Mattina Alonge: Hello. Hello, you're listening to 90.7 KALX Berkeley. I'm Mattina, and this is The Graduates an interview style show where we get a glimpse into the work and experiences of UC Berkeley graduate students. Today, I'm sitting here with Kwasi Wrensford, a PhD student in the Department of Integrative Biology. Welcome, Kwasi.

Kwasi Wrensford: Hi, Mattina, thanks for having me.

Alonge: You describe yourself as a behavioral ecologist. And I'm wondering if you can explain a little about what that actually means,

Wrensford: Right. Uh, that's a great question. So a behavioral ecologists, we sort of describe ourselves. So we focus on animal behavior kind of, um, as the big general guiding principle, but what kind of makes it behavioral ecology is we're interested in animal behavior in the larger context of an animal's environment and its interactions with, with that environment and with other animals in the environment. So a lot of behavioral ecologists, um, tend to focus a lot on things like mating behavior, um, how they find and acquire food and how they might compete with other species or with, um, individuals within their own species. So that's kind of a short version of what's a behavioral ecologist is.

Alonge: Okay. Basically how an animal interacts with both living and nonliving aspects of this world. Yeah. Um, is there one of those things that's more important?

Wrensford: That's, that's a really good question. Um, and I guess personally, I don't know if I could make an argument for one or the other. I think it's all integrated, you know, I think these aren't mutually exclusive things, right. So one drives the other, drives the other, right. So, uh, it just kind of often depends on what people are more interested in or what they kind of what their little favorite aspect of animal behavior is. Um, but me personally, I don't think they're, um, one's more important than the other.

Alonge: Okay. On that topic. What got you really excited about animal behavior?

Wrensford: Yeah. So I've always loved animals. I was kind of the, I was always the weird kid who was always into, uh, into animal books and I loved going to the zoo. And so I always liked animals just in general, but I guess what got me interested in animal behavior is like an actual research topic was, uh, actually in my undergraduate years, I got a, I got a special grant or scholarship through the National Science Foundation that they give to undergraduate students to go out and do a research project with a lab somewhere in the country. And so I got a grant to go out to this amazing field station in Colorado, the Rocky Mountain Biological Lab. And there, I got to work with, uh, a professor Daniel Blumstein who studied the behavior of these awesome animals, yellow-bellied marmots, they're very cute. Um, you know, if you've ever seen, like if you ever been out into the mountains of California, they're up there, or if you're back East, woodchucks are very similar, groundhogs.

Wrensford: Just very large fat squirrels. But this project is really cool because it was like a, it's a long-term study. So they've been studying the same population of marmots for the past, uh, since the sixties. Um, yeah. So my old advisor, Dan, Dan, he was actually the second PI to head this project. And so yeah, I got to go out there, trap the marmots, observe them and sort of work on all aspects of the project. And that really is what got me thinking that, and, you know, behavioral research is a thing that I could actually do, you know, actually just kind of watch animals in their own environment and start with, from my science, from there, you know, that's a really cool feeling. There's immense value in, um, captive laboratory animal research. And, you know, we've learned so much from the models we have, but you know, you can't replace actually, I'm seeing an animal in its natural habitat when you're asking like evolutionary or ecological questions. Right. Because that's where, that's where they are. That's where the what's out there. Yeah.

Alonge: Yeah. On the other hand, it seems that that could be somewhat challenging in a lot of ways. What particular things do you find challenging when studying animal behavior, animal ecology?

Wrensford: Yeah. So you're definitely correct. It's a, it's very challenging. It's a very difficult way to do work. You know, like, you know, the, we talk about the benefits and that you can get these, uh, observations and insights into animals in their natural habitat. But the main benefit of doing lab work right, is you have ultimate control. You know, if you want to know one specific aspect of an animal's biology in a lab setting, you can manipulate any little piece that you need to, to isolate the effect that you're interested in, but in the field you can't do that, right. The animals are going about living their lives and you just kind of have to roll with it and you get, you get what you get basically. And you're at the mercy of nature, you're at the mercy of the animals. And, you know, sometimes, and sometimes that leads to really great moments. Like I know there's a lot of stories of people doing research in nature, just kind of handed them the perfect experiment, either like a storm shakes things up in just the right way. But a lot of times it just ends up being a lot of headaches and a lot of improvising once you're out there.

Alonge: Do you have any specific stories of things that were particularly frustrating from your work either then in Colorado or as a graduate student here?

Wrensford: Um, I have plenty. I guess, kind of the most immediate story. So my current work, uh, I work in the Sierra Nevada in California. I work with chipmunks, uh, right outside of Yosemite and kind of one of the biggest troubles in the last year is just the, uh, is the, with the heavy snows over the winter, the snow melted a lot later than the previous year. So, and with the, snow's not melted yet a lot of the roads that high up don't open. And so I'm in a lot of ways, I'm just at the mercy of, of precipitation and, uh, to, I can actually get out and see my animals. And so remember last, uh, last year I was just kind of had the, um, weather service kind of snow pack measure and was refreshing it over and over again. Um, in like late June, early July, just waiting for the roads I needed to open up. And that's just like the tip of the iceberg, you know, I haven't even gotten out there yet and it's already, I'm already at the winds of nature.

Alonge: Right. So you're studying chipmunks. Now, you said, um, are these the same chipmunks that we might see in our backyards or is there something special about the chipmunks?

Wrensford: Right. So the chipmunk species I study now are two species that are basically exclusive to the Sierra, Nevada, California. Um, one of the kind of quirky things about chipmunks is that in the Western, in Western North America, they're actually incredibly diverse. So we have about 20 to 30 chipmunk species. So we have one species for the entirety of Eurasia, the Siberian chipmunk. We have one species for the entirety of Eastern North America, the Eastern chipmunk, and then all the other 20 something myriad species are in the Western, in Western North America.

Alonge: So why, how did that happen?

Wrensford: Myriad of reasons we think because Western North America is much more mountainous and a lot more complex terrain that in the last, uh, glacial periods, uh, these populations were much more isolated and diversifying in isolation. And then once the glaciers receded, they came back into contact, but by then they had already diversified and reproductively isolated themselves. So that's kind of the prevailing theory, you know, there's a lot of caveats to that. Um, but yeah, that's kind of the driving story that we think is why these Western chipmunk species are so diverse.

Alonge: Got it. Yeah.

Wrensford: So the species that I study are the alpine chipmunk and the lodgepole chipmunk, and kind of what makes them interesting is that they both kind of live at the sort of the top elevational range that you will find chipmunks in the mountains there. So you can find both of these species between about nine to 11,000 feet high, so they they're really high up there. So, and that's pretty high for humans too. That's about, that's about the range where humans start suffering really severe altitude sickness. So you can, so we can imagine these animals are pretty well well adapted to their environments to be able to survive and thrive up there. But what's curious about them is that I work in a Museum of Vertebrate Zoology and at UC Berkeley, one of the benefits of working in a museum is that you have a really rich datasets going back in history. And one of the datasets that we have is actually that we took some of the old field notes from the curators of the museum back in the early 20th century when the museum first started, um, when they were doing surveys of, uh, mammals throughout California. And we're able to take these really detailed field notes and redo the same surveys along the same areas and same locations that they did that gives us a really good idea how those communities have changed over the past hundred years.

Wrensford: And with that data, we've seen that through combination of climate change and human intervention and land use change that animals are responding very, very, um, acutely to these changes, but not consistently. So there's differences in variation in how these animals are responding. So some animals seem to be their range of seem to be shrinking, especially a lot of high elevation specialists as temperatures get warmer, they're moving further up the mountain to track temperatures, but then you have some

species that live in similar habitats that don't seem to be showing much change at all in their range. And that brings us to our chipmunks, that these two species that live in the similar habitat, my lodgepole chipmunks, their range hasn't changed at all, almost in the past 100 years, while the alpine chipmunk, it's been moving further up slope in elevation to track those changes in temperatures. And so that's kind of sets up in really neat little natural comparison. What's different about these two species or one seems to be more acutely reacting to these changes in habitat than the other.

Alonge: Yeah and is there a particular way that humans are cultural influences shifting their habitat or pressuring them to shift their habitat?

Wrensford: No, that's a really good point. So I think the main culprit for what's really shifting their habitat and kind of with the resurvey project and a lot of people working on it, we think it's broad climate change. So we think mostly this broad increase in temperature over the past century postindustrial, um, is what's really driving these changes. And we can see that in, in the actual kind of weather and temperature measurements that we're seeing localities average mean temperature is going up, but it's a broader story than temperature too. There's all sorts of interacting and synergistic effects, not just, um, it's getting warmer, right? So the warmer temperatures make are making the snow melts earlier. They're decreasing snowpack in the winter and all sorts of other effects that are interacting with each other to change really the environment that these animals are dealing with.

Alonge: Yeah. Totally environment. Yeah. There's not one variable. There's a lot of different things on the one hand. It seems, you know, it's a cool system. Your question is awesome. But because this impact is so large scale, is that the type of work that you feel doesn't have necessarily like this immediate applied conservation goal, and there's something bigger that you're really striving towards?

Wrensford: Yeah, no, that's an excellent question. Um, I think with the chipmunk specifically, it's difficult to think of immediate applied conservation goals. So neither of these chipmunks are listed under IUCN is vulnerable or near threatened or anything like that. Although you can talk a lot about how you feel about the actual criteria for listing species. Um, that's another, that's another conversation, but I think in terms of applied conservation effects, I think understanding sort of how animals are reacting to these, these changing climatic conditions in their habitats over short scales, I think may, may not necessarily translate into like, okay, here's our, here's our management plan for endangered species of interest. But I think it really will inform how we think about how animals are reacting to climate change. You know, a lot of, a lot of, uh, how we talk about animal reactions to the climate change is a lot of doom and gloom.

Wrensford: You know, it's a lot of, you know, we're going to lose X amount of species by 2050 or, or things like that. And while it is a very dire scenario for animals, like we're going, we are going to lose a lot of diversity. And that's true. I think the scenario is a bit more complicated than that animals are dynamic entities, right? They're responding and adjusting and adapting as they always have. The question is, are those responses and are

those adjustments, are they quick enough to track with the kind of pressure that we're placing on them? And that's an open question for a lot of animals.

Alonge: I like your optimism in the face of everything going on. You know, I think there's a, a realism, but also an underlying optimism. And that is very refreshing and probably good for all of us to hear.

Wrensford: I'm happy to provide that. You know, like I sometimes I feel really down about the state of the world too, and, and, you know, and I think it's, and it's going to be hard, but I think also animals are amazing and that's kind of one of the things I've always, I've always felt. And I continue to feel the more I study them, the more I learn, you know, and learn how dire the situation is. But I also learn how amazing the animals we share the world with are, and kind of what they, they have at their disposal to really adapt.

Alonge: So do you have a sort of dream species that you could study?

Wrensford: I have a few, yeah. There was a, there was a time I really wanted to work with snow leopards. Like I've always loved snow leopards. I always thought there's kind of, you know, there's kind of this mysterious romantic animal.

Alonge: Yeah. Mysterious, but glam.

Wrensford: Exactly, you know, you ever seen like a picture with one biting its tail. It looks like a little feather bow. They're super cute. I love them. Um, but I've always had this sort of, sort of pipe dream that I would go out to like the Hindu Kush mountains in Pakistan and like go chasing snow leopards or something don't think that'll ever happen mostly just because they're just so rare and so hard to find, you know, people, even with people who were using camera traps. So they're not even going out looking for them in person. We'll see maybe a couple in a year. Yeah. Because they're pretty rare, pretty loosely populated and they have huge home ranges. So that's, that's the animal that got away, I would say.

Alonge: Yeah. Unexpected. Yeah. From yellow-bellied marmots to snow leopards, maybe in the future, don’t rule it out.

Wrensford: Maybe you never know, you never know fingers crossed.

Alonge: Okay. So were you, you mentioned earlier that you were sort of always interested in animals. Were you also always interested in nature more generally or the outdoors?

Wrensford: Yeah, I would say so. Um, so I was born in the Caribbean, spent a couple of years there and then moved to Southern Georgia. And so one of the great things about Georgia is it's, especially in the Southern part of the state. It's one of the, one of the coolest ecosystems in the world. I think it's a lot of, a lot of reptile and amphibian diversity. You're so far South that you're starting to get a lot of warm weather stuff. You don't really get in the rest of the country and sort of growing up around that really kind of really solidified my love for nature. Um, just kind of being out there, flipping logs, looking

for lizards and stuff. It was a really good time. Um, I was a Boy Scout for a while too. And so that's kind of what, like, so I was always in animals, but then kind of Boy Scouts is what it got me into, the more outdoorsman side of things.

Wrensford: So camping and hiking and backpacking and things like that. Um, and so that was a really valuable, um, experience for me, I think was just being able to get out there in a way that I probably wouldn't have had to otherwise. Right. My family wasn't super outdoorsy. You know, we didn't do like family trips to park national parks or state parks or things like that. So it was often through sort of my, the Boy Scouts and also I volunteered at our local zoo and it was sort of through those two outlets is what really kind of got me hooked on nature and, and working with animals.

Alonge: Yeah. The work you do has this big natural field work component. So some people do field work because they have to, but some people have field work as a part of what they do because they love the whole experience of it. So I'm guessing that you're on the ladder part of it,

Wrensford: I would say so. Yeah. I think nature, I think nature brought me into science, although I was always surrounded by science too. Like I think I've always liked science large too. So those kinds of work parallel with each other, but I don't know if I, if I didn't love nature the way I do, if I would be doing science or at least doing research science, you know, so yeah. I definitely think, uh, nature is what pulled me into, uh, pursuing, pursuing a graduate degree, doing research.

Alonge: So if you're just joining us, this is The Graduates on 90.7 K A L X Berkeley. And we're here with Kwasi, Wrensford, a behavioral ecologist in the Department of Integrative Biology. How do you continually find inspiration in the science that you do? Because it is often challenging.

Wrensford: Yeah. Yeah. It is. It can be very challenging to, you know, keep the inspiration going. I think in academia and research, we ask a lot of, of ourselves, you know, that we're this project idea driven mode of life, you know, where we're constantly being asked to come up with novel perspectives and takes on things. And yeah, you know, you can just do that all the time. Um, but I think one of the main ways that I do that I stay inspired. It's just talking to people. I think one of the great things about integrative biology that my home department is, is that folks in that department do such a wide range of things with a wide range of approaches and questions and systems and, you know, just interacting with people in the department. I can, you know, get perspectives that I never would have gotten otherwise. Like, you know, I'm this summer collaborating with, uh, with a fellow person in the department who works on biomechanics. If you'd asked me like three or four years ago, would I ever have even remotely thought of doing biomechanics work in my life? I would have been like, you're crazy. But you know, that's just comes with talking to people and identifying those mutual, these mutual interests. And that's really, what's been pushing me in my time in grad school is just being surrounded by all these awesome people.

Alonge: Please tell me you're building a robotic chipmunk?

Wrensford: I don't, I don't know if we're going to do a robotic chipmunk. Robotic squirrel in general is in the works. So I'm collaborating with Lawrence Wang who's in Bob Full's lab. And they been really interested in this, the jumping biomechanics of squirrels and using that to inform building an arboreal robot. Yeah. And so Lawrence and I are gonna go out, he's gonna come out with me over the summer. We're gonna film the chipmunks and sort of compare how good they are at jumping compared to like the tree squirrels on campus. Yeah. But yeah, it's just stuff like that, you know, that, um, that we, I have access to people like that so easily here that's really been making the job easier.

Alonge: Yeah. Yeah. Um, how about the questions that you come up with for your research? How do you shape those or yeah. Is that also coming from dialogue and conversation or do you, is your strategy more, you know, gather all your thoughts, do tons of reading, what's your process?

Wrensford: Um, so definitely both to be short. Um, I do a lot of reading. Um, my first year of my PhD was just mostly reading, but I think the questions I've chosen have made it, so that like kind of the range of kind of been everything from the nature of animal cognition to like broad climate modeling to thermal physiology. And so I've cast a very wide net and sort of the things I've read, but it's all been very useful in solving very helpful, but then sort of also taking those readings and bring and assimilating that knowledge and integrating it, but also sort of regularly sort of presenting that to people around me. You know, I think one of the things that's a temptation when you're in grad school is to kind of turn inwards, you know, that you're this lone scientific entity in your, you know, you're supposed to take all of what's around and assimilate and come up with these perfectly formulated ideas and be this sort of intellectual juggernaut.

Wrensford: And, you know, that's not really, that's not the case. I, I don't want to make assumptions for people, but I don't think that's the case for most of us, if any of us that, you know, we come up with perfectly formed ideas in a bubble. Right. And so I think it's really important to have that time to sit with your thoughts and assimilate them, but also to make sure you're sharing those thoughts with the community around you and getting feedback and getting input. And again, using that, that diverse community to sort of workshop your ideas and give you alternative perspectives,

Alonge: Community aspect of science research is probably something that a lot of people don't quite realize unless you're inside of it. And yeah, I would agree with you that I think it's extremely valuable and we certainly can't speak for everybody. Some people might prefer to work in a more independent way, but I think that you can really reap a lot of benefits from sharing your ideas and getting feedback and all that. So in terms of sort of digging into understanding science and trying to understand more about questions that might be interesting to our listeners or to other people, do you have any advice for how best to sort of seek out information if people are interested in science and a topic where, where are the places that they can look or who can they talk to?

Wrensford: Right. Right. So I think so we live in a really great time for just finding information. Right. I think information is available in a way it's never been available before. I think the easiest or the best places I've found for just really kind of accessible, easy to digest science is YouTube. Like, I love science YouTube. Like there's so many science, YouTube channels, things like, like things that Hank Green's doing, like Scishow and, um, and MinuteEarth. And there's so many cool science channels on YouTube. Now like at your fingertips, they give you in like two to five minute videos, you can learn so much about a topic.

Alonge: Yeah. And the visual is probably so much more interesting and like captivating then sitting down to read like a textbook or something that you could get from a library.

Wrensford: No, exactly. And so I think if you're just wanting to get your, get your toes wet, I think that's the best place to go. Um, I'm also a big advocate of, I love museums and zoos and other kind of, sort of in person, academic science outlets like that. Um, I worked at a zoo, so I'm a little biased, but I think a good zoos are some of the best places to learn about animals you could ever find anywhere, um, museums as well. And then also being in the Bay Area, we've got so many cool, uh, museums.

Alonge: Yeah, we're very lucky. What did you do when you were volunteering at the zoo previously?

Wrensford: So I worked in the, I worked as a volunteer with the education department, so I wasn't as directly involved with sort of the broader zookeeping animal care, but I helped with animal care for a lot of our outreach animals. So the education department had a lot of, um, uh, sort of smaller animals that we brought out to programs. Most of them were rescues or, um, re rehabbed animals that, um, weren't fit for being released in the wild anymore. So we would hold on to them and take care of them and use them as ambassadors for the zoo. And so I did a lot of work taking care of those animals, but also doing presentations as well. So, um, I remember one of my favorite things ever is there. I could go out and talk to group people with a hawk on my arm. Um, and just, and there's something about, you know, just talking about this animal while you're holding an animal right there for people to see and be in proximity to, there's nothing else like it really

Alonge: A memorable experience for you, but also them. Right? Yeah. That's really cool. And do you teach at all as a graduate student here?

Wrensford: I do. I do. So, um, I, I haven't taught every semester I've been here, but I've been able to, I've been lucky enough to teach, uh, animal behavior. Uh, it's our kind of upper level, um, undergraduate animal behavior course. And so we do everything. We'll talk about the evolution of behavior to sort of the mechanisms underlying behavior, whether it be the brain or hormones. And we also talk a little bit about the more ecological society of behavior and how animals interact with themselves, each other in their environment. And so I had, I was lucky to teach that course, and that was a ton of fun.

Alonge: Sounds right up your alley.

Wrensford: Yeah. It's quite there. Yeah. Um, and then the other class I got to teach was, uh, a, another sort of behavioral course. This is a course called behavioral ecology, but this was more of a lab and field oriented course, a lot more hands on. So we had a lab section that met every week and we also did field trips about once or twice a month. Um, and so that was sort of similar material to the animal behavior course, but putting it in the context of a more inquiry based approach

Alonge: Yeah. And where students can maybe develop some of their own ideas and questions. Yeah. It's so valuable. I think as an undergrad myself, I never actually got involved in research, but I really can see how that can be a really impactful experience. And maybe like, maybe those are the types of things that give someone their first exposure to scientific questioning and might shape their whole trajectory. So totally. Yeah. Have you been able to sort of integrate and include your area of expertise when you're teaching and share some of your experiences in the field or some like preliminary sneak peaks about the findings you're having with students and have conversations about your work?

Wrensford: I try to, um, it, it depends on the subject depends on the day, but I think, especially in sort of in the aspects of both courses where we're, we're asking more of the students to sort of formulate their own ideas and, and bring some more of themselves to the process. I think hearing my experience sort of hearing how I sort of struggle through my own work or, or that perspective I think is really valuable and really helpful. So I know in the, in the behavioral ecology course, we have, each of them sort of do, we do experiments with the local campus squirrels. And we have each of the groups sort of devise their own experiments and data collection protocols to work with the squirrels. And so, so there's a whole process and the students and how they develop their methodology, develop their questions and everything like that.

Wrensford: And as a, as a GSI, as, as their instructor, it's kinda my job to sort of guide that process and check in with them pretty regularly. And I often can make analogies to my own work, especially like when they're developing the methodologies, I can, they don't have to make the same mistakes I did when I was formulating my own experiments. So my experiments that I've been doing recently, even a lot of behavioral experiments, I'm doing a lot of filming and observations and in these sort of apparatuses that I can build out in the field. And so most of that time was spent with a lot of trial and error. Like how do I get this apparatus to work? How do I keep the chipmunk inside? How do I keep it from escaping? Like, how do I get my camera angles just right. It's all that kind of minutia that you don't ever really think about, especially if you're kind of new to the more active side of science. Right. And so bringing that to bear, bring that experience to bear for the students when they're developing their own ideas, I think is invaluable. I hope they really appreciate it.

Alonge: So do you have any sort of final thoughts for how we can all act a little like behavioral ecologists in our daily lives? What kinds of things can we look for?

Wrensford: Yeah. So I think to be a bit more like a behavioral ecologist in your daily life, I think whenever you see an animal, any animal, even your pet, when you see it, uh, doing its thing, you know, living its life, um, I just kind of wonder, just wonder why. And I think that's, um, that seems kind of simple in, but I think, you know, when you see an animal out there, you just think that that animal is, is an individual with its own needs and motivations and, and roles. And it's an ecosystem environment and those are, and those roles are dynamic and complex and those roles aren't in a vacuum either. And I think that's really important is that when we see things, when we observe things, always observe things in the larger context.

Alonge: That why question is yeah. Much bigger than alpine chipmunks in the Eastern Sierras. Yeah.

Wrensford: I agree with that.

Alonge: That's it for this week. Thank you Kwasi for being here. It was awesome to chat with you.

Speaker 3: Thanks for having me, Mattina. I had a blast.

Alonge: Cool tune in next week. Again, this is 90.7 KALX Berkeley.