

Getting Curious with Jonathan Van Ness & Dr. Patty Kaishian

JVN [00:00:00] Welcome to Getting Curious. I'm Jonathan Van Ness and every week we get to do a gorgeous little trip together where we sit down for a gorgeous conversation with a brilliant expert to learn all about something that makes me curious. On today's episode, I'm joined by Dr. Patty Kaishian, where I ask her: Are mushrooms truly magic? Welcome to Getting Curious. This is Jonathan Van Ness. I'm so excited for this week's episode because, honey, we are going to places that we have never gone before on Getting Curious. Welcome to the show, Dr. Patty Kaishian, who is a mycologist and forest pathologist. I've never even heard of that before. She's currently a Visiting Assistant Professor of biology at Bard College. How are you, Patty?

PATTY KAISHIAN [00:00:47] I'm so happy to be here, so thank you for having me on your super cool podcast.

JVN [00:00:51] So here's the thing. I have always not liked mushrooms, in terms of taste. They really are a part of, like, what I loathe, like, pickles, olives, mushrooms. I've talked about it on the show before. And even with, like, shrooms of the magical variety, if you know what I mean, those, like, make me gag. But then, we stumbled upon, on team Getting Curious, your research and it turns out, there's some stuff about mushrooms that maybe we're obsessed with, which begs the question, "Wait, do I actually love mushrooms?" Why do people have such a strong reaction to mushrooms?

PATTY KAISHIAN [00:01:30] So I guess when it comes to taste, that's all very personal. I don't have any big theories for, for that other than, you know, when you're a kid, you may have had some imprinting happen, maybe some weird, partly spoiled food that you ate, like an olive or a pickle or a mushroom. And you just, "blech," your body remembers the experience of eating something that had gone slightly bad, maybe. Also, maybe you know this, but when you're a kid, your whole, like, mouth is covered in taste buds, not just your tongue. So kids actually taste things, like, way more than, like, adults do. That's why kids are so sensitive to, to food because they actually taste it more intensely. That's also why you should be really patient with kids. If they don't like something, it's because they're having a very different experience than you're probably having. So maybe you were forced to eat it and you don't even remember the interaction, but your body remembers.

JVN [00:02:21] That is fascinating, the whole amount of tastebud thing.

PATTY KAISHIAN [00:02:25] Yeah. Yeah. And you start to lose them as you get older.

JVN [00:02:28] But the point is, Patty, is I don't want to be this person that, like, doesn't appreciate mushrooms. Like, I need to and want to, like, change my relationship with fungi. Is it fun-gee or fun-guy?

PATTY KAISHIAN [00:02:40] So that's a common question I get. All are acceptable, actually. You can say fun-guy, fun-ji, or fun-gee. I've kind of landed on fun-ji. It just seems to roll off my tongue the best. And I kind of, like, have committed to it. It seems a little more British to say, fun-gee or fun-gi, but all are acceptable. So whatever, you know, and you can bounce around, you don't have to commit.

JVN [00:03:02] So, like, what are fungi?

PATTY KAISHIAN [00:03:05] Okay, so it's a great question. They are their own kingdom of life. So just like plants and animals have their own kingdom, fungi have their own kingdom, and they are essentially actually more closely related to animals than they are to plants. We have more DNA in common with fungi than fungi have with a tree.

JVN [00:03:27] Wow.

PATTY KAISHIAN [00:03:28] Yeah.

JVN [00:03:28] How many species of fungi are there?

PATTY KAISHIAN [00:03:31] Millions. Millions of species. There's actually, I think the estimate, I wrote it down just because it does change, but it's around 2 to 3 million species.

JVN [00:03:39] So, like, what sets fungi apart from, like, plants and, like, us—like, animals?

PATTY KAISHIAN [00:03:46] There's a few differences between fungi and plants that are, like, most obvious. And one is that unlike plants, fungi don't perform photosynthesis. They're not autotrophs, meaning they don't generate their own energy the way, like, a plant, you know, uses the sun to generate sugar. Instead, they're more like animals in that they, they are heterotrophs, meaning they eat, essentially. So they produce enzymes and they basically secrete these enzymes that then chemically digest food just the way we, we make enzymes that digest food as well. So they have to rely on other organisms as sustenance like animals do. They also contain cell walls that are made of this material called chitin. So there's a lot of, like, chemical technicalities that sort of separate them from other life forms.

JVN [00:04:35] Ah! I can't even stand how much I'm into that. Okay, wait. So I was reading about, like, macro and micro fungi, like, what is that and what are the differences?

PATTY KAISHIAN [00:04:47] So it's a spectrum. You know, it's kind of actually not super technical. I would say that micro fungi are basically things that are just really hard to see with your naked eye. So you would rely on microscopes to look for them. They can be something that's single cellular, some fungi, like yeast cells are fungi.

JVN [00:05:04] Like fucking ringworm!

PATTY KAISHIAN [00:05:06] Unfortunately, there are some diseases and pathogens that are fungal. And actually the reason why those are really hard to treat is because the fungi are so similar to our cells. So unlike when you have a bacterial infection, you can take an antibiotic. And the way the antibiotic functions is very much tailored to that bacteria, which is distinct enough from our own bodies that it can have, like, a pretty targeted effect without a ton of, like, side effects. But treating fungal infections are much more difficult because our cells are so similar. We share, like, a large percentage of our DNA with fungi. So that when you take an antifungal, there's oftentimes more systemic side effects because it's, like, not as targeted because our cells are so similar.

JVN [00:05:55] So basically the distinction between, like, micro and macro fungi is, like, whether or not you can see it with your naked eye.

PATTY KAISHIAN [00:06:00] Yeah, basically. What's interesting though is, like, when people usually are talking about macro fungi, often they're talking about, like, the quintessential mushroom. So all mushrooms are fungi, but not all fungi form mushrooms.

JVN [00:06:13] Ah!

PATTY KAISHIAN [00:06:15] Yeah! Yeah. So, so the mushroom is the fruiting body of a fungus. Not all mushrooms will form this fruiting body, basically its sexual reproductive organ. And that's where the spores are produced, and fungi will have, like, maybe a more microscopic component to it as well, which exists underground or in the substrate, and that's called the mycelium. So the mycelium is like a network of fungal cells that extends like through your soil or through a fallen tree or through a living tree, even, you know, any type of substrate the mushroom is growing in and that can be fairly microscopic, but then connected to a macro fruiting body.

JVN [00:06:55] So is the mycelium, like, their roots, kind of?

PATTY KAISHIAN [00:06:58] I think it can be somewhat helpful to think of it like a root system, but it's actually more complex than a root system because it actually also, like, forages, it can, like, exist in this mycelial state for many years, years at a time, and only occasionally form a mushroom. Which is different from, like, a tree that has its root system and the, the visible structure of the tree aboveground is, like, constant, whereas the mushroom can, like, slip underground for, like, 2 to 7 years and then, like, reemerge somewhere else, and it's been traveling in this mycelial form.

JVN [00:07:31] Wait, wait, wait, now, let me get this straight. So, like, the mushroom, we see it, it comes up above ground or whatever, like, it's up there. So, like, the mushroom itself, like, reabsorbs under the ground and travels, like, as a little mushroom under the ground? And it's,

like, moving through the mycelium, like, that same mushroom, and then it pops up somewhere else?

PATTY KAISHIAN [00:07:47] So not the same mushroom. Once they form their mushroom, they disperse their spores and then they can either, they'll probably break down, decompose, maybe be eaten by animals or by people or something. But the individual, like, the genetic individual, can persist and continue to move and travel and find another, like, habitat to live in. It also, like, will go out looking for mating partners and have sex and then, like, maybe shoot up another mushroom when it's ready, depending on a lot of different factors.

JVN [00:08:18] Okay, I need to come back to fungi sex in a minute. I'm going to write that down. Fungi. Sex. Okay, but what are some, like, common examples of fungi?

PATTY KAISHIAN [00:08:31] So in the grocery store, you'll probably find, like, Portobello, the Latin name for that is *Agaricus bisporus*. You will find the same species in a few different forms. So, like, the Baby Bellas or button mushrooms and Portobello, those are all actually the same species of mushrooms. They're just, like, different varieties of it. So those are the ones that most people know about, and that might be the one that you've had that you don't-, you really dislike. That happens to be one of the few mushrooms that we've been able to cultivate very regularly, in a standardized, like, large-scale way. But there's a lot of other mushrooms that are edible and delicious or medicinal or just, you know, doing really important things in the forest. So right now, here in New York, it's morel season and morels are those mushrooms that you can usually get, sometimes you can get them at farmer's markets or sometimes at, like, specialty stores. And they have, like, kind of, like, we would call, like, a cerebriform, like, brain-like shaped cap thing. And those are kind of cool because they're really fleeting and ephemeral. Usually they grow only for, like, 2 to 3 weeks in a given location at a time each year. It's always, like, the same kind of small window of time in a season like the, you know, late April and early May, depending on where you live. So those ones are pretty, like, famous.

There's also, you know, the *Amanita muscaria*. I think a lot of people, when they think about mushrooms, think about the red mushroom with the white spots that's all over, like, you know, it's an iconic mushroom. *Amanita muscaria* is the Latin name, but it has a ton of different common names that are really, like, particular to different cultures. But it's, you know, that's that's one that people think of a lot that one forms mycorrhizal partnerships with trees and actually forms these complex webs of interactions where it binds with trees and kind of creates what we call a mutualism or a partnership with a tree where the tree provides the fungus carbon from photosynthesis and the fungus in return gives the tree nitrogen, phosphorus, sometimes water and other other materials. And they have this, like, complex partnership that they rely on.

JVN [00:10:45] So mycology, because at first I was, like, "What the hell is mycology?" When I was, like, when we found you. So mycology is, like, a mycologist is someone who studies mushrooms, right?

PATTY KAISHIAN [00:10:54] Yeah. Or fungi broadly, including mushrooms.

JVN [00:10:57] Oh yeah, mushrooms, who says that! Because we already talked about fungi.

PATTY KAISHIAN [00:11:00] Yeah.

JVN [00:11:01] Wait, so all mushrooms are fungi, but not all fungi make mushrooms.

PATTY KAISHIAN [00:11:06] Exactly. So a fungus could be a single cellular thing that you could, you know, in living in the soil. Or it could be a complex web of interactions underground or it could be, you know, like, a button mushroom in the grocery store. All of those things are, are fungal.

JVN [00:11:23] And so then what do they do in the world, like, fungi? Why are they so important?

PATTY KAISHIAN [00:11:28] Basically everything that we can see and interact with has some sort of fungal dimension with it. I know that sounds crazy, but I'm going to explain that more. So if you go back in, like, deep time, like, deep geological time before life basically evolved in the ocean, when life began to colonize land, so hundreds of millions of years ago, it's believed that fungi and bacteria were the first organisms to establish themselves on land. And it was through fungi and bacteria enabling other organisms to then transition to land as well. And it was, like, specifically with plants, fungi formed those partnerships that I was describing with plants. And that's what enabled plants to transition from living only aquatically into these terrestrial environments. So they facilitated the transition of life from the ocean to land, and then everything from there was sort of bound up with, like, sort of some sort of fungal partnership and this cascade of, like, evolutionary events that followed from the transition of life to land centrally involved, like, fungi facilitating that and, you know, enabling resource extraction from the environment to then, you know, share with plants. And then plants could sort of continue to evolve and become larger and more complex, which then could host, like, more animals. And then there was just these, like, sort of, like, cascades of evolutionary events that enabled, like, the landscapes that we have here. So 90% of terrestrial plants form, like, critical fungal partnerships, and they're reliant on those fungal partnerships for their own survival. So that can be externally, like connecting their root systems to fungi in the soil. But also fungi live *in* the tissues of pretty much all multicellular organisms. So animals, trees, we actually in our bodies have more bacterial and fungal cells and we do human cells. We are—

JVN [00:13:28] No!

PATTY KAISHIAN [00:13:29] Yes! We're like a consortium, we're like a bunch of fungi and bacteria in a trench coat.

JVN [00:13:35] Oh, my God!

PATTY KAISHIAN [00:13:36] Yeah, I know.

JVN [00:13:37] That's a lot to wrap our heads around! So basically, like, fungus, animals, and plants are almost like Destiny's Child in the sense that, like, those are, like, the three major players.

PATTY KAISHIAN [00:13:54] Bacteria as well!

JVN [00:13:57] Oh yeah, and bacteria.

PATTY KAISHIAN [00:13:58] Mm hmm. It's hard to say that one is, like, more important than the other but fungi and bacteria are much more, like, ancient than a lot of, like, current lineages of plants or animals. But what's, what is for sure true is that fungi have been at the bottom of our, like, social hierarchy. And that's I think a mistake and a misunderstanding of, like, their critical functions all around us.

JVN [00:14:23] I'm into that story, like, we got to, like, we are underestimating fungus! And in Latto's words, who's this, like, fierce ass, like, rapper who I'm, like, newly obsessed with. She says, "Don't ever, ever treat me like I'm average." And so we are done treating fungus like it's fucking average, okay?!

PATTY KAISHIAN [00:14:40] Yeah, yeah.

JVN [00:14:41] So we've talked about, like, on Getting Curious we've talked about queer ecology with some of our guests, like Dr. Maydianne Andrade or, like, Dr. Jessica Hernandez. We're obsessed with them. Will you just remind us of what queer ecology is?

PATTY KAISHIAN [00:14:53] Yes. Let me maybe first say what queer theory is.

JVN [00:14:57] Yes!

PATTY KAISHIAN [00:14:58] Yeah. So it's basically a school of thought that developed from feminist theory and gay and lesbian studies. And it's this idea that we should interrogate, like, what gets categorized as "normal" and what gets categorized as, like, "deviant" or somehow "not normal," "abnormal." How did those definitions come to be or and how are they applied to the things around us and how can we deconstruct those categories? And it at first emerged, as, you know, to discuss specifically sexuality and orientation and gender. But queer theory has also been employed to sort of interrogate structures that relate to sexuality and orientation and all of that, but, like, are not necessarily just those things. So it's not just about talking about, like, sex, but it also involves like basically anything that's been, like, created into a hierarchy and that is affected by, like, systems of power and control and, like "normal," like

normalization. So that could be also, like, ability, you know, the ability of a person; race; nationality; and other, other categories of identity that kind of interact with systems of power. And, like, particularly “Western” sort of renderings of, like, what is “normal” and what is “not normal.” And usually “not normal” is not just like, “Okay, it's not normal, but, like, it's fine.” It's usually, like, a very negative categorization of, like, “perverse” or, you know, just “dysfunctional” and “diseased,” “deadly.” You know, all sorts of things.

JVN [00:16:32] It's the same reason that people are, like, calling, like, queer people, like, groomers and pedophiles right now. It's like, “Why did that happen?” Some things are, like, you know, fucked up no matter how you put it, like pedophilia, like, which, you know, we could all agree on that. But then there's this, like, concerted effort by the right to say that like, “all queer people are groomers or all queer people are, like, engaging in this,” like, thing that we can all agree is, like, fucked up and should not be done. But it's, like, how is it that just, like, queer life has been penalized? How is it that just, like, to live as, like, a queer person or a gender diverse person or, you know, non-binary, trans or whatever, like, why are these things being vilified? And also, like, how do these things intersect in, like, so many different areas, whether it's education, law enforcement, laws themselves? Like, just like, yeah, it's like the study of, like, how queerness affects everything!

PATTY KAISHIAN [00:17:23] Everything, yeah, everything. And yeah, the grooming stuff has been really hard to listen to. It's very, it's very scary actually, because, of course, it's a personal reality for me, as for you, that, you know, these things are not just abstractions, they're tied to, you know, real violence and real pain and suffering when you kind of map these negative qualities onto a group.

JVN [00:17:44] So, yeah, it's so fucked up. But anyway, back to mushrooms and mycology.

PATTY KAISHIAN [00:17:47] I could imagine the reaction of people being, like, “Okay, we have real problems here in the world,” with, you know, like, with what we exactly what we're talking about, like, child abuse and racism and, you know, mass incarceration and all these things, like, “Why am I going to go through this academic exercise of, like, thinking about a fungus in it's, like, queer capacities?” But what I'm trying to use actually is mycology and the study of fungi as sort of a vessel for exploring the logics that are, like, operating around us all of the time and are actually responsible for things as serious as climate change and habitat destruction and, you know, colonialism and, you know, and the genocide of Indigenous peoples. And it's actually that these things are quite linked.

So queer ecology is sort of this, like, an extension of queer theory where we explore the ways in which institutions and science have sort of normalized these heteronormativity and systems of power in biological study and scientific spaces. So how people sort of have formed questions around, you know, what they choose to study, how they assign value in their subjects, what questions they—you know, who first of all, who gets to ask the questions, which has historically been, you know, straight white men of a particular class—and then how that

information is interpreted and relayed. And basically all along the scientific method, there are ways in which people's own experiences can, like, creep in and biases that exist around us in culture can sort of end up in the scientific method, even though people, you know, in science like to think that we're always just doing totally objective stuff that's not political, that has no bearing on, you know, like, racism or things like that.

JVN [00:19:26] Well, one way that we can see that, like, science is often used to justify, like, transphobia or misogyny is, like, you know, especially when we see, like, with transmisogyny and just transphobia in general, it's, like, you know, "It's biology. You can't fight it," like, you know, "There's men and women," where they're completely, like, write off the existence of intersex people, which, you know, is, like, at least 2% of the population. If there's 7 billion people to prosecute to the low, yeah, it's like it's millions and millions of people and 2% is like a low. It's like a low estimation. So it's like there's probably more. But, like, but like what, what other ways can—, I hate that I was just talking about like intersex people and in the next breath I'm going to say fungus. But even that I have to interrogate because why is it that I think the fungus is, like, a nasty, dirty thing or like something that I wouldn't want to be mentioned in? You know what I mean? It's like, I think about "My Best Friend's Wedding," when that hot ass Dermot Mulroney or whatever, when Julia Roberts is, like, you know, apologizing at the train station at the end and she's, like, "I'm the pond scum." And he's, like, "No, you're, like, you're the fungus that's the pond scum that eats the whatever." And that's even, like, queer mycology, like, interrogating, like why we've assumed all these, like, negative connotations around, like, the way that we talk about fungus. But one thing that I was—oh, wait, I'm not going to answer the question because I already know because I got to read it, about your work. But for the folks that don't, and I think you'll know where I'm leading you here, how can fungi challenge our ideas of sex, gender, and sexuality?

PATTY KAISHIAN [00:20:55] Okay. So, there are many fungi that have not one, not two, not three different mating types, but tens of thousands of sexes or mating types. We tend to use mating type and sex interchangeably. But there's this one fungus called the common split gill, and it actually has 23,000 sexes. So, just, boom, the binary of, like, male-female just completely out the window.

JVN [00:21:20] So they're, wait, how does that work? How do they have that many sexes? That one kind!

PATTY KAISHIAN [00:21:23] So it's not necessarily invisible on a macroscopic way. So it's not like there's, like, 23,000 different, like, body forms like we would maybe expect in an animal or something. But it's 23,000 or more—and, you know, some have less, but it can be, as far as we know right now, with the most we've seen is 23,000 in this one type of fungus and it can basically have, like, there different locations on the in the DNA that are responsible for like mating and pairing. And there's just, like, hundreds of different combinations in any given fungus and then they can, like, match up with, you know, hundreds of different combinations here. And when you multiply them, you get up to 23,000 different sexes. And you know,

actually, I couldn't even really summarize briefly, like, all of the different ways in which fungi have sex or perform, you know, both mechanistically, but also in the types of sexual bodies they have—

JVN [00:22:17] Well, we're gonna have to make time. Because one thing I'm very curious about is, like, sex. How do funguses get on? Like, are we rubbing, are we kissing? Are our, are our mycelium whispering sweet nothings to the other mycelium, like, what is happening?

PATTY KAISHIAN [00:22:35] Okay. So, I mean, yeah, there's, there's so many different ways it happens in the different lineages of fungi. So, but in a lot of them, what we know is that they have pheromones and they find each other through, like, chemical sensing. And then sometimes they, like, not only do they fuse for the exchange of, like, genetic material, but they actually sometimes just fuse bodies and then just become one body together. They, like, just, are, like, "Okay, we're one now!"

JVN [00:23:02] I feel like I learned about, like, yeast at some point in, like, because like doesn't yeast just like they reproduce by just, like, spudding.

PATTY KAISHIAN [00:23:09] Exactly, a lot of fungi are asexual. So yeah, we got the whole spectrum, the whole, LGBTQIA+ spectrum present in this.

JVN [00:23:18] So some mushrooms just spud, they just break in two.

PATTY KAISHIAN [00:23:21] Yep. And then just really quick, kingdom, phylum, class, order, family, genus, species. So phylum means it's a really big group, right. It contains many, many whole lineages of things. And there's this whole phylum, thousands and thousands of species of them, and we only know them to be asexual. And then some fungi, like, switch back and forth. Like, sometimes they want to have sex, sometimes they just want to reproduce asexually, and it just sort of, like, whatever suits them.

JVN [00:23:47] So what does it look like when two get together?

PATTY KAISHIAN [00:23:50] Oftentimes it's in the mycelial form. So mycelium is this, like, this cobwebby structure, and often it's white, but it can be, like, yellow or brown colors as well. But very often white, like, if you go into the woods and you were to, like, roll over a log, you might see, like, cobwebby structure. I don't know if you've seen that before?

JVN [00:24:08] Yes!

PATTY KAISHIAN [00:24:09] So that's mycelium and that's, so that's a fungus. And those mycelium will sometimes, like, the mycelia of different genetic individuals will, like, kind of smell each other out and then find each other and, like, merge their cells and then, like, kind of envelop each other and trends transfer their genetic the nuc-, the nuclei, which is the little

part of the cell that contains the genetic code. The point of reproduction, right, is genetic recombination and that creates diversity. So diversity is helpful to organisms because it helps them adapt and evolve. So the more diverse a population is, the more resilient the population is to stress, to, like, disease or anything. So when you have a bigger population with more diversity, it's more likely that the species can continue on and survive. But the tradeoff of sexual reproduction is that, you know, it can be, you have to find a mate that works for you. You might have to maybe it sometimes takes a lot of energy to do that. So sometimes asexuality is common because even though you're not really creating diversity because you're just replicating yourself, you, say, it's really efficient and you can do it very quickly without much energy. So these different strategies kind of suit different fungi at different times. Or one fungus might choose to do the asexual stuff sometimes and then sometimes have sex and kind of with another organism and go back and forth.

JVN [00:25:38] So if they have sex, though, do they, is it always two becoming one permanently or two you ever, like, come together? Or is it just or. But is it, is it that the two mushrooms never come together? And it's just their, like...

PATTY KAISHIAN [00:25:51] Yeah, it's just their little, little, like, tendril-y cells.

JVN [00:25:55] And then will little mushrooms come up as a result of the little tendril-y cells coming together or no?

PATTY KAISHIAN [00:26:00] Yeah, yeah, yeah. So, I mean, not, not necessarily immediately. There's a lot of variation in that, but essentially, yes, it could produce a new genetic, a genetic individual that's, like, different from its parents, right? Just like when a child is born from a person. And then they could, that fungus, then will when it's ready, like whatever the conditions are that make it ready, whether it's like the the temperature or the amount of rainfall or, you know, different environmental factors that might stimulate mushroom production when that new being is ready, it'll make, it can make a mushroom that technically is like genetically distinct from, you know, any, the, the mushrooms that were made from the parents. But they might have to our naked eye look, they would probably look, you know, virtually identical.

JVN [00:26:46] And do we find fungi in, like, every climate, like, is, is there fungi in like desert rainforests like Antarctica?

PATTY KAISHIAN [00:26:55] Yes.

JVN [00:26:56] There's, like, Antarctic fungi, like, seriously?

PATTY KAISHIAN [00:26:58] Those would probably be, like, the single cellular stuff. Not so much, like, mushrooms. But one, so I don't know, have you heard of lichens before?

JVN [00:27:07] Yeah.

PATTY KAISHIAN [00:27:08] Okay. So lichens are a fungus *and* an algae that they're in symbiosis with. So yeah, most of the tissue you would see is, like, the fungal tissue. But what they have inside of them are these little algal partners that they've harnessed and they use the algae photosynthesize and they share that sugar that they're making from photosynthesis with the fungus. And all of all, like, I think that there's a crazy statistic. It's something like 8% of the landmass on earth is covered in lichen, actually, and they're extremely spread out. They can be in the like the mountain, like the top of a mountain or like the desert tropical areas, the Arctic. So those are really, like, tolerant of extreme conditions. So but they, because they have that partnership, they're able to live in places that a lot of other fungi can't.

JVN [00:28:02] That is so cool! Okay. So then what's, like, is there a connection between homophobia and, like, mycophobia?

PATTY KAISHIAN [00:28:15] I would say so. So, you know, again, it can sound a little abstract at first, but what I've noticed is that as I as a mycologist, so I started studying fungi like ten, maybe 12 years ago. And I, you know, I was drawn to them in large part because I was really mystified by them. I was like, felt this, like, kinship with them. And I was like transfixed by their, their sort of unusual form and their and they were just really fascinating to me because they didn't— they defied expectation. And as I began studying them, I realized that it was like, all right, like whatever. I wouldn't even tell people that I studied them. I would get all manner of responses, like, so I'm like outward, like, disgust, even. I have memory of telling people, like, "I study mushrooms," and they're like, "Ewww," you know, they make a face, and they cringe. And then, you know, some people, you know, would maybe just ask about, you know, make jokes about psychedelics or, you know, the I don't, you know, there was all sorts of kind of responses and none of which were really people being comfortable or, like, excited.

I started to realize also that these perceptions of mushrooms themselves were extremely common, like, particularly in the United States, where, it's where I've grown up, that people are just weren't—, like, they were very afraid of mushrooms. They didn't want to touch them. They assumed they were poisonous, they assumed that they were deadly and going to hurt them. And they didn't— even, even when I was studying them, they sometimes didn't trust me if I told them like "I, you know, I'm pretty good at it, like studying them now. And this is I'm telling you that this is edible," and they would be, like, very afraid. And then I started to also realize that even in scientific spaces, they weren't taken very seriously. They were always, like, if they were considered at all, they were, like, the sidekick to other organisms and or they were just studied as pathogens. So, like, a lot of the departments and universities that study fungi will house the, the study of mycology under the umbrella of, like, plant pathology or, or forest pathology, which is technically what my degree is in. So it's, like, it's assuming that the fungus that you're going to interact with is going to harm you or something else. And that's, like, the lens through which they were approached as, like, "They're harmful and, like, we're seeking to eradicate them."

You know, now that we're in this context of climate change and, and mass extinctions, fungi are, like, materially really not represented in protective efforts. But they are, we do know that they're affected negatively, like everything else. So these perceptions have, like, really material consequences. But also, like, going back to what you said a few moments ago about, like, you know, you didn't want to follow up, you know, describing a group of people with then turning to the word "fungus," like, the idea that we could create such a disjointed relationship with, you know, the non-human world is an artifact of colonialism and, like, Western imperialism. Like, the fact that we have this massive rift between us and the organisms that we've co-evolved with for billions of years, we've been on this billion year long journey with the fact that we could, like, look down upon them is a function of this idea that we can like it's a way of creating distance so we can then exploit them and extract from them. And that's the logic that operates also within, like, human hierarchies as well. Like, "If we racialize this group, then we can take advantage of their labor without guilt," or "If we describe women as being irrational and stupid and, you know, only good for particular things then we can be comfortable with dominating them."

And with queerness, it's, like, we've felt comfortable shunning, you know, as a society, like, shunning people who are queer and describing them as "perverse" or "dysfunctional" or, you know, "degenerate" in some way because they're embodying a reality that is threatening to sort of institutional modes of control and the functions of power in, like, the context of our society, which is, like, nuclear families, a particular brand of Christianity, and homophobia is very disruptive to that. So I think that, you know, again, it certainly can be a bit academic and abstract. But I think what's going on here is something very tangible and very material, which is this idea that we are in this climate crisis now because we've been so comfortable just plundering the earth and the first step in doing that is to distance ourselves as people from all the other animals and fungi and plants and bacteria around us.

JVN [00:32:57] I think that's incredibly wise and so observant and beautiful. I wrote down, as you were saying that, that in yoga, one thing that we would say is that, like, "You learn to live your practice on the mat, like, off the mat." And there's a lot of reflections of your, like, of your relationship with yourself on the mat that you'll see, like, out in the world. Like, if you're really going to give up on the mat or if you're, like, pushing through an injury on the mat to a point that's, like, hurting yourself. Or if you're, like, you know, it's, like, you'll notice that you'll have those tendencies, like in completely other areas. And then that also is making me think of, like, "How you do something is how you do like anything." So connections are like, you know, I can see how you would think like, you know, it is esoteric and I wouldn't like how people would, how you would be, like, "Oh, people might think that." But it is so true that especially we, we have to interrogate, like, who, who told us that, how did we learn this stuff that's—, it's incredibly interesting. Now to kind of go back to something else you're saying how, like, people would be, like, "Oh, like if you're, like, "This mushroom is safe to eat," and they're, like, "Oh, I don't know," because I feel like I probably wouldn't eat it because I'm not going to

like the taste, but not that I wouldn't trust, but what is the ratio of, like, harmful mushrooms to, like, non-harmful ones like out in the world? Like, cause some can, like, fuck you up, right?

PATTY KAISHIAN [00:34:25] Oh definitely!

JVN [00:34:25] Or are we, like, way overblown, afraid of mushrooms than we should be?

PATTY KAISHIAN [00:34:28] I would say that we are completely the—, our fear is overblown because there are, there are absolutely mushrooms that you should not eat. You should be 100% sure of anything that you find, like, of its identity before putting it in your mouth. I want to be on the record saying that, but there are actually more poisonous plants than there are poisonous fungi. So the fear of them, like, the odds that you would encounter the extremely deadly one, is actually not super high. I mean, they're around, right? They are, but, like, if you pulled 100 mushrooms from the forest, maybe only one or two could actually really hurt you. And all mushrooms are safe to touch, like you can, you can handle, pick, pick, even, like, put right, you know, right up to your face, like, completely safe to do that. Which is not true for plants, right? You know, we have poison ivy, poison oak, poison sumac, all sorts of poisonous plants that you can't even touch, right? Yet we don't map that quality of, like, "dangerous" and "diseased" onto all plants. We have, like, we're comfortable having this, like, you know, dynamic, nuanced relationship with plants where we have good ones and then one we should stay away from.

And that's what, you know, it'd be good to have with mushrooms, too, like, why do we need to just deem all of them just bad and scary? You also can have a positive relationship with mushrooms without eating them. You know, I think that there's been a surge of interest in mushrooms in the last two years, which has been really interesting to see as a mycologist. And I'm very excited about it. And, you know, I've recently been, you know, like, a lot of mycologist have been more recently finding that our knowledge is more desirable. But I think a lot of the interest currently is, like, very focused on people wanting to, like, figure out what they can eat and forage and which is totally fine. But I think I kind of encourage people to go beyond that and, like, not just like, you know, ask what, like, fungus can, like what can they put in their mouth? But, like, how can I, like, have a relationship or an ethics of care with, with these species? Like, how can I protect them, learn about them, speak lovingly about them, and sort of just, like, curate this, like, appreciation that doesn't have to be, like, this transaction is, like, "Okay, I'm going to take this and put it in my mouth," right?

JVN [00:36:39] Ask not what mushrooms can do for me, but what I can do for mushrooms, honey!

PATTY KAISHIAN [00:36:45] Yeah, exactly! I literally said that to my friend the other day. I was, like, "JFK, baby."

JVN [00:36:51] Yes, I love that. That's so great because ultimately, like, it kind of gives me, like, that water study that I'm always talking about. It's, like, because fungi must have some water in it and then we have water in it. So we're talking shit about fungi, then it knows we're talking shit about it, doesn't feel good. And we got to speak lovingly about everyone around us. Now going back to what you were saying before. Sorry. I'm zigzagging everywhere—

PATTY KAISHIAN [00:37:11] No, I'm tracking!

JVN [00:37:11] It's like how you do anything. It's how you do everything. And so that was really resonating when you were saying it's like. Really, I feel like what I heard you say is that, like, by othering stuff, it makes us, you know, more likely or feel better about, like, plundering it or like, taking what, just taking it or, like, harming it or whatever, just, like, by othering it. And so it's, like, that's kind of where, like, the mycophobia and the homophobia is, like, it's like it all has to do with, like, othering, like, and, and like and it, like, just it's like it just makes us feel like we don't have to, like, care or, like, respect something as much, like when we feel like it's like othered in the first place.

PATTY KAISHIAN [00:37:55] Exactly. Yeah.

JVN [00:37:55] How do you see this relationship between mycophobia and homophobia evolving today?

PATTY KAISHIAN [00:38:02] So I think it's a, it's a pretty new conversation. Queer ecology has been in the works for a few decades now, but I was really struck by how, you know, fungi is like a perfect example in so many ways about how all of these sort of social influences have converged to sort of vilify a group of organisms. So the paper that I wrote on Queer Mycology, The Science Underground, and I coauthored it with a friend of mine, Hasmik Djoulakian, we put forward that idea of, like, queer mycology. That was an original contribution for us to put forward. But it's also about, I think it's also about this idea of control, right? So, like, we as humans, it's pretty natural to have fear over what we can't control, whether it's in our personal life or whether it's other things around us, groups of people that we don't understand, that are different from us.

So I think fungi because they're, they're not, like, so predictable and they, their biology is such that they're very, like, kind of fluid and unfamiliar. We, we, there's this fear and revulsion that kind of we've associated with that. And fungi have also been associated with, like, witches and demons and sort of the underworld throughout a lot of, like, Western European history. And it's a very entrenched idea that, like, fungi are associated with, like, these negative perceptions of the underworld or negative spiritual perceptions. Queer ecology, although it's been around for a little while, there's been a surge of interest in it in the last year or so. And so I think the conversation's just going to really keep rolling. And I there's a lot of people coming out with really interesting work in the realms of queer ecology. So I think these conversations are really

just starting to, like, really lift off. So I'm excited to see where it takes us and how it can hopefully translate to, like, materially benefiting our environment.

JVN [00:39:56] I'm a dum dum, I got so excited about hearing about queer theory that then I —, we didn't get back to queer mycology because, like, you guys literally invented queer mycology and then you were just talking about it, but it's, like, can you tell us? And we kind of talked about, like, what it is, but it's, like, it's really the idea that it's, like, like, how all of the, like, really right-wing conservative people will be like, you know, "There's two biological sexes. And, like, sex works like this and in reproduction works like that, it's nature, it's God. It's, like, how it was set up." And then really what y'all are saying is like, "Yeah, but also there's this like other way that's, like, totally not like that. And there's like literally 23,000 different sexes here, and so..." But it's, like, we never really got to explore that because it was a bunch of, like, white dude scientists making the science.

PATTY KAISHIAN [00:41:12] Exactly. A lot of our early scientists were, you know, yes, white men, but also people who were, like, explicitly Christian and actively trying to demonstrate that the organisms that they studied, you know, were in some sort of hierarchy in terms of who was closest to God. And obviously, you know, able-bodied straight white men were at the top and then all sorts of other people were beneath them. And then, you know, then like at the bottom of that ladder would have been the creepy crawlies, like, the "degenerate" organisms and, you know, maybe in the middle are, like, horses, I guess. We like to think, like, "Well, science has always been this very objective, very clear cut body of work." And, you know, I am a scientist. I love science. So I'm not, like, anti-science, obviously, which I'm also always, like, nervous that someone's going to accuse me of that in, you know, particularly in this very politicized environment. But, you know, I think it's really important for scientists to be very science *critical* while being, like, science *positive*, like, say, like, "Yeah, science is, like, a really great, really powerful tool. We know so much stuff because we've studied science." Like, we know about the atom, we know about how our immune system functions. We can invent these crazy vaccines really quickly, by crazy, I mean, like incredibly effective and powerful.

So it's been used in this way. That's really remarkable. And, you know, I am impressed by, right? But it's it's easy to forget that, like not that long ago, we had people who had extremely bigoted, extremely negative relationships with, like, other groups of people. It was only like 100 years ago that women were allowed to participate in the Linnean Society in England, which is, like, sort of like a, like, you know, "elite" group of scientists. And of course, people are even now, if they're not, like, explicitly excluded, they're like very much systemically and functionally excluded as much as possible from, you know, getting grants, getting tenure track positions, from being, you know, senior faculty members. Even getting into grad school in the first place requires often either a lot of resources or just, like a lot of luck or like a strong family network, you know. So it's like there's still a lot of odds stacked against a true, diverse group of people operating within science. I mean, of course, I mean, most heinously, you know, science was used in, like, eugenics, right, a lot of arguments in favor of eugenics use, sort of scientific logics and, like, you know, measured people's faces and took all this data and tried

to, like, build argument that, you know, certain people were more intelligent and were less likely to be criminals and all of that horrible stuff.

So it's just really essential that scientists, like, reflect on that history and, like, don't just, like, sweep it under the rug and pretend it never happened. Carl Linnaeus, who was a really famous biologist and he's considered the founder of modern taxonomy, like, the naming and sorting of species. He did a tremendous amount of really cool work but you know, he was pre-Darwin so he didn't know about evolution, and he explicitly thought he was one of the people who thought, like, there was a great chain of being and that people, like, humans at the top were closest to God and everything else was just, like, muck that, like, organisms that were not good at what they're trying to do, basically. And he explicitly hated lichens. He called lichens "rustici pauperrimi," the poorest peasants of the vegetable class or whatever. But that's like the bedrock of science is, like, situations like that where people were really subjective about it. They had their own, like, agendas, sometimes very explicitly, and that's, like, the foundation of science. So we have to, like, we have to do, there's a lot of work to do to, like, dig in to that, pull it apart and, like, try to figure out, like, what to keep and what to, to throw out.

JVN [00:44:32] So, yes, you also just said taxonomy, which is, like, the, like, the categorization of things and you've done so much incredible work in fungal taxonomy and, like, getting into, like, understanding more about, like, differences between fungi like, where they come from. But you've also done a lot of, like, you know, ethnographic research around the world, which again, I didn't know what that word meant until, like, this episode, which, like, yay for us. But can you share some of that work with us?

PATTY KAISHIAN [00:44:57] The ethnographic work that I have done, hasn't been, like, super formal. I've often, like, kind of blended it in with trips to study, like the taxonomy. So I look for a name and describe new species and I conduct a lot of biological inventories where I'm trying to figure out, like, "Okay, what, what's the species diversity in a given place," right? And try to get, like, some data about what, who lives where. And, and on those trips, like, I've been numerous times to Central and South America. I've been to Bolivia a few times and Costa Rica and the Peruvian Amazon. And the first time I went to the Peruvian Amazon, I had the pleasure of working at this biological station that was extremely remote, it was, like, a 12 hour boat ride from, from Iquitos, Peru, which is a plane ride from anywhere, like, you can't drive to Iquitos, very, very remote. And my time at that, it was called Madre Selva Biological Station, very small station. And basically in the vicinity of that area are the Yagua people, who are Indigenous people to that part of the Amazon. And I was, like, conducting a survey for the mushrooms around the field station and then I would also go into the communities around and sort of just speak to people about what mushrooms they used for culinary or medicinal purposes, and then write those down.

Because part of the tragedy of, of colonialism is the loss of ethnomycological data. So meaning like the ways in which people use mushrooms and same with plants and other things. So unfortunately, there's been tremendous loss of knowledge through the, you know,

genocides and forced displacements of people. And also the language can—, forced, like, linguistic conversions of many groups. And so that names of things that had, you know, certain meanings and particular languages were lost as well. So I actually learned about a few fungi that I didn't know that people used in any way is one is called *Pycnoporus cinnabarinus* which is this bright orange, like, mushroom that grows on wood. It's, like, an electric orange. It's very, very cool and shocking-looking. And one thing I learned from them is that they use it as, like, a poultice to grind up and put on wounds just because it has, like, antimicrobial and antifungal actions.

I also learned in Bolivia when I was doing mycological study there. And in the markets, I was with some Bolivian friends and colleagues, and we walked around the markets to try to see if someone had this fungus that grows on corn, like, and it kind of invades the little corn kernels and then, like, bursts out of it. It becomes like ten times the size of the original kernel. It's, like, a gray kernel that, like, pops out, it's very cartoonish looking. It's actually eaten as a delicacy in Mexico by people throughout the country of Mexico. But in Bolivia, people had a very, like, suspicious connotation of it being like really bad luck. I just think it's important to, like, ask people about their usages of them and kind of figure out what, what dynamics they have and what sort of relationships they have with these fungi. So I haven't done it in a super organized way, but I just try to always make that a point. If I'm traveling to, like, engage with people about, like, their usage and sort of record that information. And then most recently I've been working in Armenia, which is where my, I'm ancestrally from, and one project that I have developing is, like, trying to translate a lot of old Armenian texts to see, like, what fungi were used and in what capacities and try to, like, digitize that. So it could be, like, widely accessible.

JVN [00:48:43] That is so cool. Wait. So do all mycologists, like, chat with each other? Like, just like, have cute little, like, mycology, like, like, and if so, like, what's the word on the ground about, like, what's the current state of, like, fungal biodiversity like? Is it just, like, all fucked up, like everybody else is? Or is it, like, kind of okay or like, what's what's the tea?

PATTY KAISHIAN [00:49:05] Academic mycology is a pretty small world. So yes, a lot of us do know each other or at least know of each other and we go to often—, I mean, now it's been a minute since COVID, but, you know, we usually go to, like, the annual conferences and it's, like, a weird family reunion at those conferences. But the, the word on the ground is not, not great sad, sad to say. We, you know, we fully expect that fungi on average are going to be negatively affected by climate change. So, you know, habitat loss especially but also increasing temperatures and drought, fire, pollution. So but what's, what's tricky is that we really don't have a lot of data on the fungi. And then therefore it's been really hard to like track, and that has to do with fungi being so poorly studied because of all the reasons we were talking about and then also because of, again, with their sort of, you know, their queer nature makes them challenging to study in that they're, like, they don't fit in the box super easily. And it's hard to get, like, really solid, like, information about where they are and how they're doing because they're, they kind of defy our expectations and our attempts to quantify them.

So there's this body called the International Union for the Conservation of Nature. And they keep track of, like, species globally, and their, like, how threatened they are. And there's what's called the "Red List." Like, if you get on the red list, it means that you're endangered or threatened in some way. There needs to be quantitative data that proves that you're threatened to get on the red list. And so for the reasons I just mentioned, it's been really hard to prove that fungi are threatened, endangered, because, like, we have so little funding compared to other groups, so few mycologists compared to other other organisms, and then their weird biologies. So we have right now about 500 species of fungi on the Red List. But I think there are 58,000 species of plants on the red list and like 12,000 insects alone. So, like, the disparity of, like, what's being kind of considered and taken care of is, like, enormous, but there's not, someone could be misled by those numbers and think, "Oh, fungi are just not in trouble." We wish that was the case, but it is that they're in trouble. We just don't have enough data to prove that they are and then get them protected. So that's something that a lot of people are working really hard to, like, do. But one thing that I'm kind of, like, in favor of is just saying, you know, "We shouldn't have to prove that they're endangered. We should just be protecting them as much as possible."

JVN [00:51:42] Right. But it's, like, you know, only love to do things when it's an emergency. Oh, yeah! This is a good question. So how are, like, certain fungi indicators of an ecosystem's health?

PATTY KAISHIAN [00:51:52] So, so going back to lichens, actually this is one of the better known examples of that. Lichens are really sensitive to air pollution because they absorb their, all of, like, their nutrients that they eat and, like, the water that they need just straight through directly through their, their, like, tissue, right through their, just, like, the whole body just absorbs it. So that's one of the reasons why they've been able to successfully grow in all these different places. And they don't need to have like a root system or mycelial systems. They can just go right on a rock or like on a tombstone even, or like, you know, in the tip of a mountain. But unfortunately, that same ability to like that has enabled them to to be so successful around the world also makes them really sensitive to, like, atmospheric pollution. For example, sulfur dioxide, which is a common byproduct of, like, combustion engines. So, like, road or car pollution, they're really sensitive to that because when they absorb it into their bodies, it can actually, like, denature, basically break down the chloroplast in the algae that photosynthesize. So then they're not getting that nutrients anymore.

So some lichens are way more sensitive to that than others. Basically, like, if you look at a city and you were to, like, survey in the city for all the lichen species, like in New York, for example, you would find some species would not be able to survive there because they're too pollution-sensitive. But as you kind of radiate out away from, like, dense urban areas into, like, areas that have cleaner air, you can find more and more species popping up like and and so basically diversity of these lichens will increase as air becomes cleaner. So you can actually use those lichen bodies to sort of monitor air pollution and like the effect of like any policy that may have been trying to, like, minimize air pollution. You can just take a reading of, like, the sort of

amount of these particular compounds in the air, but you really want to know, like, how it's actually affecting the ecosystem. Lichens are like a more nuanced way to do that.

JVN [00:53:52] Interest!

PATTY KAISHIAN [00:53:52] Yeah. Yeah. I also study this, like, really unusual group of fungi that live on insects. I'm looking into seeing if those can be used also as indicators of, like, pollution in more aquatic environments because, because they, like, are parasites on insects. There's, like, two kingdoms that you're kind of looking at. The ability for those fungi to be present in the environment is, means that a lot of things have to be going right for them. Right. So I'm sort of interested in studying, like, can we use these insects and their fungi to sort of tell us if, if a lake is being overly polluted or, you know, if, if a conservation effort has been successful in helping, like, an area recover.

JVN [00:54:37] How often are we, like, discovering new types of fungi?

PATTY KAISHIAN [00:54:41] All the time. Yeah. For the most part, you know, new species are being described on a daily basis. [CROSSTALK] Yeah, it's really exciting. And if you play your cards right, you know, sometimes someone can name a species after you. I know there was just a millipede named after, like, Taylor Swift or something.

JVN [00:54:57] Fierce! And then, like, and then I hear it's, like, we need more research on the conservation front, more just, more hands on deck for the conservation front. What's left to learn about fungi?

PATTY KAISHIAN [00:55:11] We've only described about 150,000 species, which is a lot, obviously, but it's only 3 to 5% of the species thought to exist. So we need to continue to describe new species because once you have a species described, then you can start to understand what it's doing, what's its role in the environment, what is it in relation to? And then you can answer so many questions about, like, how organisms are interacting and how, like, the different functions of, of the world around us that are still pretty mysterious. So I think that that's something I'm very interested in, is just, like, continuing to describe species because once you give something a name, then it's also very more easy to protect it or get people to care about it. Right? So that's, I think that's one of the bigger projects. But a lot of people are really excited also about, like, all the different chemical compounds that are present in fungi. You know, we have fungi to thank for a lot of the medicines that we have today, like penicillin that comes from the fungus *Penicillium*. And that, you know, has saved millions and millions of lives.

So, you know, there surely are new compounds that we don't even really know about in fungal bodies that could be really helpful to people. So that's something for sure that, you know, is very exciting to people doing pharmaceutical research. I think also just sort of being able to be good stewards of the land is going to be improved by, like, a deep knowledge of fungi and

the ways that they're working with us in the environment. So fungi are often used for, like, remediating the habitats that have been degraded through pollution, such as, like, oil spills or even nuclear waste, heavy metal waste. So continuing to, like, develop research around, like, exploring that to, like, a clean environments and help people like, you know, help combat the harmful impacts of pollution on communities in urban areas and also in wildlife protected areas as well. So that's an exciting, really exciting area of mycological research that really is vastly underutilized at this point.

JVN [00:57:20] And then you said earlier that you've been studying fungi for 12 years, so like you're mining your own business. It's, like, 12 years ago, it's like 2010 and you're, like, "I got to get into fungi." Like, what drew you initially to this work?

PATTY KAISHIAN [00:57:35] So my first loves growing up were, like, the snakes and the swampy stuff, like, critters that were really underappreciated, undervalued, and misunderstood. I felt an early kinship with them based on sort of my own experiences. A big portion of my childhood, I was, I had extreme gender dysphoria, and I felt a lot of, like, safety, I think. I didn't have the language for it at the time, but I think I felt a lot of safety in the presence of these, of organisms that were a little bit also, like, misunderstood, a little bit maligned, a little creepy, a little weird. Not that if you have gender dysphoria, you're creepy. But I felt, like, just not, I didn't know what I was or who, you know, how I belonged, I guess. So that was an early part of my, like, consciousness was sort of this kinship with those organisms. And then, like, I guess I, the first time I encountered fungi specifically was around 2009. I took a semester off from college because I really wasn't sure what I was doing. I was kind of pre-med, but I was like, didn't like that, like, rigid structure.

And I was like, I don't know. I took some time off and I ended up taking a naturalist class at Cornell, to learn about, like, the organisms in the area, cause I'm from New York. And there I met my first mycologist, Dr. George Hudler. And at the time he was a professor at Cornell and he wrote this really great book called *Magical Mushrooms, Mischievous Molds*. And it sort of about like all the times in history that fungi and humans have sort of like collided positively or negatively. And he was like really effective at communicating about the importance of studying mushrooms. And I was just like hooked from then on. So that was what I had been, like, kind of looking for was like, "Okay, I know, I love being, I know I love biology and I've always felt this kinship with these sort of unusual organisms." And this just was like a lightning strike. I was like, "Okay, that's it." I never looked back. And that was, yeah, I've just been down the rabbit hole ever since.

JVN [00:59:36] That is so fascinating. I love that entire story. And then so like after these years, like what continues to just, like, surprise or delight the shit out of you about fungi?

PATTY KAISHIAN [00:59:48] I'm just really in awe of their of their beauty. It grows on you, I think. So if you don't feel it right away, that's like perfectly fine. I recommend, like, looking at

just like, fungal glamor shots, which you can find on the internet, just like really shockingly beautiful.

JVN [01:00:03] They just discovered that purple one in Arizona for the first time! And it was really stunning.

PATTY KAISHIAN [01:00:07] Yes. So stunning. And there's, so there's, like, every color on the spectrum. There are completely black mushrooms and fungi. And then you have, like, pure white and then, like, orange and pink and blue and, like, fuzzies and all sorts of things. So just, I'm just never over it, I guess. Also, I think because they're so ephemeral, you like have these different seasons where you see like these different beings that you and you're like and every season it's, like, "Oh, you know, like it's ah, again," like, a reunion, like, of seen these fungi that you haven't seen for less, like, ten months, so now you get to find each other again. And so just, like, deepening those relationships, I think I just it is, it's delightful as fuck. So, yeah.

JVN [01:00:49] So then also, we *loved* learning that you're a founding member of the International Congress of Armenian Mycologists. Obsessed with the title. You also mentioned earlier that you have Armenian heritage, which is just, I love when we can, like, layer in who we are and to what we love and, like, make that a part of the story. Can you tell us about, like, founding that and like what the Congress of Armenia mycologists aims to do?

PATTY KAISHIAN [01:01:13] Yes. Thank you for asking about that. So it's pretty recently founded. Believe it or not, there are more than just one Armenian mycologist in, living currently in the US, because there, there are very few Armenians. So even though I'm also part Irish, I'm, like, very attached to my Armenian identity. My last name, Kaishian, is Armenian. And that's because in large part there was the Armenian genocide around 1915 to 1917. So actually only about 200,000 Armenians survived that. So we're extremely small, like, ethnic minority group. So identity to us is, like, very, very significant. And I'm in the US, you know, alive now because my great grandparents were able to survive that and come here. And that's true for, for most Armenians living in the U.S. today, that it was, like, a forced displacement. So, you know, to be Armenian is to be very much aware of these, like, struggles of, of, of genocide, of colonialism, but also of, like, resilience and sort of, like, strength and and bonding to each other. So we, a few of us, decided to form this group in 2020 because unfortunately there was, like, another flare up of ethnic cleansing in Indigenous Armenian lands. But we're here living in the US, and we, like, are scientists, so it was very, like, hard to just kind of watch it all happen but feel like we were kind of powerless to it.

So what we kind of decided is that, you know, you know, again, like, while it seems like there's not necessarily a very direct link to that kind of struggle and the study of fungi kind of tying into the themes that I've discussed, like, moments ago, like, you know, protecting biodiversity is good for, is good for human diversity as well. And often what we've seen with colonialism all around the world is that biodiversity declines in the presence of colonialism and colonization. So protecting biodiversity and joining that with, like, social advocacy for, like, the sovereignty

of Armenia, Armenian, but also in general of an Indigenous peoples is something that we kind of made our political aim, to be explicit about the fact that we seek to protect biodiversity in conjunction with, like, human diversity.

So what we are doing and started to do last summer, we went on a sort of a pilot trip to Armenia to survey some areas that we're going to continue to do some research in. And we wanted to have, like, a very multifaceted research program in Armenia where we're collaborating with, with people who live there, our friends and colleagues who live there. So we're trying to raise money to rebuild their laboratories, which are extremely dilapidated. So we're trying to, like, apply for grants to, to build infrastructure for, for scientists there and then sort of do collaborative projects where we, like, share grants and publications because we as American scientists, we can get way more access to, like, high amounts of funding compared to what's available in Armenia. So we want to sort of, like, channel resources there and then kind of collectively look for new species of mushrooms, translate Armenian texts, and do outreach to educate people about the value of protecting land and being good stewards of the land.

JVN [01:04:35] Ah! It sounds like you have so much exciting, important work that is happening and it is on your plate. I am so excited, I feel like we learn so much. Is there anything about mycology or queer mycology that you feel like we missed or like mushrooms and fungi that we must get out in the world that we—, I know that one thing I missed to say is that your hair looks amazing. I just had to—, you have amazing hair. [CROSSTALK] You would just be remiss if you're, like, "Oh, my God, I can't believe we didn't mention X, Y, Z."

PATTY KAISHIAN [01:05:07] I think, you know, everyone has a role to play in, like, climate change and even in science. So I think that some people feel like they can't be involved in science because they didn't have the proper classes or training in a formal institution. But one thing that I think is really important is that we all can be like stewards of the earth and we can all actually even be valuable to, to the project of science and knowledge creation. So I just, I don't know, I just want everyone to feel like they can be part of it. And, and I mean that in a super genuine, not just a gesture way, like, we all can, like, help protect each other, both other life forms and like human life forms, it's like we're all responsible and we're all capable of that. So I just want to, like, end on that kind of note. Yeah.

JVN [01:05:55] And I couldn't end it better myself. Thank you so much. So much, Patty. You've been incredible. Thank you so much for your work. You're the best. Thank you so much for coming on Getting Curious.

PATTY KAISHIAN [01:06:04] Thank you so much, Jonathan. I'm thrilled to be here. So thank you.

JVN [01:06:11] You've been listening to Getting Curious with me, Jonathan Van Ness. My guest this week was Dr. Patty Kaishian. You'll find links to her work in the episode description

of whatever you're listening to the show on. Our theme music is "Freak" by Quiñ - thanks to her for letting us use it. If you enjoyed our show, introduce a friend, or ten, or, like, 75 and show them how to subscribe. Follow us on Instagram & Twitter @CuriousWithJVN. Our socials are run and curated by Middle Seat Digital. Our editor is Andrew Carson. Getting Curious is produced by me, Erica Getto, and Zahra Crim.