



Conservation is the Bees Knees with Peter Soroye

Nerdin' About Podcast Transcript, Season 2 Episode 8

Michael

Hey everyone welcome to Nerdin' About! I'm Space Michael, and with me as always is someone whose favorite superhero is Rogue from X-Men, and that's Dr. Kaylee Byers.

Kaylee

I just really identify with Rogue, I think. But to be fair, I don't know that much about the superhero landscape. You feel like somebody who would know a lot about superheroes? Is that true?

Michael

Well, I mean, specific superheroes, because the superhero world is not really the land that I live in. I lived in the Star Wars, and the Star Trek universe, comics that sort of connected to those worlds, for sure. But lately, I've been getting into them a bit. You know, X-Men, certainly, I really get into especially the comics, the ideas of being a mutant and changing morphology, and there's some biology and then there's some science in there a bit.

Kaylee

And there's some crossover there with Picard. What superhero power do you think Picard would have had?

Michael

Well, I mean, obviously, it's hard to picture Patrick Stewart as anyone else, but Professor X. So obviously, he's going to be reading your mind, because Patrick Stewart and Captain Picard are sexy, you know, like that thought that he's reading my mind, you know, is kind of tantalizing. I kind of like that idea.

Kaylee

I don't like it because it doesn't involve consent. (laughs) But anyway, today, we're going to be talking to a real-life science communication superhero. So, I'm very excited to introduce everyone to Peter Soroye. Peter is a conservation biologist and PhD student at the University of Ottawa, where he studies the impacts of climate change and land use change on biodiversity in order to inform management and policy. Peter is also one of the most active science communicators I know. Hi, Peter, welcome to the podcast.

Peter

Great! Living the dream. It's great to be here. Thanks for the invite.

Kaylee

We are so excited for you to be here and to live this dream with you. So, to start off, for folks who aren't familiar, you're a conservation biologist. Can you tell us what conservation biology is?



Peter

So, conservation biology, broadly, is focused on I guess two things. Obviously, we know humans are doing a lot to the world around us. So, one big part of conservation biology is figuring out exactly what we're doing, and exactly what impact it's having on the ecosystems and the wildlife around us. The second big thing that conservation biologists do is try to figure out ways to better do the things that we humans are doing, while having a much more minimal impact on the world around us today. So, we're trying to figure out why species are going extinct, and hopefully not only prevent those extinctions, but recover populations.

Kaylee

So, for you, what does that work look like for you, for your thesis?

Peter

There's a lot of flavors of any science field, right? My flavor of conservation biology is macroecology, that just means big picture ecology. I always hated picking a favorite animal when I was younger, so as a macroecologist, I get to study dozens of species of bumblebee, or I can go beyond and look at all invertebrates, and look at the impacts that humans are having in a broad sense across countries and continents, on these groups of species. So, a lot of my work looks at that, looks at historic trends, and a lot of different species, how they've been disappearing from some areas, colonizing new areas, and how those changes relate to things like climate change, and historic patterns of human land use and stuff.

Kaylee

So, you're looking at groups of organisms over large space in relation to big world changes?

Peter

Yeah, exactly. The idea is to try to distill those big picture patterns and lessons. We're testing ideas of specific mechanisms and methods of impact and trying to distill those into general principles that we can use in more specific ways on the ground or in a more policy context.

Michael

So, Peter, you said that you when you were young, you couldn't pick a favorite species. There's so many of them to pick from, but you are working with bees right now. So, are bees now your favorite species? Or have they sort of just become the ones you work the most with? Like, how do bees connect with the work that you do on climate change?

Peter

Bees are definitely... now bumblebees are by far my favorite insects. I don't know if I'm ready to crown them the GOAT of all animals yet, but definitely. bumblebees are just adorable, right? They're, cute, they're fuzzy. They're literally bumbling around flower to flower. They play all these important roles as pollinators; they are crucial for ecosystems. That's obviously really critical too, but they're just so beautiful. For me, that's what really connects me to conservation, I love seeing these little beautiful things. I hate the idea that they might not be there in 10 years or 15 years. So, they kind of ground me to why I'm doing this research, why I'm doing science, and why I'm in this field.



Michael

Well, maybe dig into that a bit more like why are bees so integral? Because I think we all kind of inherently know, and we've generally known about why bees are so important, but maybe get into some of the specifics of why that is?

Kaylee

Is it all about that honey?

Peter

Yeah, actually so fun fact it's well known that honeybees make huge amounts of honey, but they're really among the only bees that make that much, and bumblebees will make a little bit of honey, and other bees will make little bits to go through rainy days literally for rainy days. But honeybees are the only bees that will mass produce honey, it's made through this process where they're basically turning nectar into a shelf stable product something that will last them through the winter. And because honeybees are among the only groups of bees that need the colony to last through winters, where obviously there's no food to forage from, they're the only bees that have to mass produce honey at that big scale. So, there's no other nests that you could go into, and pull-out honey like you would in a honeybee hive. Bumblebees are awesome. They like the little bits of honey and nectar that they bring back or when they make honey and when they bring back nectar, they put it in these little beautiful honey pots or nectar pots. It's incredible when you look at the nests, it's like breaking into an old archeological dig site or something I imagine, and you see all these old Greek vases. It's similar when you look at a nest, you see all these little pots everywhere. So yeah, fun fact everybody assumes that all bees make a lot of honey but of the 20,000 bees that are around the world, only a small proportion of them are honeybees.

Kaylee

All these other bees have like smaller pots of nectar. Do they run risks from animals trying to get at those?

Peter

Badgers are notorious for digging up not only honeybee hives, but bumblebee hives as well sometimes, and there are a couple animals that will go after that. But the thing about honey is that it's processed, and it stores for a long time. That's why honeybees do it. So, they can last through the winter on these food reserves. For bumblebees that don't, you know, their colonies die out in the winter. It's only the Queen that that lives through the winter. So, they don't need to keep that fruit for a long time. So, the nectar has, you know, I guess a quick expiration date. This is complete speculation, but I like to think of a badger bursting into a bumblebee colony and eating all this expired nectar that the bees have just left.

Kaylee

That's pretty great.



Michael

So maybe let's get back to the original question, and maybe connect the dots of bees and humans' impact on them and climate change. The big issue that we're all trying to solve.

Peter

Yeah, definitely, I've mentioned, and you touched as well, bees are really important animals. Obviously, they fall into the group of pollinators, anywhere from 75 to 95% of flowering plants need help with their pollination. So, they need help transferring pollen from one flower to another, and this is what every flowering plant needs to create fruit to create seeds, to be able to make other plants, and so bees play a really crucial role of doing that transfer of pollen. So, without them, our natural ecosystems fall apart. The foundation of them is different flowering plants from the wildflowers that we might know to even things like trees, etc. other types of potential flowering plants, grasses, some of those can pollinate on their own, but a lot of them need bees and other pollinators. Then of course, as humans, our food structures, our agricultural systems really rely on wild pollinators like bumblebees as well. Bumblebees, especially are great for things like tomatoes, blueberries, things that need buzz pollination, where they need really kind of fat pollinators to really physically shake the pollen off the flower. So smaller pollinators like honey bees or butterflies, they can't, they can't dislodge the pollen from a lot of these crops. So, bumblebees are really important in quite a few different ways, both for the wild ecosystems, and agricultural systems too.

Kaylee

Did you call that buzz pollination?

Peter

Buzz pollination.

Kaylee

Oh, that's the cutest thing I've ever heard. (laughs)

Peter

Yeah, the idea of it is, is even funnier, I think it's literally that these flowers need to be shook, and they need a fat fucking bee to land on them, and buzz at such a high frequency or a hard level that it physically dislodges the pollen from the flower.

Michael

That's what we call an FFB. (laughs)

Kaylee

Well, this relationship can be really intricate right? I remember in undergrad seeing a video of orchid bees, a species of orchid bee that the orchid would attract the bee and the bee would fall in, and then there was a tiny hole for the bee to get out, and in the process of getting out the orchid would put little pollen sacks on its back, and it would allow it to fly away.



-- Oh, hi there. me again. Sort of from the future. When I was editing this podcast and I got to this part about the orchid bees. I thought "holy science. I did not tell this story well" and it's such a cool story. I felt the need to jump back in with a little more information. So, the bees I mentioned are orchid bees there are many different species. Some species are in the genus *Euglossa*, go look them up. They are beautiful little bees. These bees are pollinators for orchids, and what they get from the orchid is scent compounds. So, the male bees actually go around collecting fragrance compounds which they use in their courtship rituals, like a fancy little cologne, and they don't just gather those scent compounds from orchids, but they also get them from things like tree resin and fungi. So, the bees are attracted to the scent compounds, and they go to gather them from the orchid. In the example that I mentioned, I'm specifically talking about the bucket orchid. So, they're an orchid and they've got this little bucket at the base, and as the bee is collecting these scent compounds, the orchid has this compound that it releases that's slippery and the bee can fall down into the bucket. It has nowhere else to escape but through this tiny opening, and as they go through that opening, that's where the orchid attaches its pollen sacks. It holds the bee there while it glues them on, and then the bee can fly away, and off to another flower. So intricate. It's also worth noting that because of this very specific relationship, any loss of these species of bees can also mean a loss of the flower in the future. So, let's protect those bees! Okay, back to the episode. --

Peter

Yeah, sometimes it can be super specialized. It's funny as well, speaking of co-evolution the ways that some bumblebees have evolved to completely not play by the plant's rules either. Like there's a whole group of bees called nectar-robbing bees. It's a strategy that's spread across a lot of different species, but instead of going in the flower for example, and picking up pollen as they crawl down to the nectar at the base, they crawl around the outside, and they'll cut a slit at the bottom of the flower and take the nectar at the bottom of it. So, they completely bypass any of these fancy strategies these flowers have evolved, and they just cut right to the chase and get what they need.

Kaylee

So smart. I don't think I would figure that out. I would be fully the bumbling bee that just like goes right into the middle and probably gets stuck. Okay, so I know you said that you don't like to pick a favorite. But can I please make you pick a favorite of your pollinator friends?

Peter

Man, this is tough. Favourite pollinator is obviously the bumblebee, there's no question about it. Among bumblebees if I have to pick, then I need to give a special shout out to the polar bumblebee *Bombus polaris* which is this bumblebee that lives in the Canadian Arctic, it's one of the biggest bees in North America, and I just find it so wild that it lives literally in the Arctic Circle in parts, and it manages to subsist and then thrive in the short summer months of the winter, and so it's nice and big to keep all that heat, and maximize flying time in these cooler conditions. But then I have to mention the biggest fucking bee, which is the Patagonian bumblebee, and it is absolutely massive. They call it the flying mouse which is another name they have for it. I think it can be up to like four centimeters which is huge, it would be big for a mouse, but for a bumblebee being that long is just absolutely fucking insane, and the Patagonian bumblebee has this beautiful orange coat as well. It's absolutely adorable.



Kaylee

First of all, I am looking at this bumblebee and it is adorable. It's so fluffy, I love it. So, if we come back to a climate change, and we get serious again. Based on current climate change projections. What is the outlook look like for our pollinators based on your work?

Peter

Yeah, that's a great question. If we take kind of business as usual, and just assume that we'll be continuing on that, then it looks pretty grim. One of the things I found in a recent paper that we published last year was that in a period of just over 50 years, from a baseline period to today, we are seeing declines by up to 40% on average across North America and Europe of finding a bumblebee. That's on average across all species, all across North America and Europe. If you were to go out somewhere and look for bees 50 or 60 years ago, and then go back to the same place today, you will find 40% less species. So, it's a huge decline in such a short time too. So, if we continue at that sort of rate the outlook looks pretty grim. Other pollinators are suffering similarly from climate change and habitat loss and pesticides and other things. It can paint a pretty grim picture, but it doesn't have to be that way. Right? We know, in a lot of cases, what we need to do to stop these threats, and we know what we need to do to recover populations. It's a depressing picture if we continue business as usual, but there's no need to continue business as usual. There's a lot of things we can do to stop that.

Kaylee

What are the parts about climate change and land use change that are impacting pollinators?

Peter

It ends up being a lot of things. Like with most biodiversity, it ends up being just a mix of a million different threats that are going on at the same time. For bumblebees, some of the things specifically are of course with habitat loss, you see destruction of habitat and of flora resources. So, both the flowers that they might collect nectar from but also the places that they might go to create nests, or to overwinter. So, bumblebees, for example, and a lot of other wild bees in the winter find little holes, whether it's an old mouse hole or their burrow something or hide under a log or a piece of bark, and they'll stay the winter there. Then in the spring, the queens awake from hibernation, or during a period wake up, and set up the whole colony again every year. So, habitat loss can destroy those places as well, which is currently a big mystery. In a lot of cases, we don't know where bees are going to overwinter at all. So, land use change and habitat loss play a role in that sort of way. For climate change, it's also a mix of things we see that generally ranges are shrinking, and that's related to increasing temperatures in the southern parts of species range. So, over the last 50- and 60-year period, as temperatures have been getting warmer, with human induced climate change, the range, if we look at where species are across the continent, that southern range limit is slowly, slowly moving further and further. When we look specifically at sites and what's happening there, we see that bumblebees are experiencing temperatures beyond anything they've had to in the past. One aspect of climate change, not only gradual warming, but more extreme events, and more frequent and more severe extreme events. So that plays a big role in terms of pushing species over the edge of what they can tolerate, and what they can handle.



Kaylee

So, they're dealing with the climate issues, they're dealing with the fact that they're losing their habitat, and we don't even necessarily know what that habitat is, that sounds like a really fun project go around picking up leaf litter to find adorable little bees.

Peter

It's so funny seeing the things people do to look at this as well. I read a paper once and it was a short paper, but it was like we were having a picnic, and we saw a bumblebee crawling out of some like leaf litter at the bottom of a tree, and we saw this two other times while we were doing that same picnic. So, the whole paper was just explaining this is a novel observation of this bee that was overwintering. It's wild, that was completely new information, and was useful information. There is one researcher at Queen's who hired retired police dogs to sniff out bumblebee queens, to track down where their nests were. So, it's incredibly creative the lengths people are going to try to fill in this gap of information.

Michael

So, Peter, you've painted this pretty grim picture of our pollinators leaving the planet or their numbers being greatly reduced. But you did say that there are some things that we can do. So how can we manage this issue? How can we save our FFB's?

Peter

Yeah, that's another big question, obviously, right? That's there are a lot of things you can do small, but to address climate change in a concrete way there needs to be big systemic action. For almost any type of conservation, one of the best actions you can do to help save species is vote for decision makers and politicians who care about environmental issues, and care about biodiversity loss as well. They're about making a stand on climate change. When it comes to more specific things on the ground, one of the really useful things and more individual things that you can do is making a pollinator garden. It sounds small, it sounds like there's no way this has an impact, but there's so much urban habitat, and semi-urban habitat across the world. If we start making it a little more habitable for bees, and this creates an oasis of resources for pollinators, of nesting habitat for pollinators, and gives them more importantly stepping stones of how to cross potentially hostile environments. They can almost jump from these little islands of pollinator gardens in some cases to help move in response to climate change or to move in response to other factors. So, pollinator gardens can be a super useful thing. They can also help bees shelter from extreme events when things get too hot when things get too crazy. You can create pollinator gardens in such a way that it helps species not only get food, get resources, but also help shelter from climate change and other things.

Kaylee

So, let's say I build a pollinator garden, on my patio. Should I be focusing on planting species that are local to me?

Peter

Yeah, definitely. Local wildflowers are always the best. You want to plant the same thing that bees are going to see out in the wild near you as well. There's a lot of resources online. [Pollinator Partnerships](#) has a great series of guides that are tailored to every kind of eco region across North America that you



might live in, and have a whole list of potential flowers that you could plant in your pond in your garden. Garden centers are usually pretty great at doing that as well. The other thing you can do, which is awesome for people who are less gardening inclined like me, is creating the best pollinator gardens involves mimicking natural habitat. So also, just be lazy taking care of the garden.

Kaylee

Done. (laughs)

Peter

Leave leaves in the fall, leave fallen leaves on the ground, rake them into a corner. Don't pick them up, sticks, leave them, logs, leave them.

Kaylee

You're telling me to not clean my very disgusting porch right now? Totally condoned? (laughs) It's bad.

Michael

So, Peter, we talked about individual actions that we can do, or not to in Kaylee's case,

Kaylee

I'm going to lean into not doing. (laughs)

Michael

You know, the big thing that we can do, of course, is vote, you know, for governments that are going to enact some policies. But what specifically do you think that governments should be doing? Because I always get the sense that governments have no idea what to do. They will just put some blanket statements; we're going to do more for the environment. But, from your standpoint, as a conservation biologist, what would be some of the recommendations that you would make to a government that does want to make some change?

Peter

Let me start at a smaller, city level even of things that people can do there, or that municipalities can do. One of the big things that we saw at the start of the pandemic last year was some cities not mowing road verges, like the road shoulders. So instead of it being cut grass, it blossomed into little shrubs, tall grasses, a lot of wild flowers, and you know, that's another small thing of not doing something. Now all of a sudden, these verges can turn into a really great pollinator habitat. A similar idea with parks and the edges of parkways or other things. So that's one example of a small thing. There are a lot of really great scientists in municipalities, and provincial governments and federal governments, and a lot of them are already suggesting a lot of different things to do, but putting aside area for pollinators for biodiversity, more broadly setting aside protected areas that people can ideally interact with as well. It's a great idea to not only get people outside, but also protect some of our species and provide habitat for species. There's a whole suite of sustainability things that cities can do as well, incentivizing public transport instead of individual cars and driving, incentivizing things like bike lanes and walkability within



cities. A lot of these things also cut down not only on carbon emissions and human footprint, but a lot of times can also go hand in hand with creating habitat for pollinators and greener spaces in general.

Kaylee

So, you were talking about we're dealing with all this fragmented data, and it's incomplete. What to you is a big question that still remains in this field?

Peter

I guess I'll mention two things. One that I already touched on, which is overwintering habitats for bumblebees, and other pollinators as well. In a lot of the cases, we just don't know where they go for like three or four months of the year, they just kind of disappear. There are all these funny stories of people finding them in old shoes or in pop cans that people have thrown onto road verges and stuff. So sometimes there's like a huge breadth of places that species can go to overwinter, but others appear to have really specialized niches of where they want to go. That's just a huge question mark, we have an idea sometimes for some species, we know it very well. For a lot of species, we just have no idea. So that's one huge thing. The other one, I think, is just where species have been, where they were in the past, where they are now, because bees are not the easiest to look for. Some of them are everywhere, a lot of them are really difficult to find. Our knowledge of distributions and occurrences where species are now, where they were five years ago, 10 years ago, 30, 40, 50 years ago, this is very incomplete as well. We can't go back in time and sample where they are, but in a lot of cases that data already exists. It's just in a museum somewhere, in a drawer, and in some researcher's old lab book that they have not brought out in 10 years. So, I think the digitization will help. There's a huge push in a lot of museums and science centers to digitize collection data, and I think that will unveil a lot of new information that will help us better understand past and present trends, and then allow us to predict into the future.

Michael

So, Peter, you also have this program called [Backyard Bio](#) What's that all about?

Peter

Yeah, that's a program I'm participating in, but it's organized by Jesse Hildebrand and the folks from [Exploring by the Seat of Your Pants](#), but it's a super great event initiative. I don't know what they call it phenomenon, lifestyle, but the idea of it is it's going to be a month long, and in the month of May, and just getting people to go outside into their backyards. survey the biodiversity there. I had a blast doing it last year. I went to within 20 minutes of my house in downtown Ottawa, and found so many dope things from bees curled up inside of flowers to baby raccoon sleeping in trees. That's crazy what you can find just right in your own backyard right around your house, and Backyard Bio a super great way to get into that.

Michael

Should we get to some Nerd Herd questions?

Kaylee

Yeah, let's head over to the Nerd Herd questions.



Michael

If you want to get in on the Nerd Herd questions, we post them on our socials @NerdNightYVR, Twitter, Facebook, Instagram. Our first one comes in from Amy, who asks, "How much land do we actually need to preserve if a lot of land is going to be used, i.e., human development? Is there a sweet spot of urban development to pristine wild lands that is sustainable?"

Peter

Oh wow, that's a really great question. I'll say at the outset, I don't know the answer. I can speculate, a lot of conservation biologists are throwing numbers here and there. Some people suggested we need to keep 50% of the world wild. Other people have said less, other people have said more, there are all sorts of numbers in between. I don't know the answer. I don't know if anybody really knows the answer. But that's an awesome question.

Kaylee

We should definitely maximize. Aim big, because we'll probably be disappointed. Am I just really miserable? What's wrong with me? So pessimistic. Okay, we have another question from Christine who asks, "which places in the world are most affected right now by changes in climate and land use? And is that predicted to change? Do we think that will change?"

Peter

Yeah, another great question. So yeah, climate change is obviously a global phenomenon. The difficult thing about it or one of the reasons why it's so difficult in places like Canada to mount sustained action against it is that the impacts of climate change are not spread evenly across the world. So, a lot of countries, especially in tropical regions are, are facing an outsized impact of climate change, and a lot of places that's already been a transformative thing for the past couple of decades. Of course, when it comes to extreme events, one of the things we're understanding more and more is this climate chaos, how climate change causes more unpredictability in weather, how it makes extreme weather events more common, and worse. Things like monsoons, things like hurricanes, things like droughts, and heat waves, all of these things are stretching out for longer or becoming worse. This is affecting places all across the United States, but has been affecting countries all across the world for a long time, longer than a lot of people probably realize. I guess one of the things we often worry about is these what we call state shifts, that we'll reach a point where we reach a tipping point. One of the big one's people mention a lot is the melting of the permafrost. So, the moment where permafrost can no longer stay permafrost. If that were to change, then all of a sudden, we'd see a lot of impacts across the boreal and sub-Arctic regions where that would change dramatically, all of a sudden, we'd see a lot more impacts there. So yeah, impacts will definitely change, probably just keep getting worse, but might get worse in some places more than others.

Kaylee

Yeah, that's an interesting point. I remember learning about permafrost in like a northern ecology course in undergrad, and being terrified that it had that much power over my future life.



Peter

I love though in a nerding out way, the idea of - I've seen like videos of people searching for fossils in the permafrost in Siberia and elsewhere in the Arctic. And it's so wild to see them literally just dig through like layers of mud and thousands of years as they pull out perfectly preserved items from the last ice age or before. Absolutely crazy place.

Michael

I've seen that twice actually, in the last month, one was in an X-Files episode where they find an alien stuck.

Kaylee

I should have known that that was where that was going. (laughs) I thought it was real life.

Michael

And also in Transformers, they find a buried Transformer in the ice as well. So hopefully, you know, if we keep looking, we'll find something right? Our next question comes from Lisa: "How do conservation biologists work with Indigenous folks in regions they're studying in?"

Peter

Wow that's another terrific question, and one that a lot of conservation biologists are grappling with at the moment. There's a huge reckoning right now across a lot of conservation organizations, for a long time, conservation has operated completely ignoring at best Indigenous communities, and that needs to change. Indigenous communities have been great conservationists, and protectors as stewards of the ecosystems that they live in for thousands of years. Now there's been a huge recognition of that huge acknowledgement, I think across most places, and a lot of steps being taken to correct that, and work together to co-produce protected areas and management with Indigenous communities. That's awesome to see, a lot of great organizations like Wildlife Conservation Society Canada are doing that here. Of course, more broadly across the world it's been a really great push. I think that's terrific question.

Michael

Oh, man. should be nerd out?

Kaylee

I would love to nerd out.

Michael

Alright, if you want to get in on the nerd outs, we post them on our socials @NerdNiteYVR, Twitter, Instagram, Facebook, and even email us as well vancouver@nerdnite.com. We'd love to hear from you. We miss you all. Our first one came in from Lindsey who is nerding out about stromatolites and beginner snorkeling tips. Peter, how's your snorkel game these days in Ottawa?

Peter

Wanting, I guess. (laughs)



Michael

Kaylee, are you a snorkeler?

Kaylee

Yeah, I am a snorkeler. I'm also a scuba diver when I can be, so pretty comfortable in water for the most part.

Michael

Are you doing it here? Or do you wait till you go to other more interesting waters?

Kaylee

Actually, I will have you know that the BC waters are incredibly interesting. And there's some amazing cold-water diving off the Sunshine Coast that I really want to go do.

Michael

I guess what I meant to say? More interesting waters not Kits beach.

Kaylee

Correct. Though I did go for a walk not at Kits because bleh, in another area the other day and I saw a seagull grab a crab out of the water and fly away with it. It was magical. I had mixed feelings. I was like, "Oh, the poor crab but also like, oh, if that seagull doesn't eat that crab it's just going to eat garbage." (laughs)

Michael

Peter, what have you been nerding out about recently?

Peter

I had a meeting yesterday with Dr. Thomas Cohen at the Canadian Museum of Nature, he's a paleontologist. He introduced me to this concept that just blew my mind. Since then, I've been doing some furious Wikipedia researching, and looking at some janky papers on it. It's relatively simple, but it's the idea that in the late Cretaceous period, obviously, temperatures were much warmer, North America was covered in tropical forests. Then in the north was warm, temperate, like probably similar to BC, but the Arctic still went through like four/five months of winter. I just thought it was so wild to imagine. It's one thing to imagine the Arctic being a warm temperate forest, but it's another to imagine it still going through these cycles of like five months of sunlight and five months of darkness. Thinking of how different the ecosystems would have been, and how different organisms would have had to adapt to that it boggled my mind. I've been puzzling on that ever since and what that means.

Michael

It's actually been coming up a lot recently with some exobiologists thinking about planets, that have really strange orbits, some that are tidally locked. Where they would get like 24 hours sunlight, and then on the other side, they don't get any, and they talk about how along the terminator, which is where the line of the light in the dark. (laughs)



Kaylee

Thank you for defining because I had one definition in my head for that.

Michael

Along that line would be where the life would probably congregate, because we'd sort of be able to crossover get a little bit of both. So, it is really interesting.

Kaylee

Well, Michael, it sounds like you're already sort of nerding out about that. Is that your nerd out for today? Or what do you got?

Michael

Well, funnily enough, I have been nerding out about Star Trek, there is a storyline in Star Trek: Nemesis, which is one of the newer movies that has a tidally locked planet. There was a species that developed on the dark side, and they never saw sunlight, and they're very evil looking. But the main thing that I've been nerding a lot about with Star Trek is that I realized that I actually haven't seen a lot of the original episodes. So, I've seen a lot of the main ones. So, there's a couple in the original series that are kind of seminal that you have to watch. They're just really good storylines, really good writing, really good original sci-fi ideas that's rooted in the heart of what Gene Roddenberry the creator of Star Trek really wanted the show to be about. There's also these other really, really strange episodes that now I realize why they're kind of lost to time because this show came out in the 60s, and there's a lot of misogyny. There's a lot of ideas that at the time, they probably thought that they were being progressive. I've always said one of my favorites and maybe even if I was to say the best character in fiction, is Spock. When I was a kid, I always looked to Spock as being what you want to like strive towards, stoic, the antithesis of Kirk who's sort of brash, and arrogant. Even though Kirk tends to get lots of success with the female species, that's not what you want to strive for. So, what's interesting is Julia Galef, who's a host of a podcast called [Rationally Speaking](#), is also really into Spock. She's even the co-founder of this Center for Applied Rationality, and Julia did a study recently where she went back through all of the scripts in Star Trek, and analyzed every time Spock used the words "probability", "chance" "definitely", "probably", because that was something that was kind of rooted in who Spock was. He was very confident about certain things, he used his rational mind. But what she found was that he actually has an awful track record at all of those things, as written into the show. She describes it when he describes something as impossible that it actually happened 83% of the time. Quite often, if he said something that he was 100% certain that something was going to happen, it did not happen 100% of the time, but that's the way they wrote the character to be. So, for me, this creates a lot of like anxiety, because this is the character that I was striving to be. So, in a book that she wrote called the Scout Mindset, she talks more about this, and she talks about confidence. She kind of breaks it down into two sets. One is epistemic confidence, and that's how much certainty you have in your beliefs. So, let's say Peter, I am 80% certain that your findings are correct. That would be epistemic beliefs. The other is social confidence, and that's, do you speak in a confident tone of voice? Do you go out and take charge and make things happen? Are you comfortable speaking in front of groups and putting your ideas out there? And she went and did real life studies and showed that that actually helps you more. Many of the people that are successful in life now have that more social confidence as opposed to the more epistemetic confidence. So, I guess my nerd out is I'm now in this grey zone because I don't know



if Spock who I've been trying to strive towards my whole life is the right path, if I've been led astray, or maybe slowly over time I've accumulated some of the social confidence. I don't know I'm a bit confused right now.

Kaylee

Well who would the socially confident character be, Riker?

Michael

Yeah, absolutely. Yeah. Kirk would be socially confident. He is not even a good captain, but he inspires people to follow him because he seems like he knows what he's doing.

Kaylee

Thoroughly mediocre, but running the starship?

Michael

Kaylee have you been having any existential crises recently? What have you been nerding out about?

Kaylee

So, I've got a couple nerd outs. They're not related to existential crises. Thankfully, right now. I've got two, they're very unrelated. The second one's my real nerd out. I got to plug the first one. Today, I was awarded a BioOne Ambassador Award, which is pretty exciting.

Michael

Woo! Nice.

Kaylee

So, the BioOne Ambassador Award information just came out today. It's by BioOne Journals. The reason I'm excited about it is because the award actually went towards science communication. So, you were nominated by a journal in which you had published that year if you were an early career researcher. So, within five years of a PhD, or currently in grad school. Then you had to write 750 words about how your research changes the world. It's called [Location, Location, Location, Rats, Real Estate and Public Health](#). It's now up in the BioOne website. I think I was just excited about it, because it was an interesting science communication challenge. I really appreciated that BioOne was awarding an effort to make the science interesting to a general audience. So, there were five awardees actually past guest, Dr. David Shiffman, it turns out is another one of the awardees. I haven't read his piece yet, and there's three other pieces. I'm very excited to read all of them, they're pretty in the biology realm. You can check that out if you're interested. The thing I'm really excited about that I just realized is coming the other day is related to basketball. So okay, I don't know anything about basketball. That's not anything against basketball. I know nothing about sports. They involve balls, people pass them, maybe it's a puck, maybe it's a stone. I don't know, sometimes you're on a horse, whatever. There are sports that exist, with a beer I'm into it. Related to basketball, and Peter, I know from your bio that you're into basketball, Space Jam is coming out. Space Jam number 2. And Space Jam 1 is one of my favorite movies of all time, it came out in 1996. I was 10 years old, which was Michael Jordan meeting the Looney Tunes, and going on an adventure around basketball against the Monstars. The soundtrack



literally was the soundtrack of my life for about five years. So, I just realized that there's a new soundtrack coming out for the new Space Jam 2. I don't know if they're bringing back Quad City DJs to do the Space Jam song, but I hope that they are. I am beyond excited for it.

Peter

I'm going to switch my nerd out, I'm also excited for Space Jam.

Michael

I've never seen Space Jam and I think I need to watch it ASAP. What year did it come out?

Kaylee

1996. So you're eight years older than me. It's fair that maybe at 18 you weren't into the Looney Tunes/Michael Jordan thing. I don't really forgive you for it because it is one of the greatest movies of our time, but you should see it. Have you seen Space Jam Peter?

Peter

Oh my god. Yes. I also don't forgive you Michael, I think it's a cult classic. (laughs)

Michael

Well, I'm going to go find it right now so I can stop having people be mad at me. Anyway. Peter, thank you so much for joining us on Nerdin' About. If people want to learn more about you and your conservation biology work and your science communication work. Where can people go?

Peter

Yeah, you can check out my website www.petersoroye.com. Find me on twitter [@PeterSoroye](https://twitter.com/PeterSoroye), Instagram [@PuffyPete](https://www.instagram.com/PuffyPete). I try to share what's going on there and all those places. So yeah, check it out. And thank you so much for having me. It was a blast being on here.

Kaylee

This is a lot of fun. Everybody who's listening you should definitely go follow Peter. Peter is amazing to follow especially on Twitter, but also great on Instagram for great pictures of birbs. So, thank you again, for hanging out with us. This was a lot of fun for everyone listening. If you want to hear more from us, you can follow us on our socials [@NerdNiteYVR](https://twitter.com/NerdNiteYVR) on Twitter, Instagram and Facebook. We'll be back in a couple of weeks but until we meet again, explore your backyard and go find some FFBS

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