in captive monkeys in 1958, and in 2003 there was a U.S. outbreak that - according to the CDC - involved 47 confirmed and probable cases of monkeypox. They were reported from six states - sorry, the Midwest, it was all you - and all those cases stemmed from prairie dogs which were infected by Gambian pouched rats that an exotic wildlife importer from Texas brought in.

And if you're again needing a visual, these pouched rats weigh like 4 pounds, average 2-3 feet long, some not including their tails, and they have kind of cute, big pink ears. Imagine a Chihuahua with a long tail and a mickey mouse hat. Or like a possum, but rats. Just imagine huge rats.

Dr. Lee: And I remember when it happened. I'm assisting the vet who's swabbing the back of their mouth, their cheek pouches. That's why they're called pouch rats: they have cheek pouches like hamsters. One of the rats, I swear, it looked him dead in the eye and he reached with both hands, and grabbed the swab, and yanked it out of his mouth. Everyone who was there - it was me, a graduate student, and the vet, and we all looked at each other and said, "Did anyone else just witness that?? That just happened." It looked him in his eye as it yanked it out of his mouth. I will forever remember that. And in my memory, that was the same rat who escaped, he'd get out of the cage all the time. He always escaped.

They were really good at removing their name cards. At first... I apologize now, but I thought it was the animal care cleaning the cages and they forgot to put their name tags back on. And I was like, "We can't have this! We gotta keep the name cards on!" And we would come to find that it wasn't the staff at all. It was the rats. They were removing their own cards. They were removing their own water bottles. We had to change a lot of our protocols and the day-to-day husbandry of how we care for them, they're that different from regular rats.

We had to change the materials we use. We can't use glass bottles because they're so good at flipping them out. They were breaking these super industrial, expensive Pyrex bottles, every night. They were just breaking them because they would flip them out. [*glass shattering*] And then they would use that little hole to either reach their hand out and undo the cage, or for the smaller ones they would move their food hutch, because it slides in, and then they would use that to escape out.

Aside: I asked what happens when they escape and she said it's not like monkeypox panic sirens go off and there's mayhem. There are double doors for safety, but it's certainly a, "Come on, guys!" moment.

Dr. Lee: So at my last institution where we house them, which was Cornell University, part of what we did... We had one that escaped so often, like, we just got used to it. We would just put hutches around the room. Because what it is, is they just go on these little jaunts. They literally would go on jaunts, so we would put just extra little hutches, which is just... it's a mailbox top. So imagine a mailbox thing without a door, that's their little housing hutch. We would just put a couple of these in the room in the corner. And then when the staff would come in to do the daily checks, they just take a peek in on them. And the good news

is because there's a handle on top. You could just... if you're very careful, just pick the hutch up, open their home cage and put it right back in. But yes, once they get used to it and they get used to us, they'll go to a hutch. Otherwise, you gotta get out there and you gotta catch them.

Alie: Oh wow! How do you catch them?

Dr. Lee: When they're loose like that? I corner them and grab their tail.

Alie: Oh my gosh. You did an awesome TED talk, talking about these animals and how little was known about their biology. Are you really having to kind of figure out, basically, what's the life cycle, what's their reproductive cycle? Are you spending a lot of time in the field with them?

Dr. Lee: I am. I do the field work. When this project first started, I was brought on board and I was the start of doing all that, but now the project has expanded. I now have a faculty position so there's been additional postdocs brought on board. So this has been an expanding team effort. I wanted to make that clear. A lot of this stuff, I started just noting the questions and the patterns of behavior. We've been able to pick this work up by others and spread it out across multiple teams now. I'm excited about that, but yes, that's exactly how it started. We didn't know anything and we started from scratch. The first animals we got were the ones from Ghana, which we only got four, which wasn't enough to do any research. That just helped me get used to the animals and handling them.

Aside: In the genus *Cricetomys*, you've got your Gambian pouched rat, and as it turns out, three other species with different variations, which Dr. Lee encountered once she started working with the ones in Tanzania. Boy howdy, did she.

Dr. Lee: But that's a different species. And from my observations, having handled both, they're very different. They're different. They look different. They have slightly different behaviors. I thought the ones from Ghana... because I'd never seen or interacted with anything that big and fast, I was like, "These guys, they're some tough customers. You don't want to come across them at night." And when I got to Tanzania, I realized the ones from Ghana were baby dolls.

Alie: Oh my gosh! [laughs]

Dr. Lee: They were outright, just snugly compared to the Tanzania ones. [laughs]

Alie: Well, they're so smart, and they're so dexterous, you are able to research how they can be used to help with finding landmines?

Dr. Lee: Right. So that's actually a nonprofit that does that. They do the training, and they've worked with several academic teams from a little bit of all over. What they do is really basic operant conditioning, positive reinforcement, and they train them. Now, they don't work with wild animals. Some of the history behind that is, in the early days trying to figure it out, they were working wild ones because these are nuisance rodents.

That's the thing I've learned in doing it, because I work in the wild with wild animals. I learned that all the animals that have gone into the program, they were captured, originally trapped to train, but now they just go into breeding. They're all nuisance animals that are caught within the town because they were getting into somebody's house or food stores or just vexing them in some sort of way. They're all nuisance animals.

I'm hosted by the local university, Sokoine University of Agriculture, that's in Tanzania. And my host department is the Pest Management Center, so just as the name would say, they are pests.

Alie: It would be like if we had a raccoon getting in the garbage and we're like, "You know what? As long as we gotcha, do you want to help us find some landmines?"

Dr. Lee: That's exactly how it works. Landmines, and help us diagnose tuberculosis, because that's also what they can do.

Alie: Really? And that's...

Dr. Lee: Yep.

Alie: Are they using olfaction for that?

Dr. Lee: All olfaction. This is all olfaction.

Aside: That just means smell, but I was trying to sound more professional because underneath I was very giddy to be having this conversation, if you must know. Anyway, her postdoc.

Dr. Lee: So, the postdoc, that's at Cornell now. Dr. Angela Freeman, she's been doing some amazing, again, basic biology and descriptive studies looking at... really focusing on their olfaction. So, she's really getting down to the answers of how it is that they're so good at this. She's really doing a lot of that. She's looked at olfaction, and because olfaction... we know we can use it for training for work, but then here's where the biology comes from in the ethologist in me, what are they using olfaction for in the wild?

It's likely for reproduction. It's likely for social interaction. So, she's beginning to look at olfaction from the reproductive point of view. The stuff that's come out so far is just what you would expect. It's like, "Oh, they're good at smelling so they can identify who's receptive and who's not receptive for mating."

Alie: So it's just like an extrasensory pheromone snooter looking around.

Dr. Lee: Yeah, looking around. They use it for that, very likely they use it for finding food. They already have the evolutionary mechanics for sniffing things out really well. It makes sense that they've been really good at sniffing out these other molecules related to either lung disease or TNT.

Alie: Wow.

Dr. Lee: That's what applied science is. It's using what we know about basic science, and you home in on it for applied science.

Aside: So, this is a big deal because between 15-20,000 people each year are killed or injured by landmines. Our little rat friends are really great at sniffing out the TNT. Plus, they're too light to detonate the landmines, and they don't bond with their trainers like dogs do, so they can move around to different countries without getting emotionally butthurt. Now, Dr. Lee notes that we know a lot about dogs, but not enough about these rodents of practically dog size.

Dr. Lee: The reason why... In my TED Talk, I talked about this. They put the applied science... the organization that trained them, they put the applied science in front of the basic science and they had a lot of trial and error.

The reason why I talk about that is because when we don't take our time and invest in basic science, you'll lose a lot of time. That's what happened. It took them years, and years, and years to, kind of, perfect their protocols. They're still working on perfecting their breeding protocols simply because they didn't understand, 'what's their breeding ecology?', 'what's their mating system?'

So, what I do, I study them in the wild. So, I take trips - at this point when I am able to leave the country - about once a year or every other year, really trying to find out where they live and how they live. So, finding and marking nests; who lives there?; who's visiting there?; trying to estimate their home ranges or who overlaps with whom. This story is still... As much as I find out, I'm still figuring things out.

Aside: So, one thing she's discovered in her research is that depending on the age and the sex of these super-sniffer rodents, they use their space differently. Also, they like to get down.

Dr. Lee: Like many mammals, they're probably not monogamous, and there's lots of visitation and checking up on one another, so olfaction is very important. But then, one of the things that's always been an issue since I began visiting there since 2012 is the fact that, if I was looking at my data as far as ages of individuals I trap, you never trap young ones. You never trap babies. Never.

Alie: Really?

Dr. Lee: No. They don't come above ground.

Alie: Ohhhh!

Dr. Lee: They don't come above ground. When I'm talking to my hosts, that includes my host at the university and includes my technical hosts... First of all, I am amazingly indebted to Shabani Lutea. He's a tech at Pest Management Center. He's truly the authority on pouch rats. I just get to work with him. I am very, very lucky. I get to codify and I get to work with him, but he's taught me everything I know. He's the one who's caught every single animal that has gone into that training program. He really is that person.

He was the one who... As I'm out with him catching animals for my research, that's when I kind of started putting the story together. He's like, "Yeah, all these animals came from..." basically the equivalent of his backyard.

Alie: Oh!

Dr. Lee: His backyard and throughout his neighborhood. So, I literally... I spend a lot of my time on one street. One street is notorious... It has contributed more to saving lives and repatriating land. [*chuckles*]

Alie: Unbelievable.

Dr. Lee: One whole street.

Alie: Oh my gosh, of these nuisance pests.

Dr. Lee: This one street in Untuwala [phonetic], which is a... We would call it a neighborhood. So, a neighborhood in Morogoro. This working-class neighborhood in Tanzania has done more for that. But, in the process of doing that, and in the process of spending time with these families, in the process of them not just letting me come in their house but tromp all through their property, that really started awakening me to thinking about, "What does this research mean to them? Like, this is an animal that bothers them."

Aside: But, Dr. Lee says, “In their eyes...”

Dr. Lee: Yes, it’s nice and it’s great that it saves lives, but they are literally like, “We’ve been catching rats for years, and giving them away, or getting rid of them because they’re bothering us. When is this research going to mean something to us?”

That really stopped me in my tracks. I started thinking about it and I was like, “You’re right, this research has to matter now.” So, trying to understand their habits and what makes them good at exploiting these things is now what I am focused on; specifically trying to understand their distribution and their movement patterns, such that we can come up with solutions to help people to either divert these animals from coming into their houses or coming onto their property.

But, it’s interesting, despite all of that, folks don’t... They’re not overwhelmingly antagonistic. Their feelings are not overwhelmingly antagonistic. Like they’ll say, “They bother me. They vex me. Could you do something about it please?” But, it doesn’t come off as... It’s not like the groundskeeper in *Caddyshack*. [*Alie laughs*] And they have every right for it to be.

[*Bill Murray as Caddyshack groundskeeper: “My foe, my enemy is an animal. In order to conquer him I have to think like an animal...”*]

This is what I’m learning; I’m going to be very clear, this is what I’m learning as an American, as a Western scientist doing science in a place where people have a historical and an indigenous relationship to an animal. I really believe that’s a very Western way of thinking of it, this idea that human-wildlife conflict have to all be contentious, or people have to be antagonistic against it just because there’s a conflict. I’m really beginning to think that is a construct that we’ve created because we compartmentalize ourselves outside of nature so much.

So yeah, it vexes them, but they also... you know, it’s not a deal breaker. In other words, people haven’t picked up and moved. Sometimes it comes down to, “What better resources can we provide for people?” Some of it is, if we had better resources and infrastructure for how we built our houses, or the foundations, what materials are available to people for laying a foundation of their home. Some of these issues could be addressed with that. It won’t fix all them.

Or it could come down to if we had infrastructure grants so that more people had indoor plumbing, because they usually... I found the rats accessing near the... We would call it an outhouse, their toilets. Well, if folks have indoor plumbing, this isn’t an issue anymore. I’ve come to realize that there’s so many different ways to think about this. Some of it just comes down to, if we’re just sharing, you know, intellectual capital resources with one another in different parts of the world.

Alie: Mm-Hmm. And what about you growing up? Were you someone that was out in nature a lot? Were you looking at particularly mammals, or lizards, or bugs, or flowers? When did you start to really appreciate wildlife?

Dr. Lee: I always liked... I was an outside kid. So, I grew up outside. My mom worked in parks & rec, so I got to go to work with her every day. Childcare was a minimal thing. [*Alie laughs*] I got to hang out in tow, so I spent my days outside in the park, in the front yard, backyard. I’m also Gen-X, so you know, kids were expected to go outside and just play. Just go figure it out. So, I’ve always liked animals. I was that kid bringing stuff home. I really was.

I've been a little bit more attentive to the cute furrries. I tried to have a bird once, that didn't go so well. [*Alie: Oh no!*] I liked the furrries. I didn't see my first lizard until I was an adult almost.

Alie: Really?

Dr. Lee: No. I didn't see... Reptilian wildlife was rare for me. I think that I saw a turtle once or twice, turtles were always far away. They weren't part of my urban wildlife-scape. So, for me it was all... It was mammals, it was birds, and it was insects. And I don't like insects, I've never been a big fan. That's my no-go.

Alie: [*laughs*] But the cute furrries...

Dr. Lee: The cute furrries, absolutely. I was always asking questions. Like, I've never not been asking questions about why, and how, and what, and 'explain it to me'. I just *consumed* nature programs. If there was an animal show on, I was watching it. I was like, "I'm going to watch all the animal shows," everything. So, that's really what did it for me.

Alie: At what point did you know that you were going to become a scientist? What was that path like?

Dr. Lee: I didn't know that I was going to become scientist until I was in the middle of doing a master's.

Alie: Really?!

Dr. Lee: I didn't... No, I did not understand. And how that path... Back to the whole 'always asking questions'. I started a project, which wasn't even my thesis, I wasn't even trying to get a thesis. I was just taking classes because I thought I wanted to be a veterinarian. And I needed to improve my GPA because I had applied in undergrad and didn't get in.

So, I was writing papers and diving deeper into what we call the theory behind biology, as opposed to just the facts and the history of discovery. My professor told me, "You ask a lot of good questions." I'm like, "Because, I'm always asking questions." I was asking questions from the point of view of, I just wanted someone to tell me the answer, because I was certain those answers existed. I just didn't know where they were, or what the answers were. It was in the process of taking these classes that I realized, "Oh, a lot of these questions haven't been asked." [*"That's a great question."*]

So, he started me on a project based on one of the papers I wrote in class. It was animal communication and cognition. That was my a-ha. That was the beginning of leading me on this path. He was like, "This paper can be a project." And he outlined how it could be a project. So I started working with him, just on a research project. Still not a thesis. I think I had imagined it with birds, because I was just writing hypothetical papers. Like, "Imagine this, and imagine that."

And he worked with field mice, voles, so he's like, "We could do this project with the animals I work with," trying to ask if there's different levels of communication, if there's synonymous signaling. I was like, "Okay." I was following along. So I started the project, and I started getting into it. It was in the middle of that project that I was like, "Oh, *this* is what the scientific method is for."

Aside: How wonderful is that? Get ready for some more inspirational goose bumps.

Dr. Lee: I really got into it, and it hit me. I was like, "I don't need anyone to answer my questions for me anymore. I can answer my own questions." That was when I decided to be a

scientist. I literally... I had application in for vet school and I withdrew it. I was just... I got a call from them because I had interviewed with them. It was my top choice school. So, they knew me because I interviewed twice.

They were like, "Just get your scores in. You're good. You're good. We've seen your progress. This time we think it fits." Without saying 'you're guaranteed', they were like, "We promise you, it looks very good for you this time." And I was like, "No."

They were like, "But you're really..." I said, "No, I'm gonna take my chances and apply for a PhD." They were like, "What?" I was like, "I want to research animal behavior. I realized this is what I've always wanted to do. I just didn't know this was a job that I could do."

I didn't know science was a... I knew science, but I only knew it in my own life from a very applied, practical point of view. To help people. To fix things. To solve a problem. I didn't understand or know that basic research was even a viable pathway. This is how weird it was. I was in college, loved college; did not put together one and one, that my college professors were researchers.

Alie: Right! I completely understand. Like, when you go to elementary school and high school, they're there to teach you. So when you go to college they're just there to teach you harder stuff. And then, yeah, it doesn't click that they are also publishing papers and continuing their ongoing stuff, right?

Dr. Lee: Right, yeah! So that's when I was like, "Oh!" And I was like, "Wait, you get paid to watch animals all day? I want in on that. I want in. on. that." And it was in the middle of... that's when I went and did the paperwork. I was like, "I want to get a thesis. I'm going to do the thesis now and I'm going to apply for a PhD. And I was like, "I want to be a college professor." Because then I understood that a professor was someone who, not only taught college classes, it's the person who teaches college classes and trains students in science. And so I was like, "That's what I want to do." And so yeah, I didn't know I wanted to... I didn't understand that I could be, nor wanted to be a scientist, until I was in my master's.

Alie: Oh! I think's amazing! Are there any movies about scientists, or about mammals, or rodents at all, that really get it right... or wrong? I know you mentioned *The Princess Bride*, which [giggles] is burned in all of our minds! Or, any myths about scientists that you want to debunk?

Dr. Lee: Oh, most of the movies don't get it right!

Alie: Yeah! [laughs]

Dr. Lee: Most of them don't get it right. [laughing] So... I feel like I wouldn't even want to use my time explaining how they all get it wrong.

Alie: Yeah! [giggling] Just know they don't get it right!

Dr. Lee: Most of them don't get it right.

Aside: Okay, what about mammals? We're mammals! But so are pouched rats. And wolves. And [in Aussie accent] Tasmanian devils! Is there more variation among mammals than, say, reptiles?

Dr. Lee: And so now if we're going to look at the whole thing, reptiles' big, big umbrella? Then, of course, they got the spread, they win! They win the "We're More Weirder Than You" if we do it that way.

Alie: [laughing] That's a very good point!

Dr. Lee: But yeah, mammals are interesting. We have a little bit of everything. We have the 'live birthers' versus the 'not-live birthers'. And among the 'live birthers' we have the 'fully developed' versus the 'barely developed'. Among those that do the 'fully developed'; 'stay with mamma a long time', or, 'I need you out the door as soon as possible'. So this, what I like to call, 'diversity in investment' strategy of the species, like how much do you invest in an offspring to make sure they're big and strong before they're out there on their own in the big wide world? It literally can range from years to moments! *[laughs]*

Alie: *[laughing]*

Dr. Lee: Years to moments!

Alie: Why do you think that is? And what influences that?

Dr. Lee: So it's a lot of things that influence that. Some of it is evolutionary. Just part of it is, "You gotta work with what you got!" So if you're a certain type of animal, you are kind of locked in that type of strategy. So as humans, we're locked into these long gestational periods of nine or ten months. We are locked into these long post-birth periods of nourishment, of at least 2-3 years. And even then, just because they don't need to suckle milk anymore, they're not really... You just can't set them free at age seven.

Alie: Yeah! *[laughing]*

Dr. Lee: You just can't set them free. They won't make it. So part of it... the fact that you're born a human, you're locked into that strategy. You just can't decide, "I want to be a mamma kangaroo and I want to drop this egg in five days, and that's it!" There's nothing you can do about that; evolutionarily you're locked into whatever you are because of your species. So, part of it is evolution. But it's also ecology. In other words; where you are, the time you are, how much space you have to do your business and make a living. All these inputs determine how you make a living and how well you live.

Aside: So all these different evolutionary pressures, like if you're dodging predators constantly, or if you gorge food and then store it really well, or if you have a fast metabolism; those will affect your internal furnace. And if you're like, "I need to know more about thermophysiology!" Definitely listen to the Thermophysiology episode of *Ologies*, with Dr. Shane Campbell-Staton. His episode is amazing! Also check out his podcast *The Biology of Superheroes*, which is sooo good! Okay, but yes - evolutionary pressures and hot blood!

Dr. Lee: All these different strategies determine a lot of stuff. Going back to comparing birds and mammals, we're both warm blooded so in order for gestation, in other words, for your babies to develop really, really well, - and this is across all species even for reptiles - you've got to have that right temperature. It literally has to cook. When we say it's been 'in the oven', it literally has to cook. And it has to cook at the right temperature. Too hot or too cold- you mess up the whole recipe. Nothing's going to happen. But there's a few different ways of doing it. So a lot of reptiles, they drop their egg, they put it in the soil, they cover it up, do a little kiss, throw it up to the sky, and be like, "Hope it works out!" *[laughing]*

Alie: *[laughs hysterically]*

Dr. Lee: Mamma reptile's like, "I did a little temperature check, this ground it about it right. And I know I'm going to be gone forever, 'cause I ain't gonna never see you again... hope this stays! Kiss up to the sky and I'm out!" So that's, like, turtles.

Birds on the other hand are like, “You know what.... I’ve still got to get this temperature right. But I still need to be able to move a little bit here and there to go and get some more food. Because carrying all these eggs; they’re heavy!” They’re heavy!

Females animals, when they’re gravid, or when they’re sitting on a nest, they’ve got to be careful because it makes them easy pickings for predators. So that’s the reason why mamma turtle holds onto those eggs as long as she can. She incubates them and cooks them, and after a while she’s like, “I’m too slow. I’m going to get gobbled up by these sharks, or whatever else is out here in the water. I’ve got to drop these eggs and lighten my load!”

Mamma bird is very similar but she’s like, “You know what. I can kind of get up and move around a little bit. So what I’m going to do is, I’m going to make this really nice nest, I’m going to insulate it as much as possible. If there’s a partner involved we’ll take turns sitting on it and keeping it warm.” But they have to be careful too, if they stay gone too long, that throws the temperature off... Back to the cooking, it’s like, “Oh! Messed the recipe up!”

What happens in mammals is, “You know what? I need to be able to move *and* I need to be able to keep the temperature going.” So what female mammals are able to do is they’re able to keep their babies with them at all times. They know their temperature’s going to be just right. They’re going to go where they go. There’s still some trade-offs in loss of movement and dexterity, but compared to other species, female mammals are able to still get quite a bit done. Even though they’re pregnant, up until the last day. So that’s why some have strategies of sitting still in the end. But think about cats; they stay hunting, until near the end.

So that’s one of the advantages. We have these tradeoffs, but that temperature control is really important. And what we see are these three very dramatic strategies for that temperature control across the three main groups of vertebrates: drop ‘em off, wish for the best; drop ‘em off, but keep up with them, but if things get real, real bad I’ll bug out and I’ll start all over again; or, we are in this together! That’s the mammals. “We are in this together. I got you and you got me!” *[laughing]*

Alie: Oh my gosh! I have so many questions from listeners who know that you’re coming on the show. I announced you were coming on and everyone’s like, “AHH!” So I could ask it, but I would rather let them ask it.

Aside: Okay, we’re going to let those questions cook a second longer while we take a quick break to hear about sponsors of the show who enable us to make a donation to a cause of the ologist choosing and this week Dr. Lee chose SEM Link. That’s Science, Engineering, and Mathematics Link, which is a non-profit. It was founded in 2005 by Tokiwa T. Smith in Atlanta. And SEM Link promotes student achievement and career exploration in math and science, while increasing student exposure to STEM communities. Their mission is, “Unveiling potential through exposure.”

To learn more or to donate yourself you can see SEMSuccess.org. There’s a link to them in the show notes. A donation went to them in Dr. Danielle N. Lee’s name, and thanks to some sponsors of the show who you may hear about now.

[Ad Break]

Okay, your questions. This was the most asked question y’all! Patrons Ashley M. Gelhaus, Lauren Krupens, Ayshia Yaeger, Ellen Skelton, Clint Herber, Alia Myers, Hardy Kern,

Michael MacLeod, Addie Cappello, Madelyn Winter, and first-time question-asker Miranda Chavez, who wrote in, simply: Platypus, man... What the fuck?

Alie: What is happening with the platypus? Natalie Landon-Brace, first-time question-asker, essentially says: Why are they so weird? Do they even have nipples? They've got eggs and venom, but they're a mammal? What's happening?

Dr. Lee: Yeah. Alright. So platypuses are mammals because they meet what I call the base criterion of what makes a mammal a mammal, and that is: they make nourishment from mammary glands. But they don't have nipples.

Alie: [*confused squeaking*] Wha-??

Dr. Lee: So you would *think* nipples, but you can have mammary glands without nipples. So what happens with the platypus is they have tufts of hair, so we think milk glands are actually just special sebaceous glands; those special little glands that hang out around hair anyway, that's what we think mammary glands are. Still deep research needed to figure that out, to be honest.

Alie: Oh wow!

Dr. Lee: So they make nourishment still, they make a milk, but they don't have nipples. So basically the babies just kind of suckle on little tufts of hair.

Alie: Wahoo! Like little cow licks? Just milkshake cowlicks, if they find them.

Dr. Lee: Yeah, so they're what we would call on the evolutionary tree, 'high up'. So they're really in between. They're a really good example of that bridge, our connection to our other vertebrate cousins, like the birds and the reptiles that I mentioned before. Because they have that kind of in between... they have so many traits that are very bird/reptilian like.

Alie: But they lay eggs?

Dr. Lee: They do lay eggs.

Alie: And so you don't have to have live-birth to be a mammal?

Dr. Lee: Nope! The drop-dead criteria is, "Do you make milk from mammary glands?" That's where the word comes from. Mammal... mammary.

Alie: Ah! So it doesn't matter if you drop some eggs, or have a bill?

Dr. Lee: It doesn't!

Alie: [*laughs incredulously*] I need to get a platypus expert on because there are a lot of people who are just convinced they're not real!

Dr. Lee: I can understand thinking that!

Aside: So platypuses. [*dreamy, hushed tone*] They're real and spectacular. Also, platypus experts: watch your DMs, because I'm onto you! This next question, by the way, was just begging for the drama of the superlative, and was asked by Ann Over, Colleen Sellwood, Alia Myers and Adam Weaver.

Alie: A lot of folks just want to know if you have a favorite mammal?

Dr. Lee: I do. So when I was younger, I was like, "I love wolves and dogs!" I am a dog person. I like them all, but I do like dogs. My favorite to brag on though... My favorite to brag on are mustelids. They're the badasses of the entire animal kingdom.

Alie: Those are the weasels?

Dr. Lee: Weasels, honey badgers. I love them. They just regularly take on animals 50 times their size. I like to call them the “ain’t never scareds.” They ain’t never scared!

Alie: They’re spitfires!

Dr. Lee: Their spitfires. “Don’t come unless I send for you!”

Alie: *[laughing]* Ferrets and weasels and just... ah! Yeah, I feel you on that! That’s amazing. Let’s see, so many questions. I’m skipping a lot of questions about platypuses because they were all under the same...

Dr. Lee: That’s neat! I love that so many people have questions about the platypi! *[laughs]*

Alie: I know - platypi! Alia Myers is a first-time question-asker and wants to know: Are there any mammals that can’t make facial expressions? Can most mammals make facial expressions? Is that how they communicate, partly?

Dr. Lee: Many of those that use visuals. So what we call ‘facial expressions’, that’s a lot of our interpretation, but what many of them are able to do is that there’s a lot of dexterity around their muzzle and their nose. And they have a lot of movement around their ears and around their eyes. And so what we would call ‘facial expressions’, they actually do use a lot of being able to manipulate those muscles for a lot of animal communication within their species.

So we have, what’s called, graded signals or discrete signals, like ears up, ears back. They all communicate just slight tweaks of how they’re... you know, of information to conspecifics or even to other animals. If they live in these really large communities and you need to let things know, especially for animals that are communicating with predators, like, “Not today! I’m going to put up a fight.” [*“What is that expression on your face?!”*] But what we call facial expressions, that’s actually a bit more of an interpretation of us because of us as people.

Alie: So we’re looking at it because we have facial expressions, so we’ve kind of put that on to other animals.

Dr. Lee: We do! But do they have this dexterity in the muscles in their face? Absolutely.

Alie: Ah! Ellen Skelton wants to know: Why have so many mammals evolved to cooperate or stay in large groups as opposed to other animals?

Dr. Lee: So sociality is really common in a lot of species that we attribute a lot of high cognitive function to. We see that. And that’s because sociality yields a lot of benefits. Think about it. You don’t have to look for a mate when it’s time to mate. You can conserve your own physiological energy when it comes to keeping warm, the right temperature. Being around others is a really good way to exploit them for information and other resources. So, “I don’t have to be really good at hunting... I can let *you* be good at hunting... and I come around and pick up the scraps.” So sociality has a lot of benefits.

Now, there are costs to it as well. So, the likelihood of spreading communicative diseases, where there’s parasites, or things like the mange, or even sexually transmitted diseases. You’re like, “Ah, there’s too many of us!” And bad things can be passed around really easily or even sicknesses. Like what we’re experiencing now with COVID among us, sociality counts against us. But so much of what we need to do to make a living requires,

for many species, outright cooperation, or even just passive cooperation. And if nothing else, we've got to find each other, you know, in order to reproduce.

Alie: Yeah, that's true. Unless you've got parthenogenesis going for you, you're going to have to... *[giggling]*

Dr. Lee: Here, so that's the thing! We know that can happen with some medical assistance. *[laughing]*

Alie: Oh yeah!

Dr. Lee: But without medical advances, we're back to only working with what I call an 'evolutionary toolkit'. Our evolutionary toolkit does not allow us to do a lot of things very, very well for long without the aid of others.

Alie: Right. Someone... I've read somewhere about thinking about everything that you have in your life, everything that you touch, whether it's like a shirt that you're wearing, to a glass that you're drinking out of, how many human beings had to be involved in the process of that. Whether or not you're drinking tea that came from somewhere else, and someone had to grow it. You know, just so many people are involved in objects that you don't even think about.

Dr. Lee: Facts!

Aside: So even if you're alone, you're touched by others. But not like creepy, like, ghosts with bad boundaries. Just metaphysically. We all affect each other and we're in this together.

Alie: Mo Casey had a great question about life expectancy: Why does a mouse have such a short one compared to a horse which lives for decades? And is it just size? Speaking of which, the pouched rat, how long do they live?

Dr. Lee: All right. So, starting with them, we know that in captivity they can live seven to eight years. We're not sure how long they live in the wild. That's because, from what I can tell, I don't see anyone else that's interested in tracking them in the wild. So, of the animals I have tagged, fingers crossed I keep finding them. Whenever something lives for a long time in captivity, we estimate about half that in the wild because there's no antibiotics in the wild, there's hunting, there's life, things happen. The reason why different things live different times is not just about size. Size is a correlate with it, but it comes down to what's happening with them physiologically; their metabolism, how long something takes. So, being large enables you to avoid a lot of predators. Big things don't have as many other things that can take them out. If you're not taken out, then you can live a long time thereafter, assuming everything else in your body is in pretty good shape. You just gotta get through that scary, small period of your life. *[Tina from Bob's Burgers, "So small, so fragile."]* That's one of the reasons.

Once you get past that scary juvenile period, then you could pretty much live until what we call 'natural death' when your body just wears out. Little things live for a short period of time partially because of their metabolism. Their metabolism is really fast; they're burning themselves up. We don't use that because that's not technically what's happening, but that's just one way to envision it from a lay position, is that they're always going. The other thing that you have to keep in mind for things like mice is they don't tend to die of old age. We really take for granted as people that most things don't die of old age.

Alie: They just are predated on earlier on?

Dr. Lee: Yeah, predated on or you just kinda die. You just return to the earth in the arms of the angels. [laughs] So yeah, they do have a relatively shorter lifespan. Small mice species can live one or two years. They don't tend to, but that's part of it. Basically, you accumulate these effects, so in longer-lived animals, we tend to see what we call age-related disease or natural causes of death. So, things like diabetes, or heart disease, or later onset diseases either due to metabolism or structure.

In animals that tend to be predated upon early, those things just don't accumulate because they tend to die when they're still in or just past the prime of life. By prime, I mean the height of reproductive life, so in other words, when you're at the height of having the most babies. Even looking at people, old age is a relatively new thing for us.

Alie: Living to be 100 would not have happened without antibiotics and a shelter.

Dr. Lee: Now, that's magic. Let's be honest. If we were to transport and talk to someone from 200 years ago, 100 years is magic. The demography, if you look at it, 50 was considered old a hundred years ago. Our 50 isn't our parents' 50 either. Back when my mom was younger, 55/60 seemed old. Even the image of what a 55/60-year-old looked like is completely different. We started joking, saying today's 40 is 30, starting with Demi Moore because she's defying... But that's actually becoming progressively true for our generations. We are a younger 40 and 50 than our parents were for sure.

Alie: For sure. Yeah.

Aside: Just a side note, retirement communities start at 55. Wilford Brimley, rest his recently, dearly departed soul, was just 18,530 days old when *Cocoon* started filming, which is just 50 years old. You can see this generational incongruity at the Twitter account @BrimleyLine, as they tweet out other celebrities who have crossed this age line. Matthew McConaughey, Will Smith, Gwen Stefani, Jennifer Lopez, Jay-Z, and the entire cast of *Friends* are now older than Wilford Brimley was when he starred as an elderly curmudgeon in *Cocoon*. Life, man. It comes at you fast.

Oh, and Ferris Bueller crossed it 8 years ago! But he looks good, right? Okay, speaking of ancient things, this next one was asked by patrons Scott Sheldon, Meagan Walker, Vincent Heidt, Fernando, and Marc Chavez.

Alie: A lot of patrons wanted to know: If it weren't for the asteroid wiping out the dinosaurs, do you think that mammals would have survived to today?

Dr. Lee: No. That had to happen for mammal evolution. That is critical. When I teach mammalogy, that's the one historical event that is critical. If it had not been for that, there would still be mammals, but they would've stayed small. They would have stayed in the ground. We would not have had a mammalian radiation. That's what we call it, the explosion when the mammals came above ground and they were able to diversify in form, shape, and species. If the dinosaurs hadn't died, none of that would've happened. We would not be here if it had not been for the K-T Event.

Alie: Really?! This is literally the first I've ever heard that. That's amazing.

Dr. Lee: Yeah. They had to go for us to flourish.

Alie: Ah! Is that why there are, say, 5,000 species of mammals, but like 30,000 species of beetles?

Dr. Lee: Insects have been around for a long time, so they've experienced some radiation as well. There's been more mammals and we've lost some, but what we call these is radiation events... Think of radiation as spread out. It's not just spread out physically, geographically across the globe, but it also comes with this diversification in new form and type. Big events! Stochastic events are often the reason for radiations of any type across any type of organismal species. You need the spark that caused it, but not necessarily. Beetles, there were just a lot of them to begin with. Just a lot of insects. *A lot of 'em!*

Alie: *[laughs]* Your favorite, which you love.

Dr. Lee: No, I do think most many beetles are pretty. I appreciate them. They are beautiful. Many of them, not all of them. Roaches are technically beetles and I hate them.

Alie: *[disgusted shudder]* Ugh, yeah. I love bugs and roaches are one that I'm just like "Nope, nope, nope."

Aside: Quick aside, bug nerds. I know you're screaming into your windshield, or your partner's face, "Roaches aren't beetles, technically!" Yes, we hear you, you're correct. They're more closely related to termites. I did some light reading about it. But Dr. Lee is here for *mammalogy*. This is not a cockroach episode. Also, don't make me dip my toe in the Venn diagram between milk and roaches and remind you that cockroach milk is a thing and it comes from one species of roaches who blurrp out this substance that is being touted as a superfood for humans. Are we done with this? Okay, moving on then.

Alie: Kourtney Ryan had a great question: Do you think there are any undiscovered mammals out there?

Dr. Lee: Absolutely, there are. Yeah. Undiscovered in the sense of Western science. Absolutely.

Alie: Wow. Wow. Let me see. First-time question-asker MJkaylaqween, who says, "I love you both," and is excited you're on.

Dr. Lee: Ah, thank you.

Alie: First-time question-asker, says: I love mammals. Why are some people afraid of mice?

Dr. Lee: You know what? I can't speak for everyone, but are they afraid? Or are they startled because it just shocks you to see something scurry? I'm not afraid of rodents by any means, but if I catch something in the side of my eye moving that I wasn't expecting, I'm going to jump. That's a very normal startle response. I believe it's natural to be startled by them. But I wonder if this whole fear part isn't socially conditioned. Then we tell ourselves we're *supposed* to be afraid, or someone tells you that that's a fear reaction as opposed to, "Oh stop, what is that? Let's figure it out." So, I don't know if a lot of people are truly afraid. I do believe being startled is natural.

Alie: Yes. I think that's why some people are more afraid of certain bugs too because they're just faster, you know?

Dr. Lee: Yes. It's the startle. That's what I mean. I don't like them. They sneak up on me. I don't like that. *[laughs]*

Alie: Roaches are really fast, but like a pill bug, no one's ever like, "Ah! What is it?!"

Dr. Lee: You know what? I played with rollie pollies as a kid and I loved them, so rollie pollies I'm okay with.

Alie: Yeah. They're so slow. A lot of people, and I will include this in aside, want to know what is up with the variation in the number of nipples?

Aside: Looking at nipple-conscious listeners Anthony Stull, Elliott Warden, Jasmin McLean, and first-time question-asker Jakob Joachin.

Dr. Lee: Hold up. Even in pouch rats, I have counted on the females in my colony. Some females have seven, some have eight, some have six. It's usually a very species-specific thing. That's one of the things where we can say, "Oh, this species has this number of nipples. And that one that." So, we were trying to figure out how can we differentiate between, let's say, the species that live in West Africa versus those that lived in Eastern and central Africa? Early on, one or two papers were saying, "Oh, the West African ones have six nipples and the East African ones have eight." Yeah. I can't tell you for sure. The jury's still out. I have counted animals I've caught myself from the exact same place, same species, and I've counted six, seven or eight nipples. I had some females with odd number nipples.

Alie: Okay. Marky Mark's got three, and he's a dude. So, what's up with dude nipples?!

[Marky Mark: "Third nipple? I'm not aware of that." Interviewer: "You're not aware of that? Is it true you have a third nipple?" Marky Mark: "Yes."]

Dr. Lee: Just carryovers. There's some evolutionary biologists who say it's because males either historically may have been able to produce milk back in the day and then it was lost, or it's just a physical vestige, so it's vestige that's leftover. Like, that's just part of the form, it doesn't mean anything, so you have all these leftovers. But nipples usually are a good indicator to the number of young an animal can support at a time.

Aside: So, if you birthed triplets out there and you're listening to this, my heart and at least one extra boob go out to you. I would definitely donate them, if I had extra nipples like Marky Mark and his funky bunch of three. And, by the way, those are called supernumerary nipples. Zac Efron is a member of the Triple Nipple Brigade. Harry Styles isn't, because has four nipples! Isn't that fun to know? About one in 500 humans have bonus nipples. Most people think they're just moles.

So, if you have a bumpy birthmark somewhere on your milk line (aka between your armpit and crotch) take a closer look. Although, surprise! Nipples have shown up on backs, on faces, and in the case of one 22-year-old Brazilian woman, the sole of her foot. She went to the doctor in 2006 to be like, "Hey is this thing I've had on the sole of my foot normal?" And they were like "Yeah, it's a normal nipple in a really creative place. Can we take 4,000 pictures of it? It rules."

Also if you're wondering why approximately half of humans have perpetually swollen breasts while all the other rodents and mammals don't need sports bras unless they're nursing, one theory is that as humans evolved to walk upright and our derriere areas were less swollen in estrus, there needed to be an indicator of sexual maturity that was closer to eye level. Although, judging by the phrase, "my eyes are up here buddy," perhaps face-nipples would have been the better adaptation. But back to the mammals that Dr. Lee studies. We're still talking nipples though.

Alie: Do male rodents have nipples?

Dr. Lee: They do, but they stay really, really flat to the body.

Alie: Oh my god, that's amazing.

Dr. Lee: So here's the other thing – in a lot of mammals, males have hair on their bellies, and that's one of the things that four-legged females lose. If they are a hairy species, they'll lose that hair. That's also another indicator of sex and reproductive condition, is if her belly is bald or not, because if her belly is bald it means she's, at the very least, brooding some babies, because they've got to be able to get to those nips.

Alie: Ohhh they've got to be able to find them!

Dr. Lee: That, and the babies rub it off. In the process of nursing, babies are pretty rough on that underbelly.

Alie: You know when you see an older guy who doesn't have any hair on his legs from the knee/sock area down?

Dr. Lee: *[laughing]* Yes! Just worn off.

Alie: Just worn off. Okay, questions I always ask: the thing that you hate about being a mammalogist? It can be as petty or as big as you want. It can be anything from emails to cleaning glassware...

Dr. Lee: I hate dealing with poop.

Alie: *[laughs]*

Dr. Lee: I hate poop. Nothing ruins me more than having to deal with poop.

Alie: Do rodents have smaller poops, at least?

Dr. Lee: They do, but I just don't like dealing with the smears and the messes. *[groans]* But that's where a lot of important information is. Nothing icks me out like getting pooped on, or stepping in it, or smashing my finger into it *[grossed-out groan]* I hate the poops.

Alie: Do you have to analyze rat poops?

Dr. Lee: I keep some for it. I'm beginning... if I can use this as a commercial?

Alie: Yeah.

Dr. Lee: I'm looking to form a long-term relationship with some gut microbiome biologists. Because they do poop on me, and I feel like that's free data. *[laughs]* So collecting it, and then asking some really good questions about it.

Alie: I had a scatologist on who they call Dr. Poop, she's at the Lincoln Zoon in Chicago, and she has 13 freezers full of poops from every animal. But if there's someone out there who's looking to do some studies on Rodents of Unusual Size with Poops of Slightly Unusual Size.

Dr. Lee: Yeah. But here's one of the things, I can't bring that over because of international rules and laws. I can't take samples out of Tanzania.

Alie: Oh. So you have to do it there?

Dr. Lee: I either have to do it there, or I have some historical data from before they stopped it - I have some old stuff, but I'm still working with local mice species. So another thing I would say I don't like about being a scientist in today's age is it's sometimes hard to do some things based on the rules and risks. There are rules because there is a risk of bringing disease agents over, I get that. But sometimes I don't have the capacity to do everything because I haven't cultivated all the relationships that I would love to cultivate, not just

here but also with scientists on the continent to do more research, having more of it just happen *there*.

Alie: Right. It's not like *CSI* where you have the same person collecting blood swabs and doing the footprint analysis.

Dr. Lee: In our dreams.

Alie: [*laughs*] Yeah. Not what's happening. Okay, what about your favorite thing about being a mammalogist?

Dr. Lee: The travel. I do science to travel. I grew up in a family where we never got to go on family vacations so travel was always a dream of mine. I grew up working-class poor so my biggest dream was to grow up to be middle class. [*laughs*] There were certain things I was envious of, like being able to travel and go places, and back to those nature shows that I loved, they seem to always be all over the world. So for me, being able to travel to see a lot of things for myself, I love being able to travel and visit places.

Alie: Where are some places that you've gotten to go?

Dr. Lee: Most of my travels have been because of science. So travel for research-related things and learning? I've been to Guyana, I loved that, I took a tropical biology class and stayed in the bush. Tanzania, I've done research there. I've been able to travel to other places to talk about my research, so I've visited Mexico, Canada, Brazil, parts of Europe like the Netherlands, France, the UK.

Alie: Oh my gosh.

Dr. Lee: Again, all places I couldn't have gone on my own dime. [*laughs*]

Alie: Yeah, for real. That's why I work in TV too, I get to travel for that, and that was a big part of it. Like, I got to go to Alaska for TV – when would I get to go do that? Never. So yeah, smart. Your passport must need extra pages.

Dr. Lee: Not lately, these days.

Alie: I know. [*moans, disappointed*]

Dr. Lee: I do usually get right up to the mark, and I'm telling them "No no no, there's a space in there. Right there."

Alie: [*laughs*] Oh my god. Did you want to let everyone know about September 13th? About exciting Black Mammalogists Week?

Dr. Lee: Yesss! We're super excited. I'm joined by amazing colleagues, everyone from undergraduate students to fellow professionals and faculty members to celebrate Black Mammalogists Week. We're celebrating not only the research that mammalogists have done historically and today, but also invigorating a spark of curiosity and interest in mammalogy and in science in general, among anyone who is interested. Letting folks know that there is expertise in mammalogy, historically and contemporarily, and we're just excited to share our science, and essentially, our blooper reels – there are a lot of blooper in doing science, mammalogy in particular. Our goal is to inspire folks to become mammalogists, to be become scientists, and to join this larger community of scientists. We're really excited to share this with everyone.

Alie: Do you have any previews of any science bloopers you're going to share?

Dr. Lee: I'm probably gonna share when I got bit by a pouch rat.

Alie: Ahhhhh!

Dr. Lee: I got bit. [*“Ouch!”*]

Alie: Were there antibiotics involved?

Dr. Lee: Probably should have been.

Alie: Oh nooooo! Where did it bite you?

Dr. Lee: It bit me on my left thumb, and that happened in 2015, and to this day I still don’t have feeling back in that thumb.

Alie: [*gasp*] Do you know where that pouched rat is?

Dr. Lee: You know what, it was funny. We were moments away from releasing her back into the wild after taking measurements. [*cackles*] We were just getting some last-minute measurements and were going to release her. So we released her back into the wild and I want to imagine she’s living her best life and telling amazing stories about that one time... She took me *down*. I was physically taken down. It took three grown men to get that rat off of me.

Alie: Ah! Oh my gosh.

Dr. Lee: I physically went down with her. So she’s telling amazing stories, like, “This one time I took out this human, took her DOWN!” [*laughs*]

Alie: Oh my god [*gasping for breath between laughter*] Oh wowwww. So every time you give a thumbs up with your left hand, there’s a lot going on behind that.

Dr. Lee: It’s a lot. If we were in person, you could actually see my thumb, I have divots in my thumb, little marks and divots.

Alie: Wow. That’s a good story. People need to tune in to hear the whole thing. Amazing. This has been so great having you on. I feel like I’m such a fan girl. I’ve been so nervous and excited to talk to you.

Dr. Lee: Thank you! I don’t know what to do when folks say that because I’m always like, “You talking about *me*?” [*incredulous laughter*]

So ask smart people stupid questions, because the answers may be sniffing out landmines or tuberculosis, or inspire you to count your nipples in the bathroom mirror at work. You can follow Dr. Lee – do it ASAP – on [Twitter](#) and [Instagram](#) at @DNLee5 and follow Black Mammalogists at [@BlkMammalogists](#), or at [BlackMammalogists.com](#). Those links are in the show notes, plus there are more links up at [AlieWard.com/Ologies/Mammalogy](#). We are on [Twitter](#) and [Instagram](#) @Ologies on both. I’m @AlieWard on [Twitter](#) and [Instagram](#), so please do follow.

There’s more info up at [AlieWard.com/Ologies](#). There are free transcripts for deaf and hard-of-hearing folks, or anyone who wants a transcript, up at [AlieWard.com/Ologies-Extras](#). Huge thanks to Emily White, who is a professional transcriber, who heads up the efforts to get them done alongside a group of amazing Ologites. And if you need transcripts for anything, email [HireEmilyWhite@gmail.com](#), because she is amazing. Thank you Caleb Patton for bleeping episodes for kiddos.

Thank you to Erin Talbert for adminning the [Ologies Podcast Facebook group](#). Thank you Shannon Feltus and Boni Dutch, they manage merch at [OlogiesMerch.com](#). There are shirts, and hats, and totes, and visors, so much available there, even cozy fall blankets in *Ologies* print available at

OlogiesMerch.com. Shannon and Boni also host the comedy podcast *You Are That* and they are hilarious. Thank you Noel Dilworth for helping me with all the scheduling because my brain is bad at it. Thank you to assistant editor, aka The Butcher, Jarrett Sleeper who hosts the mental health podcast *My Good Bad Brain*. And of course to lead mustache, editor Steven Ray Morris of the podcast *See Jurassic Right* which is currently airing a Back to School series with dinosaur scientists! That is *See Jurassic Right*, his podcast. Also, Nick Thorburn of the band Islands wrote the theme music, and performed it.

And if you stick around alllll the way through the credits until the end of the episode I tell you a secret, and this week the secret is that I read some hack that if you put dish soap on your shower floor and then baking soda, and you let it sit for a couple of hours or overnight, and when you come back the next day your grout has never been cleaner. So, I tried it – y’all, it works! Also be careful, because it’s slippery and nobody needs to fall naked. I was on a date once where a guy told me about how he passed out in the shower because he had hemorrhoids so bad and he cracked his head open, and I was like, “This a lot of information.” He also mentioned that he had a fiancé but he was planning on breaking up with her over the phone and I was like, “This. Is. Not. Going. To go. Forward.” My point is, don’t slip and fall in the shower. But sparkling grout? What a day-maker!

Okay, enjoy Black Mammalogists Week, and then get ready for a very creepy October – not too creepy, but pretty creepy. Okay, berbye.

Transcribed by:

Aska Djikia

Scott Metzinger

Archaeologist/Museologist in training, Ruby-Leigh.

Isabel Burns in Pacifica, CA.

Elinor Austin

Some links you may enjoy:

A donation went to semsuccess.org. Follow SEM Link on [Twitter](#)

Dr. Lee’s TEDTalk “[How Hip-hop Helps Us Understand Science](#)”

Dr. Lee’s OTHER TedTalk: “[Finding Landmines Using Pouched Rats](#)”

[APOPO, the non-profit training rats](#)

[APOPO’s work with giant pouched rats](#)

[A giant pouched rat shows off her babies](#)

[Monkeypox infections worldwide](#)

[Rates of monkeypox](#)

[Foot nipples, a real thing](#)

[Foot nipple, from an academic perspective](#)

[More information about celebrities with supernumerary nipples](#)

[The Brimley/Cocoon Line](#)

[Cockroach milk, mmmm](#)

For comments and inquiries on this or other transcripts, please contact OlogiteEmily@gmail.com