

# Dipterology with Dr. Bryan Lessard

## Ologies Podcast

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Oh heeey, it's that lady that works at the post office in your old neighborhood who asks, "Where you been?" Alie Ward. And listen, I'm looking at you and I see you, your arms are folded, you're glaring, you're saying, "*Make me like flies, bitch.*" And maybe I will, but we have our work cut out for us on this one, I'm not going to lie.

So, it's good I've enlisted one of the world's most charming and visible dipterologists. He's done fieldwork on several continents. He's named more species than you can literally shake a flyswatter at, and he lives and breathes flies metaphorically but also probably literally... on accident sometimes. He studied Biotech for undergrad and then got a PhD in Insect Systematics and Evolution. And is now doing a Post Doc fellowship at Australia's Commonwealth Scientific and Industrial Research Organization's National Insect Collection, researching the evolution and classification of soldier flies, which are stout little outside flies, named after warriors because of spikes on their necks. Although *Werkopedia* notes that they are often rather inactive flies. So, soldier flies, you're my kind of flies.

This dipterologist is also a TEDx speaker and a sci-commer who has done a bunch of TV and radio appearances and just wrote his first book, *Eyes on Flies*, for kids, it's due out in September. And we're going to get to him in just a moment, but first you.

Thank you everyone at [Patreon.com/Ologies](https://www.patreon.com/Ologies) for supporting the show for a dollar a month or more. That allows you to submit questions that I could read with my mouth, hopefully correctly. And thanks to everyone rating and reviewing and subscribing, I read all your reviews because they matter to me. And I pick one each week. This week's is from [EmilyWhoLovesTrees](#) who wrote:

*One time I was having a really bad day and I was crying in my car (Who hasn't been there?) and decided to listen to Ologies and the newest episode was Happiness, exactly what I needed. Always is. By the way, this is the first review I've left on any podcast, ever. You deserve it.*

[EmilyWhoLovesTrees](#), happy to hand you that travel pack of Kleenex from the depths of my backpack.

Okay, rub your tiny hands together and start to barf with hunger for info on golden rumps, huge family reunions, maggots and crime, ancient weightlifting, rainbow exoskeletons, species naming, sexy dancing, delicious filth, Jeff Goldblum, how to keep flies out of your domicile, but why you should love them more. With the biggest cheerleader for the tiniest and most maligned creatures, Dipterologist, Dr. Bryan Lessard.

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**Bryan:** I'm Dr. Bryan Lessard, AKA [@BrytheFlyGuy](#) and I'm he/him.

**Alie:** I was going to say, [@BrytheFlyGuy](#), how long have you been using that name? Because it's perfect.

**Bryan:** I think I started when I launched my Twitter account back in 2013, so it's nearly been 10 years I've been using [@BrytheFlyGuy](#).

**Alie:** *[laughs]* Now, I was going to explain this in the intro, but I decided I'm just going to let you do it. You are a dipterologist, correct?

**Bryan:** Yes, correct. I am a dipterologist.

**Alie:** Okay, and I'm going to make you explain why you're a dipterologist from at least a taxonomic viewpoint. What is the etymology of *Diptera*?

**Bryan:** Yeah, so *Diptera* is the scientific term for flies, obviously. It's Latin for *di*, meaning two, and *tera*, meaning wings. And that's how you can tell flies apart from most other insects, is that they only have two wings. So, that's why we call them *Diptera*.

**Alie:** But does it ever vex you because you're a dipterologist, you study flies, you're @BrytheFlyGuy, but there must be so many different types of flies, how can they all be grouped together just because they have two wings? What's up with that??

**Bryan:** That's a really good question. There are 160,000 species of flies buzzing all over the world.

**Alie:** [laughs] What?! Are you serious? That's so many!

**Bryan:** Yeah! And those are the ones we know about now. It's funny because when people think about flies they think about tiny little bush fly or a March fly that annoys you or ruins the picnic. [fly buzzing around, "Shoo fly don't bother me."] But there are so many species out there. There are actually 15 times more fly species than bird species, just to put it in perspective. And they're everywhere. They're on every continent, including Antarctica. How mind-blowing is that?

**Alie:** Very. Also, because you think you'd go to Antarctica and be like, "Ahh, the flies can't find me here." And one pops up from a snow cone being like, "Sup, bitch?" And you're like, "What? What? How? How did you get here?" What are they eating in Antarctica?

**Bryan:** Yeah, so the largest full-time animal living on Antarctica is actually a fly. It's the Antarctic midge fly. It's so tiny as well, you wouldn't even see it. But it's actually adapted to survive the freezing temperatures because they actually freeze the larvae, and they can stay frozen for nine months of the year. They wait for it to get really cold, they go into hibernation, and then when it starts warming up, that's when they start reactivating and turning into adults so they can breed, have children, and the cycle continues.

And regarding what they eat, I think they eat a lot of algae and moss down there because I think that's the only thing they can eat.

**Aside:** And what eats a flightless Antarctic midge fly, you ask? Nothing. *Nothing*. Nothing else can go as hard as living as a baby under the ice for two years, desiccating 70% of your body's water as an antifreeze strategy, and being the only native, fully terrestrial animal on the continent of Antarctica. "What about polar bears?!" you scream at me in your car, alone. If you heard the Ursinology episodes you would know, polar bears don't live in the Antarctic! And that Ant-arctic literally means, 'no bears here'. Antarctic. Although, that icy continent should be called "4-millimeter wingless flies that are more hardcore than bears and only emerge as adults 10 days of their lives, just to have an orgy and ice their babies." That is what Antarctica should be called thanks to their midges. Now, what about other flies?

**Alie:** And why do flies only have two wings? What happened to the other set? Hymenoptera has four, right?

**Bryan:** Yeah, and butterflies have four. And what's really cool about flies is they got smart millions of years ago and they're like, "You know what? We don't need this second pair of wings; it's holding us back." [Alie laughs] So, what they did is they decided to reduce them.

**Alie:** So cute.

**Bryan:** *[laughs]* They decided they didn't need this second pair of wings, it was holding them back, so they ditched them. They actually evolved, or de-evolved the second pair of wings into these tiny little halteres, which are like lollipop knobs.

**Aside:** Halteres? Yes, and I needed to know what this word meant, so I looked it up for us, and those armpit lollipop knobberjobbers, get their name from Ancient Greek gym rats. Because *halteres* were weights made out of big-ass rocks. And long jumpers would hold them and swing them forward to gain momentum and a few centimeters on their long jumps. Also, very inspiring that you need a weight set, you can just carve a handle in a rock and call it a day... and a haltere.

**Bryan:** And how they work are little counterbalances. So, they can zip and fly around in the air, and they can dart and change direction and angles so quickly because of these counterbalances. So, they're really clever, really speedy, and just amazing how evolution just does its magic.

**Alie:** And are those little knobbyjobbers, are those considered wings but just stubby wings? Or are those completely evolved into a totally separate structure?

**Bryan:** They've evolved into a completely separate structure. So, they've still got the base, which is called a stem. Then they've got the little lollipop-like knob at the end and that's what they kind of flick around to change the momentum in which direction they're flying.

**Aside:** Kind of like a Greek long jumper using physics to carry themselves forward. So, tada! You love flies now. No? Okay, all right, almost.

**Bryan:** So, it's quite remarkable. It's so simple and beautiful but yeah, that's pretty much what gives flies their morphological uniqueness. There's always exceptions too. One of the flies that I study down here in the alpine zone of Australia are the soldier flies. There's one species, *Boreoides subulatus*, that is actually wingless. The female doesn't have wings at all. *[Alie gasps]* So technically, can you call it a fly? *[laughs]* We technically still do. *["That is a no-fly zone."]*

**Alie:** Even though she does not fly, she is a fly.

**Bryan:** She is a fly. What's really cool is she's reduced her wings, we're not sure why she lost them, but she crawls up blades of grass and tree trunks looking for her male mates, because the males actually kept their wings. So, the males fly to the females and then they reproduce and then lay their eggs in the leaf litter around. Of course, you've watched the movie *Alien*, with the xenomorph queens?

**Alie:** I have, yes, I have. Chills, chilling. *[both laugh]*

**Bryan:** You know how the queen has this huge abdomen that's absolutely built for pumping out eggs? *[buzzing and squishy sounds]*

**Alie:** Yes. Mmm, delicious.

**Bryan:** Yup! This wingless soldier fly is the xenomorph of the insect world. Her abdomen is about three or four times the size of her thorax and she can pump out hundreds of eggs. She's really born to breed and ensure the success of her species by pumping out as many viable eggs as she can.

**Alie:** So many siblings, so many. But a large family. She's like, Pumping. Them. Out.

**Aside:** Okay, so I googled up the soldier fly and it looks kind of like a ladybug larva. It's dark with a pointy, segmented butt. And according to the website for the Australian Museum, due to its lack of wings, "the female of this species of fly is often referred to as a walk." ... Ouch dude, brutal.

**Alie:** Can you run me through what types of flies there are? I understand there's a bazillion. But what is a fly? Mosquito, is that a fly? Crane fly, is that a fly? We've got houseflies, we've got midges. When we see something, I'm sure there are so many things that are flies that we don't realize are flies.

**Bryan:** Yeah. And mosquitoes, they are definitely a type of fly because they only have two wings as well. Many people think mosquitoes aren't flies, they're annoying, they're horrible. Fun fact, some mosquitoes are actually vegetarian [*Alie gasps*] and will just drink nectar from flowers all day and pollinate. So, even the pesky mosquito has a role in the ecosystem.

**Alie:** Good for them. What are some other things that we don't realize are flies? What does it even encompass? And how do you, as a dipterologist, come to be one? What was your entry point? What was your entry species?

**Bryan:** Ahh, good question. I had no idea about flies until I started university. I used to hate them. I thought horseflies and March flies were the bane of my existence going hiking. I thought blow flies were super annoying, wished them away. And then I did a Bachelor of Biotechnology actually, because I like DNA, and I thought, you know, I'm going to save the world by stopping companies from genetically mutating our species. And then it was a lecture in second year of uni, it was Forensic Entomology, and that's where I learned that maggots could help solve crime. And I was watching a lot of *Bones* with David Boreanaz [*laughs*] back in the day, and then I thought that was right up my alley. [*"Oh ho, what's going on with the maggots? They're like freaky happy."*]

So, I did a research project with that lecturer James Wallman, and he showed me how cool flies are and putting even the most annoying blow fly under the microscope, I was absolutely blown away by how beautiful they are. They're metallic shiny blues and greens and are just gorgeous. And that's where I caught the fly bug and have been studying them ever since. [*Alie laughs*] It's been more than 10 years now.

**Alie:** And what is the work that you're doing now? What is your day-to-day like when you go into your office, or you sit down at your computer or the lab?

**Bryan:** Yeah, so I am a taxonomist and taxonomy is the science of naming and classifying species. So, one of the best parts of being a taxonomist is that you actually go out in nature and collect and go on really amazing field trips. I've been lucky enough to go to Lord Howe Island, which is this gorgeous remote, *Jurassic Park*-style island about four hours flying, east of Sydney. I've gone to Chile to collect flies, Costa Rica, South America, New Zealand.

And it's really cool going out and seeing the personalities of these flies, believe it or not. Because I spend so much of my time in a museum looking at pinned research specimens, they're obviously dead. [*Alie laughs*] So, it's so cool studying a species for like five years and then going out and seeing it in nature, in its habitat, and then you can see its personality; how it cleans its eyes, it rubs its hands together, does these beautiful dances in the air. It's kind of like meeting a celebrity actually. [*Alie laughs*] It's really rewarding.

I love it, I love this job. It's so good. Because not only do you go out collecting, but you bring back the specimens that you collect, and then you have the fun experience of trying to identify them and playing a really complicated game of Spot the Difference between what

you've brought in and the museum specimens. And that's when you can see if you can identify it and if it's an existing species, or if it's a brand-new species to science. And that's where it's really fun because if you discover a new species, you get to name it whatever you'd like.

**Alie:** Oh, I know!

**Bryan:** You can have a lot of fun there.

**Alie:** I know! *You* can have a lot of fun there. I mean, how many new species of fly have you discovered and gotten to name?

**Bryan:** In the last 10 years, I have named 50 species new to science, [*Alie gawks*] but I've actually discovered 150 extra ones that are new that I haven't actually had time to name because it's such a long, complicated, exciting process.

**Alie:** Wow!

**Aside:** So, he's named 50, discovered 150 other new species of flies. Just forever changing the knowledge that we possess on Earth, and naming it.

**Bryan:** Do you know why though, there are so many new species out there?

**Alie:** No! Why? Is it because the world is heating up? Is there more poo? What's happening?

**Bryan:** [*laughs*] It's because we don't have enough taxonomists or biologists out there to simply go out, find them, and document them. There's probably... augh, I don't know, I'd say maybe 500 dipterologists in the world, and there's 160,000 species that are known, and scientists estimate that we've only described and named a quarter of all life on Earth, just a quarter.

**Alie:** Wow. It must be like trying to count buckets of water in the ocean. How do you even know where to find all these species? And when you're looking to see if it's a new species, and you're looking under a microscope, what if you're looking at the specimen in the museum and they look different but it's just because the one that you happened to catch has one extra leg on accident?

**Bryan:** Yeah, so what's really important here is that we have these museum collections that have all the known species that are known to science that other entomologists have described, they've lodged the specimen in a museum. What's really cool is that these natural history museums are like libraries of life. And scientists are mailing specimens all over the world in the post to other researchers. And this is actually getting a lot easier with new digitization technologies where you can take high-res images and you can share those with other scientists.

It's my job as an entomologist to build upon our knowledge of our insects and help discover and name these species that are new to science, but also find out why they're different and how we can identify them. Because one species might be a really important pollinator, one species might be a really bad pest species that you need to keep out of a country and might have some really important biosecurity impact to that country too. So, naming a species is the first step to understanding that species, and it gives scientists a universal language to be able to talk about that. Otherwise, we wouldn't know what we would call it.

**Alie:** Does RuPaul know that you named a fly after her?

**Bryan:** [*laughs*] They do, definitely. RuPaul hasn't emailed me or talked to me directly. He did retweet the RuPaul fly that I actually named after him last year. And that's as close as I've gotten to him.

**Alie:** Wow. I mean... so exciting.

**Aside:** Also, I wasn't sure what RuPaul's pronouns were, and I was like, "Shoot, I got that wrong." But I looked it up and apparently RuPaul has said, "You can call me he, you can call me she, you can call me Regis and Kathie Lee, I don't care. Just as long as you call me, me." However, right now you may be calling him *Egregious* and Kathie Lee after some hurtful actions of years back excluding trans women from his show *Drag Race*. But he later issued a Rupology saying, "I understand and regret the hurt that I have caused. The trans community are heroes of our shared LGTBQ movement, you are my teachers."

And for @BrytheFlyGuy, he wanted a fly that represented the rainbow and a nod toward pride. And we chatted off-mic about LGBTQ+ representation in science, right after we stopped recording and I was like, gah! And I wanted to include those thoughts with his permission, so he sent me a great follow-up note that read:

*I'm an openly gay scientist. A few years ago, I was a bit hesitant to come out publicly thinking it would impact my career, but that negative thinking was the very reason why I decided to come out. I want young, LGTBQ+ people to have career role models and see a place for themselves in the STEM workforce. I hope the next generation can feel more comfortable bringing their whole selves to work and can continue to better the world through awesome science. But I do recognize that I live in a safe part of the world, where I can be my true self, and that this is still a challenge in other parts of the world that will hopefully change for the better.*

So, queer scientists, happy pride, keep being you, whether you're in or out. And you can check out 500 Queer Scientists too, that's a great website.

**Alie:** Can you tell me, when you are choosing who to honor with a fly species – which, by the way, so lucky, what an honor – what is your process? And are you struck by the colors, or the form, or the moxie? And tell me also some of the people that you have named flies after?  
[laughs]

**Bryan:** This is the most creative time you can have as a taxonomist, definitely when you get to name a species. But first, you have to do all your science vigorously and thoroughly. So, you've got to be sure it's a new species.

When I found this specimen, I saw that it was wearing the rainbow flag. It was these gorgeous metallic reds, blues, turquoise, yellows, purples. So, I knew that was a defining feature of the species. And the other unique feature of this species is that it had this thornlike hook under its abdomen, it was tucked under the abdomen actually. And I thought, "Wow, that's so unique." And I was watching a lot of *RuPaul's Drag Race* at the time as well, so I think subconsciously it was imprinting on me [Alie laughs] that I had to name the species after RuPaul as well. So, it became *Opaluma rupaul*, the Glamazon fly of Australia.

**Alie:** Augh, amazing.

**Bryan:** What was interesting is that he was doing some press about *RuPaul's Drag Race*, and he was on *The Ellen Show* and Ellen flashed up an image of his new species.

[clip from *The Ellen Show*]

*Ellen: You're such an icon, there is a fly named after you. I scientist named a beautiful, brightly colored fly. I think we have a picture of it, and that is the RuPaul.*

And the only thing he said was:

*RuPaul: Thanks a lot, science!*

And I was like, “That’s it??” I spent a year of my life, recording, documenting this species, and that’s all you said?

**Alie:** *[laughs]* I mean, it’s such an indelible mark that there is a species that is forever named after you. When people long forget the entertainment you did, that for me is a permanence in terms of your place on Earth.

**Bryan:** Species names last for eternity, so you’ve got to get it right. It was interesting because *The Graham Norton Show* producers emailed me and wanted a photo of the fly they could bring up when RuPaul was on the show this year. And I made sure to give him some scientific facts about it. *[Alie laughs]* And I said it had legs for days, it was a gorgeous rainbow species, and it had a thorn tucked under its abdomen and then RuPaul said:

*[clip from The Graham Norton Show]*

*Graham: Apparently the Opaluma rupaul has a fierce look, legs for days, and a distinctive thorn tucked under its abdomen.*

*RuPaul: [laughs] All true.*

So, that was a little better acknowledgment of the fly, I guess.

You know, out of the 50 species I have named, only two of them are after celebrities and I figure, the RuPaul fly was my 50th species. The first fly that I ever named always has a place in my heart. I was listening to a lot of this artist while looking at the type specimens under the microscope, I was listening to her music while I was describing it. It had a bright golden abdomen, there were only three specimens ever collected, the same number as the girl group she used to be in, *[Alie laughs]* and it was also collected in the year that she was born. So, I thought the universe was giving me a sign, so I named it *Scaptia Beyonceae*, after the one and only Beyoncé.

**Alie:** *[sighs]* Gorgeous. I have seen pictures and yes, absolutely stunning. Do you know if this Queen Bey knows of her fly?

**Bryan:** I think she might. A lot of her fans were like, “Um excuse me, it’s a fly, we’re the Beyhive, it should be a bee.” Unfortunately, I don’t study bees. *[both laugh]*

**Alie:** Also, flies are cooler.

**Bryan:** Yeah, way cooler. Hey, bees get all the credit for pollination, but do you know that even the blow flies can carry twice as much pollen than a European honeybee? And in Australia, farmers of mangoes, avocados, and other agricultural important crops have clued onto this so what they’re doing, is they’re actually getting a lot of fish heads and offal, sprinkling it around their beautiful orchards and encouraging the blow flies to come in, because they like to lay their eggs in gross, stinky stuff, but while they do that, they’re out there drinking the nectar from all their orchards and helping pollinate and increase the fruit rate. So, how cool is that? *[“Very cool.”]*

**Alie:** I mean, we have them to thank for so much of what we eat. And meanwhile, European honeybees, which are not even endemic to the United States are getting all of the love on Cheerios boxes and stuff like that, which is just lies! It’s apocryphal, it’s not right. So, I for one, starting to gravitate toward Team Fly here, pretty hardcore. Flies are winning my heart right now.

**Aside:** Don't believe me? You can dust your furry butts into a 2020 study titled, "Non-Bee Insects as Visitors and Pollinators of Crops," which notes that flies visited 72% of the crops that bees did, thank you very much. And that the family of *Syrphidae*, AKA hover flies, are on it; they're the ones in your garden who sometimes look like a fly cosplaying as a bee, but they have the most flexy wings of any flying insects. They hang out in midair, hover flying, by twisting their wings 300 times a second – 300 times a second! - at 45° angles.

Now, another great *Diptera* pollinator family is the *Calliphoridae*, which are blowflies or bottle flies, which are considered filth flies. Excuse me? Filth flies. How dare they? I mean yes, they eat shit, and rotting bodies, by they like flowers too, okay? Especially the ones that have evolved to smell like shit and rotting bodies. They are multi-dimensional animals. More on them in a bit. But not all flies want rotting bodies. Some don't eat bodies at all. And some prefer to feast on alive juicy bodies, like yours!

**Alie:** Speaking of badges of honor, have you ever gotten a botfly? What does it mean to you?

**Bryan:** Oh my god. [*laughs*] It's kind of a badge of honor for a dipterologist studying flies. They want to get bitten by these botflies. And there's 180 species of botflies in the world, but in Australia there aren't that many, and I think there's only one species that might actually bite kangaroos. So, I haven't ever come across a bot fly. But I know one of our mutual colleagues has, Phil Torres.

**Alie:** Yes, yeah.

**Bryan:** I think he got bit... was it Costa Rica or something?

**Alie:** I think he maybe was in Peru, I'm not sure.

**Aside:** The year was 2019. Entomologist and Lepidopterology guest, Phil Torres tweeted, "One of my mosquito bites from Peru keeps tingling. And this is me [*prayer hands emoji*] that I finally got a botfly." Phil documented his pregnancy fly on his YouTube channel, The Jungle Diaries.

*[clip from YouTube video, "I'm Having a Botfly"]*

*I've got a botfly maggot living in my back right now, feeding on my flesh. If you saw my last video, you know what I'm talking about. But if you didn't, let me just catch you up real quick. It is a maggot, it is alive, it is feeding on me, it is in my back, it is really gross, but it is also really fascinating.*

And inside an inflamed and separating mound on Phil's back, a flesh-eating maggot baby twisted and bucked, causing him some searing pains. Although for some hosts, apparently, it's a rather smooth experience thanks to the natural pain killers and antibiotics the botfly larva makes to keep you happy hosting it. Because they're in it for the food and the childcare. They don't want to be a nuisance, they don't want to cause trouble, they just want to lap up your nutrients.

And Phil has never posted the follow-up video and the conclusion of his experience, but I texted him. And friends, he may be cutting it together, a never-before-seen update on his YouTube. So, google the jungle diaries on YouTube, subscribe, and cross your fingers and toes that he releases it, because a botfly extraction is wild. I have watched so many... so many.



**Alie:** Do they put their egg on a mosquito? How are they even laying an egg in your skin to eat your flesh and erupt forth? I don't even know how they're getting in there. I have gone down rabbit holes watching botfly extractions and I find them very soothing and disgusting.

**Bryan:** It's crazy right? It's like an entomology version of pimple popping. *[laughs]*

**Alie:** Augh, I love it. It's so gross. This teardrop shape where when you think there can't be more botfly larvae, this big, bouncy, rotund, boink comes out of a hole in your flesh! Just disgusting. I mean, do they ever bounce out of your skin and then they pupate, but they just spend the larval stage in your flesh?

**Bryan:** Yeah, so the larval stage develops in flesh because they actually eat it, it sounds really gross. And they don't want to leave the food substrate. So, what they've evolved are these really hardcore, like, fishhook-like spines; they're absolutely covered in them. And that's why they're so hard to remove, because as you pull them, they're lodged and they're not coming out. So, you sometimes need to get them surgically removed. *[Alie gasps]* What's crazy is that the larvae look so vicious, but the adults are so cute. *[laughs]* They're just fat and fuzzy and they look like teddy bears.

But like you said, they actually lay their eggs on mosquitoes, which is crazy. I think they're like the Sumo wrestlers of the fly world. *[Alie laughs]* They're these big, fat, buzzing flies and they hunt down mosquitoes and wrestle them, the female botfly will extend her ovipositor to lay an egg on the foot of the mosquito. So, the female botfly doesn't actually lay the egg on the victim, I guess you could call them the victim. So, the mosquito does her dirty work. It'll fly around, land on your skin, and the heat from your skin will actually trigger the botfly egg to hatch. And then it crawls out, and then it starts burrowing in your skin and then over the weeks and months it turns into this thick, fishhook larva that is just eating your flesh. *[laughs]* It's kind of gross.

**Alie:** Doesn't it stick its little butthole out too? And just like, *[squirting sounds]* the metabolites from your body? I understand that you're staring down the barrel of the business end of a maggot when you have a botfly which is just... what a world! What a beautiful, wonderful world. You know?

**Bryan:** Head down, butt up. *[laughs]* They actually have sphericals in their bum as well, which are the portals for breathing. Their head with the mouth is on the other side that's buried deep in, and they stick their butt up in the air, and that's what they breathe in. So, they breathe from their butts, so they don't drown in whatever they're eating, like your skin and the flesh.

**Alie:** What a life cycle.

**Bryan:** But not all flies are gross. Some are really cute as well. Like, the adult botfly is really cute and I encourage you to look at them on a search engine.

**Aside:** Okay, I search engined this and it's true. Some of them look like furry little potatoes, with giant eyes but not *Dermatobia hominis*, which specialized in human hosts in Central and South America. Many entomologists consider nurturing one, in their body, a rite of passage and kind of like a five to twelve-week pregnancy until their chubby, half-your-pinky-sized maggot squirms its way out and wriggles into some nearby soil for two or three weeks where it undergoes a makeover from a hardened, dark sarcophagus to a stocky fly stunner, that has a metallic blue ass as shiny as a Nissan hatchback and big red eyes that look like two boxing gloves. Augh! And it's made of you.

**Alie:** What about life cycles of flies in general? You've mentioned maggots before. We think of flies, we think of maggots. But is there a commonality when it comes to life cycles for flies? Or is it just all over the fuckin' place?

**Bryan:** Yeah, they generally share the same phases or stages of development. So, they'll obviously start out as an egg, and this will generally hatch into several different stages of larvae, or we'd call instars. And it depends on the family. Blowflies have three instars where others have more. And then, when they're larvae, they really want to just eat as much as they can, put on as much fat as they can, because when they enter pupation, this fat is the energy that they need to go onto that amazing process called metamorphosis and come out as an adult.

What's really interesting is some flies, like the black soldier fly, don't eat very much when they're adults, so they're relying on the baby fat that they've accumulated to get them through adulthood. And some of these adults only last for eight days. So, they hatch, they have only one thing on their mind, that's to find a lover and make some babies to continue the cycle.

**Aside:** My heavens, boy howdy. I just love the idea of a fly emerging from its pupal casing being like, "I wish to take a lover." And with *Musca domestica*, the houseflies that you love, the female typically just takes one lover and then she clutches onto that one fateful jizz load in her body for the rest of her life, going on to bear 2,000 of his maggoty babies, which actually get laid as eggs and then they hatch into maggots in sometimes just a day. So, how long will the adults live though? Just a single blissful month, less time if it's cold out.

And other so-called filth flies include blowflies, AKA bottle flies, which aren't houseflies but they're slightly larger and they're bright green and blue metallic buzzers. They love poop, they love death, and unlike houseflies, they live longer in colder weather. They can live six months in the winter but about three sweaty months if they were born under Gemini skies.

But why do some flies look like enameled metal? Bryan says that some insects and flies, like the metallic rainbow RuPaul fly, look metallic not because of a colored pigment, but because they have structural pigment, these microscopic ridges and transparent layers that split the light into metallic colors, kind of like a CD or a DVD. And he told me that scientists think that the shine attracts mates and might even aid in camouflage. He said, "Think of a metallic green fly hiding next to a reflective water drop on a leaf," which is honestly very, very cute and very refreshing sounding. And just like so many things on Earth and in our lives, that fly shimmer makes other flies want to do the nasty.

And speaking of nasty, let's keep talking filth flies. Have you ever had those round-winged babies that fly out of your drain? Okay, those are called drain flies, they live in there, and they eat garbage in your pipes. And I'm not saying that you should kill any of them, but pouring boiling hot water into your drains a few times over a few days will make them not exist. This is your choice though. And fruit flies usually are amber-colored, usually with red eyes. They live one to two weeks in your kitchen, just enjoying that soupy mature fruit you forgot you bought. And if you don't want them around, one fix is to just not let your counter fruit get soupy or beg your roommates or your office mates not to. More options on them later in the episode.

Now, gnats are not fruit flies, I just found out, they're totally different *Diptera*. Gnats tend to live outside and sometimes a swarm of them will find your sticky lip gloss and then it's up to you if you want to eat them like a whale enjoys krill. Now, do you have any tiny flies that emerge from your potted plants? Those are probably fungus gnats. And there are remedies

ranging from soaking your potting soil with hydrogen peroxide to adding a layer of sand on top, but I'm bad at plants, don't look at me.

Now all of these things live in your house, and they are flies, but only one is the poster maggot for flies, and it's the housefly.

**Alie:** What about houseflies? I feel like that is the species of fly that we are most accustomed to. Are they just so successful that there's more of them around? Are they just perfectly suited to come into your house and sit on a sandwich? Are they barfing on your sandwich before they're eating it? Are their feet covered in shit? Make me not hate them so much, if possible. [*gagging sounds*] And I know it's not fair, they're just successful.

**Bryan:** It's not fair they've just evolved to be amazing at spreading all over the world. They're just curious about what we do and they're jealous of the amazing food we eat, that's all. [*Alie laughs*]

Okay, a redeemable fact about houseflies. Well, did you know they're not just blowing vomit bubbles to be cute or disgusting? [*both laugh*] They are actually blowing vomit bubbles to regulate their own body temperature. So, if they're really hot... Flies, like most insects, are ectothermic, so they can actually regulate their body temperature and it depends on the ambient temperature. So, if they're overheating, they'll actually regurgitate a little bit of what they've eaten, put it on the tip of their proboscis, let it evaporate, you know, cool off. And then they slurp it back up and that cools them down. So, I think that's kind of a cool thing that a housefly does.

**Alie:** [*hesitant tone*] That's great. [*Bryan laughs*] I love it.

**Aside:** For more on how animals regulate their temperatures, see the Thermophysiology episode with Dr. Shane Campbell-Staton. Oh, and another cute thing that flies do for us... they're used medically to help clean open wounds, because maggots like dead flesh, so they clean yours out. Yay! Thanks.

**Bryan:** Houseflies are actually really important pollinators too, believe it or not. Some of the research I was doing in the alpine zone in Kosciuszko National Park, which is one of the biggest national parks in Australia, was looking at the flies and what they actually pollinate. And this is with my colleagues at CSIRO, which is Australia's national science agency, and what we did, we collected a bunch of flies, and we made a little insect smoothie, so we put the insects in an Eppendorf tube and blended it all up, and that released all the pollen that was attached to the fly. When the fly goes from one flower to the other, drinking nectar, it gets doused in pollen, if it sticks to the hair, and then when it goes from flower to flower, it helps pollinate. So, we were able to use these insect smoothies to sequence the DNA of the pollen grains. And we found that even the pesky bush fly that's related to the housefly can pollinate up to 15 varieties of native plants.

So yes, we hate bush flies and houseflies, but they're out there doing this amazing job in nature free of charge, helping to pollinate our native plants. So, we should cut them some slack, I guess.

**Alie:** They do deserve some slack, they do. What about their feet? Do they taste with their feet? Are they covered in shit all the time?

**Bryan:** Well, they have happy feet because yes, they do taste from their feet. They're impatient; instead of waiting to get the food in their mouth and taste it that way like we would, they like to stand in whatever they're eating and it's yes/no, do I eat it, do I not? So, what they do

is, if it tastes good, that's when they'll drop their proboscis, their mouth part that has a sponge at the end that zaps up all the liquid. And they actually do eat shit because shit is high in protein and other nutrients and electrolytes as well.

But this is where the nasty side of houseflies comes into it because if they're landing on shit with pathogens, those pathogens can get stuck to their feet, and that's when they fly inside and land on your food and spread those pathogens that can potentially make you sick. So, that's why it's best to always cover your food, especially if you're having a barbecue outside, and make sure these flies don't actually land on it. The other thing is to close your doors in summer, always take out your rubbish pretty regularly, because you don't want to encourage houseflies to come inside for these reasons. [*"Flies madame?" "Yes, close the window."*]

**Alie:** Are they smelling your garbage too? Are they like, "Mm, smells a little rotten in there, my babies are gonna love it"?

**Bryan:** [*laughs*] Yes! Definitely. Especially female blowflies.

**Alie:** What pathogens is it possible they can spread? And I feel like we see a fly and we're like, "If it lands on my sandwich, I'm going to get Ebola and die!" But what pathogens do they actually carry? Is it fewer or more than we think?

**Bryan:** Oh, we're just scratching the surface at the moment. With advances in microbiome analysis, I've got some colleagues that are actually grinding up the flies and sequencing everything that's in that body, all the microbes, pathogens, and parasites as well. So, we're just getting into it. But horseflies, sometimes called March flies, they have been, in the past, known to transfer anthrax, even though it's super rare, and in such low doses that it's not going to be the next outbreak. But it's definitely something where we're just discovering about these insects.

**Aside:** Listen. I want us all to respect flies, but I'm not flies' overworked high-profile publicist or lawyer, okay? I'm not Olivia Pope swooping in in a white coat to be like, "It's handled." So, I'm going to give you the dirt on this. I'm going to talk a little bit of shit on flies for a second. According to Penn State's entomology data on *Musca domestica*, which is the housefly, they are, "strongly suspected of transmitting at least 65 diseases to humans including typhoid fever, dysentery, cholera, polio, yaws, anthrax, leprosy, tuberculosis, helminthic eggs, protozoa cysts, and other bacteria, fungi, and viruses by the mechanical transmission through its vomits or excreta."

So, maybe you would not hurt a fly, but if you would, just know that they can sense movements and air currents before your rolled-up newspaper even gets close, which is why you want a fly swatter that has a lot of holes in it or is mesh because it doesn't send such a wave of air to warn them. So, I'm sorry houseflies. You know what? Let's change one letter, let's saddle up for horseflies.

**Alie:** Which flies bite? Because you say horseflies and I think about those big, huge, buzzing horse flies and you're like, "Ow!" Why do they even have a mouth that can bite anything?

**Bryan:** Yeah, so it's only the female horse fly that bites because she needs the protein in your blood to ripen her eggs. And without it, she wouldn't have any viable eggs and they can't continue their lineage. So, the males and some females from some species are completely vegetarian and only eat nectar and pollen. But horsefly bites are particularly painful because she has these saw blade-like structures called stylets that run parallel to her proboscis. And instead of a mosquito that has a needlelike proboscis that just slips in your skin and slurps it up, the

horsefly will actually land and use these two saw blades to rip through your skin. She's sawing through your flesh to expose as much blood and make it spill as much as she can. That's why it's so painful to get bit by a horsefly.

**Alie:** Oh! You know what, knowing that makes me feel better, weirdly. Because I'm like, "That's pretty metal."

**Bryan:** Yeah. *[laughs]* It gets worse. She'll also spit in the lesion she creates.

**Alie:** Not cool.

**Bryan:** Because her saliva has anticoagulant properties and blood thinning properties, so this stops the platelets in your blood from coagulating, so they flow more freely, so she can just slurp it up with her spongy mouthpart and get as much blood in her as she can. *["I love blood!"]*

**Alie:** Mmm. And is this kind of how mosquitoes evolved too? They just evolved a different mouth mechanism to just cut straight to the chase?

**Bryan:** Yeah. So, mosquitoes are much more delicate. If you've ever hit a mosquito, they just disintegrate on your hands and turn into a gray puff. So, mosquitoes have evolved to be a little bit more sly. They're kind of the stealth team of the insect world. So, the female mosquito will land on you, and it's always after the fact that we notice that we've been bitten when it starts to react and get itchy. So, she'll land on our skin, slide her needle proboscis into our flesh, and she also spits a little bit of saliva and anticoagulant chemicals into our skin to make it flow better as well, and then she'll fly off. And what's interesting is because she spits into our skin, this is where people start getting allergic to these bites and that's when it'll start swelling. And a couple minutes after she's bit, that's when we notice we've actually been visited by a mosquito.

**Alie:** 'Visited' is such a sweet and mystical way to put it. *[Bryan laughs]* That is so generous of you, dude. *[laughs]*

**Bryan:** I know. Mosquitoes are the biggest vectors of serious diseases, like malaria, that causes the death of millions of people in the world. But it's not actually the female mosquito that is the killer, it's actually the parasites and microbes that hitch a ride in her belly and in her saliva that she transmits. So, I guess, yeah, mosquitoes have a role in disease transmission, but they're not the killers.

**Aside:** They need their own episodes, because honestly, they're just moms out there, they're trying to feed their kids, they've been framed for all the malaria stuff. Like, someone planted all the pathogens in them, okay? So, Culicidology, mosquitoes, watch this space, we gotta do it.

**Alie:** Flies in the media, how do you feel about *The Fly*? *["Those weird hairs that were growing out of your back, I had them analyzed. They were definitely not human."]* Have you seen *The Fly*? Did it make you want to be a dipterologist more or less?

**Bryan:** *[laughs]* Bloody Jeff Goldblum, *[Alie laughs]* I swear. I think he's done more to hurt flies and get people hating flies than anyone else. Oh Jeff, Jeff, Jeff. I watched it as a kid, I think I might have been around 10 and it was scary, it was like a horror movie, and it was just disgusting, where he starts vomiting on everything. Poor Geena Davis, what she had to go through. *["Is this a romance we're having? Is that what it is?"]*

**Alie:** Would you ever name a fly after Jeff Goldblum or Geena Davis?

**Bryan:** You know what, there probably is a Jeff Goldblum fly somewhere out there [*Alie laughs*] that maybe doesn't vomit on his food so much. Maybe he's out there pollinating flowers or composting our garden, we don't know.

That's the problem with the media. We've kind of perpetuated this negative image of flies, when actually they're the heroes of our nature. They pollinate, they recycle nutrients, they're really important in the food web and we've kind of demonized them. So, that's why it's really important to talk about it and change people's perceptions. If I could get people on board with flies it would be with this one fact: without flies, there would be no chocolate.

**Alie:** [*gasps*] What? Really?

**Bryan:** Yeah. That's because the cacao plant is pollinated by these tiny little midge flies from the family *Ceratopogonidae*, and they're the only thing small enough to crawl through the cacao flower and pollinate it. If we didn't have them, the most important pollinators of these plants, we wouldn't have chocolate. So, be careful what you wish for, I would say.

**Alie:** Augh, MVPs. Thank you, midge flies. Teeny tiny flies, we love you. I think that they're beautiful too. It seems like when you look at them up close, you start to really appreciate the architecture and the color palette of flies. Would you say that, as somebody who has looked through a lot of microscopes at them?

**Bryan:** 100% and I didn't know how beautiful flies were until I started putting them under the microscope and studying them. And that's when I had my journey of hating flies to actually appreciating their beauty as well. Blowflies, horseflies... Oh! There are some horse flies that actually mimic bees and look like furry bees and that's so when they're around a flower, birds won't eat them because they're expecting to get stung, where the joke's on the bird, because they don't have stingers, the flies.

So, I encourage you to just, if you see a fly in the garden next time, don't shoo it away but maybe take a photo and maybe start a digital collection and appreciate their inner beauty. I've got a ton of images of gorgeous flies on my social media channels that you should check out.

**Alie:** I've seen them and they're so beautiful. Do you have a recommendation if someone wanted to get into microscopy and instead of staring at their phone and social media that's not yours, just getting a microscope for home use, for fun? Do you have any recommendations for what power of microscope? For a total beginner and dilettante who just wants to look at dead bugs, any recommendations?

**Bryan:** Yeah, if you don't want to get a full-blown microscope and you just want to test the waters, a gateway entry point for microscopy is you can get these beautiful macro lens attachments for your smartphone, and they have maybe three- or four-times magnification on them and you just pop your phone over the specimen and you can take photos of these creatures too.

**Aside:** You want to do a dipterologist a favor? You can also help scientists by uploading those photos to community science apps. For example...

**Bryan:** Like iNaturalist, that also have identification features and they can give you a percentage accuracy hit to what iNaturalist actually thinks that species is.

**Alie:** Can I do a lightning round of Patreon questions from listeners?

**Bryan:** Yes please!

**Aside:** On my website, linked in the show notes, I'll include some macro lens guides. And definitely check out the Aperiology episode with Joseph Saunders, which is literally all about macro photography with insects, it's so good.

But before we get to your questions let's diptera-toe in the waters of charity, let's send some money toward a cause of the ologist's choosing... I'm sorry, that wasn't even a good pun at all, don't know why I said that. But Bryan selected the World Wildlife Federation, WWF. And Bryan says they are championing global action to protect our delicate biodiversity, especially after Australia was hit by the devastating bushfires that impacted so many native species there. So, for more on what they do check out WWF.org. So, thank you sponsors for the money that we send their way.

[Ad Break]

Okay, let's blow through your fly questions.

**Alie:** Are you ready?

**Bryan:** Ready. Hit me.

**Alie:** Okay, all right, great questions from Theodore Vician, Wendy Westerduin, Alex Ertman, Emily Webb, David Rusalleda Gómez. Emily, first-time question-asker, they want to know in Emily's words: Why do they come into a room and then fly in circles, instead of leaving the way they came? Wendy wants to know: Why does it fly in triangles sometimes in squares? What's their flight pattern like?

**Bryan:** Yeah, really awesome question. It really depends on the species, because some fly researchers are actually studying the different flight patterns of different species and some are triangular, some are square, and some are a complete mess; they look like drunken little pilots going everywhere. [Alie laughs] But they definitely fly indoors if you've got the light on because they're attracted to the light and sometimes, they get stuck there. I've noticed on really hot days, if I left my door open, or even on the porch, you can see them under the porch and they think it's a tree canopy and they're flying around with their friends. And what they're doing is they're actually dancing, they're courtship dancing. Generally, it's the males that dance while the females are perched on a leaf, looking for the best dancer. So, she'll come up and pick the best dancer and choose him to mate with. So, it pays to have sick dance moves if you're a fly.

**Alie:** Oh my gosh. And is that what's kind of happening in their flight pattern? Or is there also a strategy for maybe discouraging them from maybe coming into your doorway?

**Bryan:** I think they just get trapped inside. And I think the flight pattern is species-specific, and it might be a courtship dance as well. There's a specific pattern they might use to attract female flies, these well-dancing males.

**Alie:** So sexy. Elena Horne, Cassafrass, Melindi Jenkins, and first-time question-asker, Emily Layfield. And this is maybe not the most fly-friendly question, but you'll change our minds. Emily wants to know: Why do flies seem to have an exponentially more annoying and louder buzz than any other insect I've run across? What's making the buzzing sound? Is it their wings? That's in Emily's words. So, why are they loud and how can we embrace the loudness?

**Bryan:** They are loud but they're not the loudest of all insects. I think we just notice them because they're a little bit more curious and come to us sometimes. [Alie laughs] But it's definitely their wings, especially the big fat, juicy flies like blowflies, you'll hear them because they

beat their wings so strongly. But I remember collecting in the flower patches of New Zealand and it was actually the bumblebees that drove me crazy. I had tuned into my ears to tell the different types of flies apart because they all have a different buzz, so I can collect them. But then these bloody droney bumblebees would come in and just drown out the sound. [Alie laughs] So, I don't think flies are the most annoying insect, bumblebees are much louder.

**Alie:** How are you collecting them? Are you using one of those aspirators where you have to suck it up in a tube?

**Bryan:** Yeah, I definitely use an aspirator, or a pooter that they're affectionately called too. But my favorite method is using my trusty insect net that looks like a butterfly net. Most people think that's really good at catching flies buzzing around in the air. I remember collecting at this waterhole where all the tourists were swimming and they were like, "Mate, mate, come here! You must be here to collect the brown snake." And I'm like, "No, I don't want to touch the snake. I'm here to collect your flies."

**Alie:** [laughs] I love that you do have to carry a lot less back to the lab. I imagine that your fly samples can fit just in, like, a tackle box.

**Bryan:** Yeah. The flies are much smaller, so they don't take up that much space. But we also use malaise traps that look like tents and what happens is the flies fly into the tent, and then they work their way up into this bottle of ethanol that we have at the top, and they get preserved in that bottle. So, what's really cool is we can take them back into the lab and the ethanol preserves their DNA which is cool because then we can extract the DNA and sequence its genetic fingerprint to confirm that it's a new species. And we use this all the time in entomology.

**Alie:** Oh wow!

**Bryan:** Yeah, it's really cool because you could go to really remote places like rainforests and put these traps up, and they do the collecting for you, and you can find some really nice surprises in there afterwards.

**Alie:** I know they do that in Los Angeles, and they found new species of flies in Los Angeles and flies that they didn't expect here. It's so interesting too because it just looks like a little pop-up tent, tiny. And there's so much entomology being done in something that's just the size of a Starbucks cup.

**Bryan:** It's crazy right? Especially putting them in people's backyards. I think they found, like, 70 new species of phorid flies in California using this method. It's just nuts.

**Alie:** Yes, yes! I think Brian Brown is the dipterologist I once chatted with at the NHM about that. They've got this BioSCAN project where you could walk by in the nature lab at the NHM and there would just be people, entomologists, sorting through whatever they found in the malaise traps. And you're like, "I'm watching new species being discovered, it's so cool."

**Aside:** For more on this you can check out the BioSCAN project at my beloved Natural History Museum of Los Angeles County. And Dr. Brian V. Brown who is also a dipterist, or a dipterologist, has discovered 500 species of phorid fly and counting, including the world's smallest known fly, which is a wee Brazilian species, just two one-hundredths of an inch long, or a third of a millimeter, which he named *Megapropodiphora arnoldi*. Brian Brown told the press a few years ago, "As soon as I saw these bulging legs, I knew had to name this



one after Arnold.” He means Schwarzenegger. Just saying, you want to discover a species? Flies, people.

Also, in reading about Brian’s work with phorid flies, I just tripped headfirst into an article about the coffin fly, which is a velvety, black fly that can dig several meters down through dirt and get into coffins. So, please disregard all my previous statements about California condors, or ravens, or vampire squids being the world’s gothest creatures, because I just don’t think it gets more death metal than a coffin fly. Also, those phorid or humpback fly babies, they’re also agents of just gluttatorial horrors.

**Bryan:** The humpback flies are badass because they’re some of the tiniest flies. I think some of them are smaller than a grain of salt and they eat ant heads. So, the larvae will actually crawl into the ant and eat all the musculature around the jaws, and then they’ll emerge and burst out of the ant’s head, kind of like *Alien*. [“*Surprise!*”] So, tiny flies can be super powerful as well.

**Alie:** Augh, flies are such mysteries, and they do have a lot on their mind, and they are plotting a lot, and this can be evidenced by the way that they rub their hands together. In Gizelle Martinez’s words: Why do they rub their grubby little hands together every time they land on my food? Why are they doing the evil little hand rub thing? Lynn Reid wants to know. So, what are they doing? Are they cleaning themselves?

**Aside:** So many folks needed this info. I’m looking at you, patrons Julia, Hannah Fraser, Margo, Becca Christensen, Marxe Orbach, Jarred Abrahams, Micah Delman-Allen, Orrin Stanforth, Alex Ertman, and first-time question-asker, Nicole Broder, who said: I never appreciated flies until I saw one taking a moment for itself on my windowsill and it was caressing itself so slowly and meditatively that it was really beautiful. I think it was giving itself the equivalent of a fly spa day.

**Alie:** Are they cleaning their face? Are they cleaning their hands? What’s happening there?

**Bryan:** It’s funny because it looks like they’re hatching a diabolical plot to kill you [*Alie laughs*] when really, they are just cleaning themselves. Especially their eyes because they don’t have eyelids like us, they can’t blink to get rid of any debris, so they use their hands like little paws to clear the dust and the bits that stick on their eyes. And then they rub their hands together to get them off their hands. It’s like if you ate, I don’t know, like a hot chocolate and it covered your tongue, you’d want to cleanse the palette. So, when they rub their hands together, they’re technically cleansing their palette because they taste with their feet.

**Aside:** Okay, so they taste with their feet. Okay, normal. Cool. They have no eyelids, got it. Actually, a lot of you including Jacob Bowman, Penelope Adkins, Sarah King, Ashley Curtin, Zora Young, Theodore Vician, Ren Groves, and first-time question-askers Kate Watters and Deborah Kenley, needed to know...

**Alie:** What about their eyes though? How well do they see?

**Bryan:** Amazingly well. So, their eyes are compound eyes. So, instead of having one lens per eye like us that we can focus, they actually have up to 6,000 mini lenses called ommatidia. And what happens is that the brain stitches all these more basic images together into this one image and that’s why they are so quick. Because they can pretty much slow down time, essentially, that’s how they see. So, they can see your hand swatting from miles away and then they can react.

And what’s really cool is some species have rudimentary eye spots above their big eyes called ocelli. And what these are, they look like three little dots in a triangle, and these

actually can monitor different light levels so when they're flying in rainforests, when the sun comes out, they know where to go and they can also orientate themselves a little bit more. So, they have all this amazing sensory equipment in their head that is just incredible, that we have no idea about, and we just miss them. But yeah, flies are cool.

**Alie:** What about fruit flies in science too? A bunch of listeners wanted to know: How do you get rid of fruit flies? But also, why are fruit flies used in so much genetic research?

**Bryan:** That's a really good question. I think fruit flies have about 80% of the genes in common with humans. So, they're really good models to test genetics, the impacts of drugs on them, and even NASA have been using fruit flies for decades. They've been sending them out into outer space to see what the effects of gravity and radiation are on these fruit flies, using them as a model for humans. The reason why they use fruit flies is because you can grow them like crazy in the lab. You can upscale them, so you've got plenty of little mini mice models, essentially, to test on.

**Aside:** So yes, fruit fly science lovers or experimenters out there, Mallory Skinner, Erica Periandri, Lisa St, Kyla Cheung, Lauren Legg, and Popita, *Drosophila* flies do do a service for humans, and we thank them for their sacrifice and also thank you to patron and scientist Paul Smith who asked why Flynap smelled so good, which made me google Flynap which is fly anesthesia. Night, night, sorry flies, thank you.

Now, fruit fly haters, I'm looking at you Jesse Hurlburt, Malorie Albee, Naomi Jane, Craig Collins, Celeste Rousseau, Sam Holm, you may notice, BrytheFlyGuy did not answer your question about committing dipteracide, or getting rid of fruit flies because this man is not about to give you instructions for fly murder.

*But...* if you were to say, decant some apple cider vinegar into a small bowl or cup, if you happened to cover that with plastic wrap and poked a few holes, if they happened to go in there and party, and then drown in a bath of this delicious liquid, well then that is their own choice. You can also just get rid of the soggy fruit in your house, that'll help too. If you want to hire an assassin, you can listen to the Carnivorous Phytobiology episode about meat-eating plants and just invest in a sundew, which will sit on your windowsill and do this dirty work for you. It's just a circle of life on your windowsill baby. I'm sorry, Bryan.

**Alie:** Okay, one more listener question and I think you're going to appreciate it. Craig Collins, Laura Salisbury, Derrick Allen, Elizabeth Jimenez, Omennik, Kendall Hargis, first-time question-asker Patty S, they all want to know: in your opinion, what is the cutest fly? Which flies are cute? Tell us which ones to look at.

**Bryan:** Oh my god. Okay. Ah! I've been put on the spot. There's so many. You should definitely check out the Cutiefly, which is a cute little bee fly that is this ball of yellow fuzz with this little cute proboscis sticking out. It actually inspired the Cutiefly from Pokémon; it looks exactly like that in real life. And you'd want to keep it as a pet.

**Aside:** Okay, so I did search engine the Pokémon cutie fly, AKA, *Bombyliidae*, AKA bee flies or humble flies, and yes, they are cute, and they do look humble, and they're named after bumblebees, but they're flies. So, if you were to cosplay as Cutiefly, you're a human posing as a fly, posing as a bee.

**Bryan:** So definitely check that one out. It's adorable.

**Alie:** Can you keep flies as pets? Do people do it?

**Bryan:** [*big laugh*] I'm sorry. I think you can. I think people do without realizing, in the compost. [*Alie laughs*] Black soldier flies look like leathery, segmented worms that eat your compost. I've thought about designing some activities for teachers that they can take in school to have their own mini livestock of black soldier flies, but I think it would be too gross and stinky.

**Alie:** [*laughs*] Well, I guess whenever you see a housefly, just think, "I have a pet fly for... maybe it'll be 8 days, maybe 8 minutes. Who knows?"

**Bryan:** That's the beauty of the mystery, isn't it?

**Alie:** Now what about, in all of this talk about what is good about flies, I always have to ask this. What sucks shit about flies? What do you hate about flies? What do you hate about your research? What's the worst part of being a dipterologist? Is it having something eat your flesh that's a baby? What sucks?

**Bryan:** I think crawling into dead animals is at the top of my list. [*Alie laughs*] When I was doing forensic entomology, I remember stopping at roadkill and there was this massive wombat that got hit by a car and it was really sad because wombats are so cute. It was huge and I remember putting my gloves in, and I crawled inside that thing [*Alie squeals*] to pull out these larvae that I was interested in to identify because I thought it might be a new species. It's amazing starting out in a forensic entomology lab, feeding maggots, smelling like death. I remember returning to my lectures and nobody wanted to sit next to me because I smelled like death, and I couldn't smell anymore, and everybody just moved away. [*Alie laughs*] So, that's definitely one of the things.

**Alie:** Oh gosh.

**Bryan:** The other thing is how unfunded science is generally, but that could be its own podcast.

**Alie:** Right. [*laughs*] Smelling like death and... grants. [*Bryan laughs*] The perks must outweigh it, right?

**Bryan:** Definitely. Going to gorgeous places, going out in nature, making discoveries. That's what I'm passionate about.

**Alie:** What is your favorite thing about flies? What do you respect the most about them? How do they just burrow into your heart a little?

**Bryan:** [*laughs*] I love that. I hope it's not a botfly burrowing into my heart because then I'd call a doctor. I think we just don't give flies enough credit. It just amazes me how we're so dismissive, but they do so much for us in part of our everyday life. They pollinate the hops that go in beer, they pollinate the grapes that we make wine from, they give us chocolate, they're recycling nutrients. I said flies are the original hipsters because they only eat organic, and they love to recycle, [*Alie laughs*] and they do this for free, and we just shit on them. They're so important in the ecosystem.

Yeah, so it's just this light inside me that needs to get out and shine and sing their praises because flies are so important, and we need to start respecting them before it's too late and they've become extinct through climate change and deforestation. So, now is the time so we can discover all those species out there, name them, and learn about what roles they do in the ecosystem and protect the ones that need our help.

**Alie:** I love that this summer, or winter, depending on where you are, people might be inspired to get a macro lens for their phone and just start looking at flies.

**Bryan:** I hope so because, honestly, you don't know, you could discover a species new to science in your own backyard. I've had people post photos of flies they've seen in the garden, and they've become new species. And I was so excited that someone on Instagram just posted this photo of this gorgeous fly that has never been documented to science before. It's pretty cool.

**Alie:** The dream, the dream. And on social media, where can people see more of your work and your flies?

**Bryan:** I'm on Instagram and Twitter @BrytheFlyGuy and this September I'm actually releasing my first children's book, *Eyes on Flies*, to encourage kids to get into flies, and biodiversity, and appreciate the world around them. So, keep your eyes on these flies, I guess.

**Alie:** [laughs] I love it! Thank you so much for being on, you were a joy. Time flew.

**Bryan:** Thank you so much for having me, Alie, and letting me talk about flies and my crazy passion for them.

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So, ask brilliant people, ridiculous, gross questions because now you know a lot about flies. You can look for [@BrytheFlyGuy](#) on [social media](#), there are links to his websites in the show notes. He's so wonderful.

We're @Ologies on [Instagram](#) and [Twitter](#), I'm [@AlieWard](#) on [both](#), do say hello. You can put some *Ologies* merch on your bod; we have bucket hats, we have swimsuits, totes, the works, all available at [OlogiesMerch.com](#) so you can find each other in the wild this summer. Thank you, Susan Hale, for managing merch and so much more.

Thank you, Erin Talbert for adminning the *Ologies* Podcast [Facebook group](#), with assists from Shannon Feltus and Boni Dutch from the comedy podcast, *You Are That*. Thank you, Noel Dilworth for all the scheduling. Emily White of The Wordary heads up our professional transcripts, which are available for free on our website alongside bleeped episodes by Caleb Patton. Those are at [AlieWard.com/Ologies/Extras](#). If you have small minds wanting some *Ologies*, you can check out [AlieWard.com/Smologies](#), and download those short filth-free episodes. Those are suitable for classrooms and all ages. Those are headed up by Zeke Rodrigues Thomas and Mercedes Maitland of Mindjam Media, who are both great, with some assist from Steven Ray Morris, also great. Nick Thorburn wrote and performed the theme music. And our lead editor is the mayor of babe town, Jarrett Sleeper, of Mindjam Media.

Tonight is the warriors versus Celtics game, my family is watching it right now. Warriors are up. I think halftime is about to start so I'm literally recording this in the garage, I'm going to race back inside because time is of the essence.

And if you stick around until the end of the episode, I tell you a secret. And this week, I was on a Zoom and I realized it's really fucking weird to see your own face because for every other conversation you don't have to monitor your face. And I realize this is not a new revelation to have, two years into a pandemic when we've been living on this, but on this meeting, I opened up a note from my notes app on my computer and I just made the window the size of my Zoom face window, and I just popped it right on top of my own face so I only saw everyone else's face. And I loosened up a bunch and I was like, "Huh, I feel like myself again." Just in case anyone is doing a lot of Zoom meetings still and that helps. Anyway. Also, I've had this Thompson Twins song called "Lies" in my head but instead of, "Lies, lies..." I keep thinking, "Flies, flies, flies, yeah." So, good luck getting that out of your head. Okay. Berbye.

*Transcribed by Aveline Malek at [TheWordary.com](http://TheWordary.com)*

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