

# Teuthological Ludology with Dr. Sarah McAnulty

## Ologies Podcast

### November 3, 2021

Oh heeey, it's last night's soggy nachos, AKA today's breakfast, Alie DadWard Von Podcast. Hello, it's me. I'm bringing you a very offbeat episode of *Ologies* I simply wanted to do, so we did it.

So, like a lot of us, I spent some of October being harassed by internet peer pressure into watching the Korean Netflix drama *Squid Game*. And then, once I started it, I became harassed by my own blob of ganglia to finish it at all costs, no matter how tired or how sad I was. So, now that it's officially November, I figured most of you have seen it or gotten a chance to see it if you wanted to, so it was time that we addressed its greatest artistic flaw: the lack of squids. And the nagging question, *do squids play games? Would they if they could?*

Who better to hold our hands and get to the bottom of the sea of this truth than a squid expert? So, you fell in love with her and her field in the 2018 episode called Teuthology. It's all about squids, go back and listen, it's so wonderful. Since that episode, she has gone on to do many things: she finished her PhD; she became Dr. Squid; she continued driving around her vehicle with the personalized plate "SQUIDS" and a hotline number for squid facts; she has grown the nonprofit she co-founded, Skype a Scientist, into an international resource connecting scientists with schools, and book clubs, and scout troops to chat facts; and she even has a bug hotline that you can text for more science, right into your smartphone. She's an icon and it's about time we hung out again.

But first, I just want to thank really quick, everyone at [Patreon.com/Ologies](https://www.patreon.com/Ologies) for supporting the show since before we were ever even a show. It costs a dollar a month to join that. Thank you to everyone telling friends about *Ologies*, thanks to all the review fairies, leaving me precious words like crumpled dollars under the pillow of my efforts. I read a new one each week to prove it and this one is from JLCE who says:

*Reviews are hard to write, but I tried. Ologies is educational, humorous, and the best backdrop for the most mundane of tasks.*

JLCE, thank you so much for that.

Okay, Teuthological Ludology. The etymology is from the Greek word for squid, and the Latin for play. So, we're talking games squids play. I always tell a secret at the end of episodes, in case you didn't know that, and this week a jumble of trivia about the making of *Squid Game*, the Netflix show. But don't worry, you're going to receive so many spoiler warnings before that part.

But for the main body of this episode, it's all about squids. It's squids and squids, and games, and squids, and shenanigans. Oh, it's so good! So, enough of me, let's reunite with Skype a Scientist founder and squid scientist, who is stepping in for a special episode as a Teuthological Ludologist, Dr. Sarah MackAttack McAnulty. And then the crowd is like, [*enthusiastically whispers*] "Ahhh yeah! MackAttack, fuckin' squid!"

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**Alie:** Dr. Mack.

**Sarah:** Hey.

**Alie:** We're back. We're back! We're back, baby! [*laughs*] We're back. Do you remember that time I made you pick me up at a train station in Connecticut?

[clip from 2018 interview:]

**Alie:** It's 39 degrees, I can see my breath... I'm outside. New Haven, Connecticut, first time in Connecticut, I'm looking for a squid car... I'm so nervous. I've been trying to be her friend so hardcore for months online. What if she doesn't like me? ... Oh my gosh, I think I see her. This is so exciting. Hi! Oh my gosh, it's me, hi! I'm getting in your car.

**Sarah:** Do it.

**Alie:** Oh my gosh, your license plate really says "SQUID".

**Sarah:** It does.

[back to 2022 interview]

**Sarah:** I do remember that. On my birthday, [Alie laughs] in fact in 20... whatever year that was.

**Alie:** Oh god, 20- I don't even know...

**Sarah:** A long time ago! I had no idea I was going to be meeting one of my new friends but here we are.

**Alie:** I know. And then I locked you in a library basement.

**Sarah:** Frankly, the library locked us in a library basement. [Alie laughs] Neither of us had any role in getting locked in that basement together.

**Alie:** And now, here we are. It's years later, we talk all the time, one of my besties, you come stay here when you're in LA. And squids are on the minds and hearts and in the limbic systems of a lot of people right now.

**Sarah:** You know, a lot of people are talking about squid, they're using the word squid, but we're not talking about squid the animal, enough. I never feel like we're talking about squid the animal enough. Particularly this past month. [Alie laughs] Everywhere I turn, there's a new squid-related headline, and none of the animals we're talking about are changing color, and it's not right. It's a travesty and we're going to fix that today.

**Alie:** We're going to fix it. Please, please tell me that you do not have a Google alert set up for squid, because that would be unmanageable.

**Sarah:** I don't, I don't. no. I have a Google alert set up for Skype a Scientist and that's about it. Because it would have been a real bummer this whole year to be getting all these false hits.

**Alie:** I get it. And also, so much has changed since we last went on a deep dive into the murky marine snow about Teuthology and squids. For example, you now have hotlines that people...

**Sarah:** I do.

**Alie:** You have stickers and hotlines. Okay, so someone sees a squidmobile, your car, someone sees a squid sticker, what happens? Who do they call? What happens afterward?

**Sarah:** There's a lot you can do. If you are driving next to the squidmobile, you will be instructed to honk if you love squid, [Alie laughs] and we strongly encourage you to honk. That's step number one. That's the most important thing you can do if you see the squidmobile. The next thing you should do is text the SquidFacts Hotline, where you will get many, many squid facts. So, you start by texting "Squid" or "Squid!" either are acceptable, to 1-833-SCI-TEXT.

**Aside:** Okay, get a pen, write this number down. But if you're driving, it's in the show notes. So keep your eyes on the road, because while the squid facts are heavenly, no one needs to die for them. I will be so pissed if you die writing down the SquidFacts number.

**Sarah:** 1-833-724-8398. Text "Squid" to that and you'll get squid facts. There's also a secret menu; if you text "Bugs" to it, you also get bug facts.

**Alie:** Oh my god. Is it you replying? Or is it automated?

**Sarah:** That's a great question. It used to be me, and then when I started getting like 15 squid texts a day, I realized that this was no longer tenable and I had to do something about it. So, now it's a robot.

**Alie:** Okay, just checking.

**Sarah:** Thank god. No, if the entire *Ologies* audience started texting the SquidFacts Hotline a year ago, I would have been up the creek without a paddle, but not today. Not today.

**Alie:** Now, squid games, *Squid Game*, singular.

**Sarah:** *Squid Game*. I also have been calling it Squid Games and I feel like an old lady. But yeah, *Squid Game*.

**Alie:** I know. Have you seen the show?

**Sarah:** All right, so I watched about 10 minutes, and I quickly realized that the squid in *Squid Game* is in fact, like, a court and not an actual squid, and I went back to the other K-drama I'd been watching, *Crash Landing on You*, which if you all haven't seen is 10 out of 10 amazing. So, I went back to that, and yeah, gave it up. But I've heard it's good, I just haven't persevered through the disappointment of knowing that there's no squid in it.

**Alie:** I know, I know. I've watched the whole thing. I might, at the end of this, just give some of my thoughts with many, many, many spoiler alerts like "Turn off, turn off, turn off" if you haven't watched the whole thing. But I've watched the whole thing, can confirm, no squid. This prompted a Tweet of yours that was like, "There's no squid, no games." And I was like, "I think that would be Teuthological Ludology," and I texted you and I was like, "Do squid play games?" And you said, "Hell yeah, they do."

**Sarah:** Well, in a sense yeah, and in another sense, no. So, I'm going to be putting big, Ethology, which is to say, animal behavior caveats, on what I'm about to say. Because I know there are going to be animal behavior folks who are listening to this and being like, "That's not a game." And I'm like, okay, you are obviously right. I have one game, the rest are squid tricks, but I think that tricks are halfway to a game, so we're going to go with that.

**Alie:** Dude, if *Squid Game* is called game, if *those* are games, I think tricks in the squid community count as a game. That's just me though.

**Sarah:** Yes. Absolutely. We're just going to use this as a springboard to talk about squid. Any opportunity that I have to talk about squid, I'm going to take it, immediately.

**Alie:** Okay, well then hit me with a squid game. What are some of the games they play? I am all ears. Do squid have ears?

**Sarah:** Squid... Okay, that's actually a great question. Do they have ears like we have ears? No. Some of them can hear kind of okay, but it's mostly low-frequency noises. And some cephalopods, we really haven't figured out if they can hear much at all. So, as far as the

senses in a cephalopod goes, the hearing is not the strongest thing they're working with. But they definitely don't have ears like you'd see in a sea lion, or a person, or a cat.

**Alie:** And those flippy flaps that we see sometimes at the top of their conical heads, those are in fact, not ears at all.

**Sarah:** Not even a little. Those are fins. Very useful, very cute, kind of look like Mickey Mouse ears in some species, but are in fact fins, yeah.

**Alie:** Okay. Now hit me with some games, hit me with some tricks.

**Sarah:** Let's get into it. All right, so here's the thing about squid, octopus, cuttlefish, the whole gang. They are just tricky bastards across the board. They are trying to fool either their predators, their prey, or just mess around. There's a lot of examples in squid behavior of them doing silly things to trick people.

So, let's get into it. We're going to start with the smallest, the teeny, tiniest little squid, it's called a pygmy squid. They are like... super tiny. Look at your pinky fingernail, it is smaller than that. I don't care what size your pinky fingernail is, they're going to be smaller. They're really tiny, about 16 millimeters long and very, very skinny. So, these animals are super cool, they live all over the Indo-Pacific, and there was a Japanese lab that was working on these little guys and noticed that they were shooting out puffs and clouds of ink and then, like, hiding behind the clouds of ink, and then swimming through the cloud of ink and tackling shrimp or whatever it was that they were trying to find. So, they're using ink clouds as hunting blinds, or like shades in order to stay hidden while hunting.

**Alie:** That's an excellent trick.

**Sarah:** Yes.

**Alie:** How big are these shrimp that they're eating? Are they like sea monkeys?

**Sarah:** Exactly, exactly. So, they're a little bit bigger than the squid. A lot of the time, squid will tackle prey maybe, like, three or four times their size, sometimes just their size or smaller. The great thing about being a squid when it comes to eating is that you don't just have your mouth to work with, you also have your arms. Because a squid's mouth is in the center of its eight arms. So, the whole area that you have to munch on stuff is all of your limbs all together. Because of that, they can eat things and kind of hold onto it while they're eating it, that are bigger than a lot of other animals could handle.

**Aside:** Imagine going hunting and taking down a burrito the size of a sleeping bag and then just cradling it in your arms as you munched. Squid are living that dream.

**Alie:** Are they snacking on that thing for days and days? Can they cram the whole thing into that yum hole?

**Sarah:** Great question. They're pretty much just eating pretty quickly. Their digestive systems move a lot faster than ours, or at least the really fast moving, super athletic squid, their digestive systems are moving pretty quick so that they can get all the nutrients they need to be constantly swimming with their super muscular bodies. Because the way squid move – not all squid, because there's like 350 different ways to be a squid – but the Humboldt squid, which folks may have heard of, they're really, really big and constantly, powerfully swimming.

**Aside:** Humboldt squid, up to two meters or six feet, or as tall as a refrigerator... a squidgerator.

**Sarah:** These guys have really intense metabolisms and need a lot of calories to survive a day. So, they are eating most anything. When you texted me the other night I was like, “Oh man, I better review a couple things about squid to make sure that I’m bringing my absolute squid A-game to you today.” [Alie laughs] And I was literally reading through, speed reading through, *Cephalopod Behaviour*, my favorite cephalopod book. It’s a little dense for some folks but if you really want to get a lot of cephalopod behavior information, it’s the cephalopod behavior bible, so check that out.

Anyway, in that book, I read that Humboldt squid will literally eat, like, a banana peel that gets dropped off of a boat. If it’s moving, they’re going to eat it. You always hear about like, “Sharks will eat anything, you’ll even find license plates in their stomachs.” I have no idea if that’s actually true.

**Aside:** I’m so sorry, quick aside. I had to look into this. Do sharks really eat license plates? They... do, very much, according to one article I just read with my jaw fully unhinged. Many nouns have been found in sharks’ stomachs. For example, tires, a cannonball, a golden Spanish coin, an entire suit of armor with a not-alive person in it, an unopened bottle of Portuguese Madeira wine, and a half-digested bag of money. That last one was off the coast of Florida, naturally.

**Sarah:** These squid will eat anything from another squid of their own species to a banana peel. Why was I talking about...? Oh right, so they don’t hang onto food, they don’t do leftovers. They eat it while it’s alive, pretty quickly, and if it doesn’t fit in their stomach, they just drop the rest of the animal’s body.

**Alie:** Oh god, is that becoming marine snow then?

**Sarah:** You got it. Yup! If they don’t want to eat the shrimp head, or whatever it is they’re working with, they just drop it and then maybe another, like a vampire squid, or somebody else, deep, deep below, will finish off the meal.

**Alie:** But there are some, I guess, cannibalistic or carnivorous squid that do kill their own species, so that’s kind of *Squid Game*-esque.

**Sarah:** You nailed it! Yeah, okay, that gets to the heart and the real spirit of this show, *Squid Game*. That’s true.

**Alie:** Hit me with more tricks.

**Sarah:** All right, the next one we’ve got is called... and I don’t remember if I talked about this in the last episode, but it’s called passing cloud. A lot of different cephalopods do this, but the poster child is the broadclub cuttlefish.

So, passing cloud, it is what it sounds like. They take their color-changing cells... For a full review on color-changing cells, please refer to Teuthology, the last squid episode we had. They basically can change their color as quickly as they can think to change color because their color-changing structures in their skin [AI voice: “*Chromatophores*.”] are directly linked to the brain. So, they’re able to do it incredibly fast. What they’re doing, they take these bands of dark coloration, and they move it across their body, and it ends up looking remarkably like a hypnotist’s wheel. [“*You are getting very sleepy.*”] So, a lot of times, you’ll see these animals approaching maybe a crab or whatever they’re trying to eat, and put on this hypnotic, wild-looking, passing cloud maneuver and then while the crab is like, “What am I looking at?” they get eaten. So, that’s another solid trick.

The other cuttlefish-related trick that we can talk about right now is, some cuttlefish will really contort their arms and make them move almost like... they look like they're mimicking crabs. They've found that when they sort of pretend to scuttle like a crab does... because if a cuttlefish is moving normally, they're pretty smooth, they're kind of gliding, they're kind of hovercraft-like in their motion. Meanwhile, crabs are more like... they're like, you know, [*clicking, pattering noises*] like mechanical toys kind of; really jerky movements. And so, the cuttlefish will mimic that, and the crab will be like, "Oh yes, another one of my compatriots," and then get eaten. [*Alie laughs*] So, that was another really cool thing that has been described in the last decade, so that's pretty cool.

**Alie:** And I know this is such an annoying question to get but I'm going to ask anyway. Are they able to figure out how... I hate using the word smart, but how clever, say, some cephalopods are in terms of problem solving and thinking ahead? Or do they figure that most of this is just straight-up, instinctual behavior?

**Sarah:** That's a good question. We do have an answer for "Is this stuff instinctual or is it not? So, there are some examples of cephalopods, octopus, and I think there's also some studies in cuttlefish, where they show a cuttlefish learning something from another cuttlefish or another octopus. So, some of this stuff just comes naturally. Passing cloud, that hypnotist wheel thing, they just come out of the egg doing that kind of thing.

But I don't know about the crab mimicking. That might be something that they taught each other. It's not as complicated, I don't think, as orcas who have tricks that only some regions of orca will have. It's not at that level. But they do certainly learn. There's a lot of studies on cephalopod learning. For example, when cuttlefish first hatch and they go to attack crabs, they're kind of bad at it. They get bitten by the crab, kind of a lot, because they haven't figured out that they have to attack the crab from behind because then they'll be safe from the claws.

**Aside:** Let's just pause for a moment to imagine a tiny baby squid, doing like a sneak attack on a crab back and being like, [*baby voice*] "Oh okay I got it now. From the butt, no pinchies."

**Sarah:** So, they don't come out perfect when they hatch, they need to experience life a little bit before they get good at being a cuttlefish.

**Alie:** Can you imagine if you had a baby and you were like, "Well, if you're going to eat chicken, you better learn how to get a chicken."

**Sarah:** "Don't get pecked buddy, good luck. You're going to get pecked a couple times and I'm okay with that as a mother." Yikes, yeah, what a nightmare.

**Alie:** Yeah, just being like, "Well, if you want to eat beef, you're going to have to get gored a couple times before you figure it out..." Tiny, tiny baby.

What about... Now the passing cloud, wasn't that something that got you really into cephalopods?

**Sarah:** Yes! Good memory. Yeah, that was the first thing I saw when I was a little kid, I saw a cuttlefish doing passing cloud and I was so overwhelmed by how cool and weird that was that I pretty much was hooked from that day on to learning about cephalopods because they are the coolest.

**Alie:** Also, I know that some people might say, "A cuttlefish? What is that? Is that a squid or not?" And I remember I got to know you because a few people, bless their hearts, tried to explain

to you on Twitter that your squid, your bobtail squid species you were studying were cuttlefish and you were like, "Mmm... I'm a squid scientist."

**Sarah:** Yeah, yeah. I mean, I do get it though, because putting cephalopods broadly into, like, a phylogeny or a family tree is not as easy as you might think it is. They've been around for 500 million years, this is cephalopods in general, and so they've had a lot of time to get different and in some ways also still be similar to each other. So, the bobtail squid, yeah, it's not a cuttlefish, that's for sure, but it's as different from a cuttlefish as it is from other squid.

So, you know, the words that we use to apply to animals in general, and trying to approach, like, "how related is this animal to that animal?" it's more blended and complicated than your, you know, high school textbook is going to imply. So, I totally understand when people are like, [echo effect] "What? Is that a cuttlefish? It's round like a cuttlefish so...." So, I understand the confusion.

**Aside:** Oh, and speaking of games and sleight-of-hand, rather, tentacle, people tend to get bamboozled and think that reef squid, with its full bed skirt fins, is a cuttlefish. So, they also do some similar shenanigans.

**Sarah:** So, reef squid and cuttlefish, look the same, not genetically the same. But they both do this thing where they will take their arms and wave them above their head in kind of a, "Look at me! Look at me!" maneuver, and then hit them with the tentacles while the prey is looking at their arms waving above their head. I recall when I was a kid, my dad would take his right arm and wave it in the air and then whack me with his left hand in a playful, non-abusive kind of way. And it is very similar to that. So, that's another cuttlefish maneuver.

**Alie:** Give me more.

**Sarah:** All right, all right. This is, I think, my favorite squid trick. This is so wild. So okay, there's *grimalditeuthus bonplandi* – and I would give you the common name for that, but a lot of these deep-sea squid don't really have common names, so we're just going to call it *grimalditeuthus*. It's a mouthful but that's what its name is. So, it is one of these deep-sea squid, it is super cool because...

Okay let's go over, real, real, real quick arms and tentacles. Arms: they've got eight of them. Tentacles: they've got two of them. Arms have suckers all up and down the limb. Tentacles are super stretchy for the most part and then have little clubs, or what looks like little hands, at the end. And those have, usually suction cups with extra grip on them. So, maybe there will be a ring of teeth, maybe it will be a hook, it depends on the species that we're working with.

But either way, this particular deep-sea squid, it has a modified, strange little tentacle that looks kind of like a little squid. And it'll puppeteer that little end of the tentacle to attract prey items that are going to then attack its tentacle and then it'll eat that item. So, it's a lot like the angler fish lure or like any fishing lure in general. But there's a video that I'm going to send you that I hope you can share with everybody, it just looks like it's like, "Hey, look just a little squid, you want something to eat?" [Alie laughs] And then presumably when somebody attacks, it'll eat them. It's just... downright dastardly, it's really effective.

**Alie:** Nailed. And what a convenient fishing lure, if it's attached to your actual body.

**Sarah:** Yeah, at the business end of your hunting apparatus. Pretty effective.

**Aside:** All right, so I watched a video of this and yeah, it's like if Slenderman went flyfishing using his hand. You're walking through the woods and you're like, "Is that a cup

of French fries? Yum, yum.” And then Slenderman is like, “Bazinga, it’s my creepy, salty hand.” And you’re like, “Wow, the worst thing about Slenderman is that he says ‘Bazinga.’”

So now, we’re going to talk about sexy things, but in a minute. First, we’re going to aim our money bazooka at a worthy charity which is, Skype a Scientist. They not only pair a scientist with various groups, but Sarah also hosts an after-hours science trivia series for grown-ups every Thursday night, 8 PM Eastern time. They have a Science for Change series that has so far covered sleep science and also the opioid epidemic. They’re doing so many great things. So, a donation went to those efforts, made possible by sponsors of the show.

[*Ad break*]

Okay, this episode was a weird one, so no Patreon questions which is super rare. But let’s get into squid games that tickle the mind and the heart, well three hearts. Squid have two hearts for their gills and then one for the rest of their body. It’s weird. Anyway.

**Alie:** What about in romance? Are there any flirtatious trickery that occurs in squids?

**Sarah:** You betcha. So, the go-to here is the giant Australian cuttlefish. Now, these animals are cool for a lot of different reasons. They’re the biggest cuttlefish, they can be about a meter long, which is pretty big... very, very big. And what they do is wrestle each other. So, this is the one official game that I can come up with. Okay, this is it. [*drumroll*] Wrestling is in the Olympics, and we call the Olympics the Olympic Games, ipso facto, cuttlefish wrestle and play games. That’s what I’m going to go with.

So okay, the big males, particularly during mating season, will wrestle each other for dominance and all that. There’s a pretty big size range between the biggest males and the smallest males. The smallest males pretty much know that they don’t stand a chance in the wrestling. So, among the mating aggregation that gathers annually for these cuttlefish, there’s kind of like a go-to male coloration and female coloration. The males are purple, blue, and zebra-striped and the females are a splotchy maroon and white.

What the little males do, they can pick what color they are, that’s kind of their call. So, they just put on the splotchy maroon and white pattern, get around the whole wrestling maneuver. They’re like, “Thanks, but no thanks,” [*Alie laughs*] go to the female. And then when the bigger males are distracted, wrestling with each other, doing whatever they’re doing, they’ll real quick, change back to the male coloration, mate with the female and then get out of there.

**Aside:** Okay, so I sat around and thought about this for too long and in the Olympic Games notion of things, the event would actually be the wrestling, and then the real trickery is happening in the audience. So, one male squid is in the stands whispering, “While all you beefy dudes are grappling, I’m going to dress like your girl and then I’m going to steal your girl.” Style, swagger, the Australian cuttlefish is the low-key Harry Styles of squid... but a cuttlefish.

**Sarah:** So, that’s a pretty solid trick.

**Alie:** That’s a great trick! Do you think any of the other ones ever catch on? Like, “How do I know if this is an imposter or not?” Or “I’ve done this, and I’ve gamed other people; how do I trust again?”

**Sarah:** That’s another solid question. So, here’s the thing: cuttlefish don’t live that long. When a cuttlefish mates, it dies pretty soon after the mating season. So, I wonder if, since the mating season happens all in one go and then everybody dies, like, if a cuttlefish would



survive to a second mating season, maybe they would catch on. But maybe they don't. I don't really know the answer to that question, that's a good question.

**Alie:** Well, I guess I'm going to have to become a teuthologist now.

**Sarah:** Join us. The beauty of being a squid biologist is that there are so many questions that we're like, "I don't know the answer to that question; somebody's got to figure it out." And when you compare the number of squid biologists to fish biologists, there are way fewer squid biologists. Squid are wildly important ecologically and there are a ton of them all over the ocean, so yeah, the more the merrier, for sure.

The more we send ROVs, these remote-operated vehicles, these little robots down to the deep sea, the more cephalopods we see. So, we just keep finding more and more and more because they do pretty well in the deep sea and we're giving ourselves more opportunities to bump into them by sending more vehicles down. [*many voices in an ROV: "Ohhh my gosh. It's got creepy eyes on it, it's so spooky. Lasers coming off, ready to zoom. Oh gosh."*]

**Alie:** When they have livestreams of Nautilus, are you ever glued to those? Or are you just waiting, like, "Let me know if we see a squid and then we'll watch the clips."?

**Sarah:** When I was writing my PhD thesis, I would just have it on, going in the background [*Alie laughs*] and if something good happened I'd be like, "This sounds like a great breaking point for me to stop writing this boring sentence I'm writing and watch." But typically, I've gotten to the point where people will tag me whenever anything good happens on Twitter. So, I usually find out pretty quick, which is an excellent feature of having a strong brand on social media. If anything good squid happens, I hear about it, which is great.

**Alie:** Yeah, I'm sure that this particular season, with squids being in the media so much, has got to be so agonizing for you. I feel for you because it's not often that the number one show in 90 countries has your study species front and center.

**Sarah:** The more squid are being discussed, the better. I'm all for it.

**Alie:** Yeah, but the *Squid Game*, you're being catfished though, in a sense.

**Sarah:** A little bit.

**Alie:** It should be Catfish Game because, again, nothing to do with squid.

**Aside:** Moving on. [*Johann Strauss II's, The Blue Danube Waltz plays. "The next squid game will begin momentarily."*]

**Sarah:** So, *The Hunger Games* is kind of like *Squid Game* in that we've got like a *Battle Royale* situation happening. You may recall if you watched *The Hunger Games* that there's a portion where Peeta will turn himself into a rock and moss. [*"Oh my god, Peeta, Peeta." "Hey."*] And bobtail squid 100% this. They have the ability to make their skin super sticky and they will stick rocks to themselves and then end up looking exactly like sediment. So, it's not that they are using their color-changing ability and texture-changing ability to look like rocks, they just literally glue rocks to their skin. [*Alie laughs*] So, that gave me very strong *Hunger Games* vibes and therefore I'm going to connect that to *Squid Game* as well.

**Alie:** It's like a ghillie suit, essentially, made of rocks. It's like one of those hunting suits. How do they make their skin sticky? Is that just at will or is it always that sticky?

**Sarah:** It's not always that sticky. And the really, really cool thing is that when they realize that they've been seen, they will suddenly unstickify, and I don't know how that works. They will secrete a glue, basically, to their skin and that's how they get it to stick. How they let go

so quickly, I don't understand. Because once I have glue on my skin, I'm done for the day, [Alie laughs] there's nothing to be done. But they manage it and it's totally amazing.

**Alie:** Did you have to try to look for them in the aquarium when you were trying to study them? Did you have to dig them out?

**Sarah:** Yeah, so I would take teeny, tiny little blood samples from them. So, sometimes they would be out swimming, sometimes they would have just their little eyeballs sticking up out of the sediment and I got very good at picking out the squid out of the... with the little eyeballs sticking out. And sometimes they would be buried so effectively that I would just have to very gently rake my fingers through the sand until I found them.

**Alie:** But props for the attempt for them.

**Sarah:** I mean, they're doing a great job. If I had a whole ocean to rake through, I'd never find them.

**Alie:** Do they ever squirt each other as a trick or a game? Do you ever get squirted?

**Sarah:** Thank you! That's an excellent segue to my next trick. Yes, octopuses and cuttlefish, particularly those in captivity... This is like the closest to play I think we get, but I'm like... I study immune systems and bacteria in squid, I don't study the behavior of squid, but it seems pretty play-adjacent to me, from my human perspective.

So, they will just take their funnels and direct them at their... like the person taking care of them and shoot them right in the face with water. This has happened to me on numerous occasions. I used to work with octopuses, and I worked with cuttlefish for a while as well in my former lives and, yeah, I mean the precision is wild. I got like a full, *full* face full of water one time when I was trying to show a new student through the lab. I was an undergrad at the time at Boston University and they were having a family come to... "Maybe our son is going to go to Boston University." And they're like, "I know what we'll do, we'll show off the octopuses." And sure enough, my hair was just dripping into my face. I was like, "I promise I'm a professional." But yeah, I mean, they know precisely when to ham it up, for sure.

**Alie:** And is it, like, a nozzle that they can essentially just use their muscles to kind of like, point it in a certain direction. Is it a siphon? What's it used for other than squirting undergrads in the face?

**Sarah:** [laughs] So, they use it for directing their motion all the time. There are kind of two ways that squid move. There's the major squeeze, jet propulsion. So basically, they're taking in a huge amount of water into their mantle, which is kind of like their version of a torso, and then they seal off where they breathe the water in and then have to squeeze it all out through this little tube called a siphon, or a funnel. It's like letting a hose go on full blast in your backyard and watching it go all over the place, or like letting a balloon go. And that's where their really forceful power comes from.

There's also their fin flapping, which is sort of what they would do if they're kind of wanting to just hover in place or do really fine motions just around their environment. They can use their fins of course for little flaps and they also use their fins, kind of like, as a direction control kind of thing.

**Alie:** Do they ever slap each other with their fins? Probably not right? They're polite.

**Sarah:** They wrestle, they will grab each other for sure. I don't think they slap each other. I think slapping... You know what? No. I was going to say I think slapping is really a land animal

thing. Oh, you know what, there is that story about the octopus punching a fish that came out, I think this past summer, and they were just doing it for fun. I love the idea of an octopus just punching a fish out of spite.

**Aside:** Wait a second, do octopods slap fish? Oh my god, they do. So, I just went on a deep dive, and in a 2020 study published in the journal *Ecology* titled, “Octopuses punch fishes during collaborative interspecific hunting events” researchers noted that several aquatic species will form “collaborative hunting groups” and that “ecology and gameplay are implicitly linked.” So, there is gameplay out there, I guess. The study continues to say that octopuses form alliances with reef fish and groupers, and they can be mutually beneficial. But that, “conflicts between partners can arise over the level of investment or the distribution of payoffs” and that “partner control mechanisms might emerge.”

Partner control mechanisms? This is sounding more and more squid gamey. So, the cephalopod scientist described it thusly. “The octopus performs a swift, explosive motion with one arm directed at a specific fish partner, which we refer to as punching.” They straight up say it! They also noted that, sometimes, they do it for no apparent reason, these octopuses! Underwater drama. There’s not even a giant piggy bank filled with cash or shrimp. But it does address the core matter of worker exploitation. So fish, I stand with you now. Okay, let’s change the subject. Let’s talk about babies, squid babies.

**Sarah:** So, there are these teeny tiny babies of squid and in the science land we call them paralarvae, which is, like, just a little squid that looks different from the adult squid. So, the genus is called *Gonatus*, there’s a bunch of different species of squid that all do this thing.

What they do, when they’re little paralarvae, they take their arms and face basically, their head, and tuck it into their mantle. What that does is make them look like little, tiny jellyfish. Jellyfish, generally speaking, are not super nutrient-rich whereas squid are, they’re full of protein, they’ve got a lot going on, jellyfish not so much. So, if you’re comparing, like, better prey items here, the squid is going to be the better option. So, if the little squid pretends to be a jellyfish, they’re less likely to get eaten. And so, it’s kind of like if, you know, you were in middle school borrowing somebody’s sweatshirt that is much, much, much larger than you and you can tuck your head, and your arms, and your legs into the sweatshirt. That is very much the vibe of this little baby squid.

Yeah, and shoutout to my buddy Casey Zakroff who... When you texted me about doing this, I was like, “Oh man, I want to make sure that I bring new stuff from the last time that we talked.” So, I was like, “Wha- wha- what are games that squid play?!” [*Alie laughs*] And he was like, “This is not a game, and neither is anything else that you just listed to me, but let’s talk about this cool thing that paralarvae do.” And I was like, “That’s awesome. I didn’t know that.” Always something new to learn about squid.

**Alie:** Well, that does make me wonder, do siblings of squid eat each other? Is there anything *Battle Royale*-esque about the way that they might compete with each other? Like spiders might all come out of an egg sac or praying mantis leaving the...

**Sarah:** Praying mantises for sure do it; that happened in my office this year. My god. Anyway. So, some squid species are more cannibalistic than others. The little bobtail squid that I worked on during my PhD, they don’t really eat each other at all, I’ve never seen it. And we’ll pack them in pretty tight when they’re really, really tiny because for some reason they eat better when you pack them in a lot in a little space. I don’t know what that’s about, but it’s a thing. So, I don’t know if it’s so much like when they first hatch, but certainly when

they live in big groups and there's nothing else to eat, they will absolutely eat each other. Humboldt squid are pretty notorious for that, but they're not the only ones that do it.

**Alie:** But there is some kind of *Battle Royale*?

**Sarah:** Sure, sure. I think that praying mantises are more brutal when it comes to the *Battle Royale* nature because if there's something else to eat, they'll pick that, but squid certainly do sometimes get violent with each other.

**Alie:** So, it does happen.

**Aside:** Listen, there are 456 players in *Squid Game*, and we all have our own favorite. You all know, maybe it changed a couple times. But there are 300 identified species of squid, and so many more just mysteriously creeping the deep. So, does your favorite Teuthologist Sarah McAnulty have a favorite herself, close to her heart? Oh! Does she ever.

**Sarah:** We have to talk about *Magnapinna*. This is not a game, this is just the best squid. When people ask me, "What's your favorite squid?" I usually say *Magnapinna*, and I know my cephalopod biologist Diana Li agrees. So, *Magnapinna*, very, very large, has a ginormous, round fin that it very slowly undulates through the water. They're pretty pale in color, so they look super ghosty, but the spookiest thing about these squid is that they have really, really, really long arms. Like, eight meters long.

**Alie:** WHAT?!?!

**Sarah:** You've got to watch a video of these things.

**Alie:** Eight meters?!

**Sarah:** It's too long.

**Alie:** For the Americans, that's 24 feet.

**Sarah:** Yeah. It's too big.

**Alie:** Times ten?!?!

**Aside:** So, these bigfin or long-arm squid, *Magnapinna*, have roughly... 240 feet of legs, or rather arms. Just covered in microscopic suckers. They catch teeny, tiny prey, kind of like fly strips.

**Sarah:** Yeah. And on top of that... Just having long arms, all right, that's already a little creepy. But they hold them out at this weirdo angle. So, they will splay their arms out and then the dangler part of their arms will just fall limp. So, it looks like they have elbows, which is already unnerving because cephalopods don't have bones, so how do they have elbows? But they do have elbows, in a sense, and it is the creepiest thing.

And they're often found... I think the earliest footage of these animals was around like oil rigs. The oil rigs will have, for whatever reason I don't really know why, will have cameras. And so, if you type in "magnapinna" into YouTube, there's kind of a greenish looking video with a really shaky camera, which also adds to the horror movie aspect of this thing, and you see first, you just see the body of the squid, slowly undulating its fin. And then the camera pans down and you're like, "Oh my god, its arms are still going." And then it pans down again, and its arms are *still* going. And then it zooms out and you see this whole creepy, weirdo animal. It's the best. It's such a good squid. It's such a good squid! And how many squid like that are in the deep ocean but maybe they're afraid of bright lights? And they swim away before we get a video of them? I don't know. There's so much to know.

**Alie:** Dude, I just Google image searched this. Mack, fuck. What?? This thing is eerie, this is the scariest thing I've ever seen.

**Sarah:** It'll strike fear into your heart. I just feel so much joy every time I look at them because of the spook factor. I already like *Creature From the Black Lagoon*, and Godzillas, and mothmen. That's my scene and this animal is the real-life Creature from the Black Lagoon, and I just love it so much.

**Aside:** So yes, these things have this elegant, flapping, sarong of a fin at their head, and then arms that jut out stiffly for a foot or two, and then take a sharp elbowy corner turn into these dangling flesh streamers that fade into the blackness of the sea. And one video I watched, the most upvoted and presumably relatable comment was, "I've been crying over this squid for half an hour. I hate it."

**Alie:** This hits on every level, because it looks like a giant bacteriophage, so you're already afraid of whatever kind of viral shenanigans it could be up to. It looks like a huge spider, it looks like a ghost, it looks like an alien. The footage that I'm seeing stills of absolutely looks like paranormal experience would be...

**Sarah:** Yes, yes! Like *Paranormal Activity*!

**Alie:** Yes, *Paranormal Activity* movie meets *Blair Witch* shakiness. I've never seen a more horrifying animal that I respect so deeply.

**Sarah:** They're so big, so huge.

**Alie:** They're so big, what does it even eat? Does it eat babies?

**Sarah:** If there were a baby down there... The nice thing about this animal, for folks who are like, "Well, thanks Sarah and Alie, I'm not going to be able to sleep tonight." You're never going to encounter this animal in the wild because where they live, humans couldn't survive, we'd be crushed like a tin can.

**Aside:** Okay, so with the greatest depth that these beasties have been sighted, being 4,700 meters, that means these spindly babies might be 15,000 feet under the surface of the sea. And I mated around a little and that would put 7,300 pounds of pressure per square inch on your body. So no, chances are that you will not be taking a dip that deep and coming face to tentacle with this majestic nightmare.

**Sarah:** They're just the best. They're my favorite. I want everyone to know they exist.

**Alie:** I have so much respect for this magnapinna and all of the squids. Can you imagine just being able to change the way you look? Make yourself look like a park bench, people you don't want to talk to walk right past you. I mean, they do amazing things and then you're just like, "I'm going to use my jet propulsion to squirt someone in the face, just for shits and giggles."

**Sarah:** Yeah, yeah. They're not even going to see it coming, they're going to say, "Who just squirted me in the face?" But you're over here looking like a park bench, they've got no idea.

**Alie:** [*laughs*] I love them so much. For more facts like this, for example... who can people text to get these kinds of facts?

**Sarah:** You've got to text the SquidFacts Hotline that has been made particularly for this purpose! [*Alie laughs*] All you've got to do, text "Squid!" to 1-833-SCI-TEXT, that's 1-833-724-8398. It's not going to charge you anything, it's just a squid biologist that needs you to know all the facts going forward in your life. It's important, you've got to know this!

**Alie:** How often do people get a fact? Do they just get that one fact? Or do they like, weekly, monthly? How often is the robot sending out information?

**Sarah:** It's up to the texter. What happens is it's like, "Hey, welcome to the SquidFacts Hotline!" and then you get a squid fact, of course, your inaugural squid fact. And then it's like, "By the way, this program is run through Skype a Scientist. Do you want another squid fact? Press 1. Do you want more information about Skype a Scientist? Press 2." And then you can just keep hitting 1, over and over, and over again to get more squid facts.

**Alie:** You've just made so many first dates... richer.

**Sarah:** Yeah, and if you're on a bad first date... You're going to be like, "Oh my god, I need to go to the bathroom to figure out what to do about this situation. I still have half a beer left, I don't know how I'm going to make it." Just start texting the SquidFacts Hotline and then you can start reading the squid facts to your bad date. Problem solved.

**Alie:** If only you could disappear into the wallpaper. If only! [*laughs*]

**Sarah:** If only. I wish I could give you that too.

**Alie:** Sarah Mack, what a joy, what a delight. I can't thank you enough for coming through in a way that the world needed right now.

**Sarah:** Of course. Always good talking to you, about squid or whatever.

**Alie:** Thank you so much for doing this. I just want to say to everyone out there who is about to get their phone blowing up with squid facts: you're welcs, pretty much.

**Sarah:** Absolutely.

**Alie:** You're welcs. [*applauds*] Yay. Oh! Sarah Mack, you made my day.

**Sarah:** Happy to. Love talking to you.

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Ahh yes, so ask serious experts, I guess, playful questions and wow, hot damn, you're going to learn some stuff. So, links to follow Dr. McNulty at @SarahMacAttack on [Twitter](#) and [Instagram](#), those are in the show notes. Definitely check out [SkypeAScientist.com](#) as well. Text the Squid and the Bug Hotlines. You can go to trivia on Thursday and meet some wonderful folks. I have played before, and it was a joy.

You can find us @Ologies on [Twitter](#) and [Instagram](#). I'm @AlieWard on [Twitter](#) and [Instagram](#), come say hi. Thank you to Erin Talbert for adminning the *Ologies* Podcast [Facebook group](#). Thank you to Shannon Feltus and Boni Dutch from the podcast, *You Are That*, for all the [merch](#) help. And happy wedding to Boni Dutch and her betrothed Joe this weekend. Wishing you all the best and many hugs!

Transcripts are done by Emily White of The Wordary. Kelly Dwyer does the website; she can do yours too, her link is in the show notes. Caleb Patton bleeps episodes for free, available at [AlieWard.com](#). Noel Dilworth and Susan Hale help with so much *Ologies* behind the scenes. Zeke Rodrigues Thomas and Steven Ray Morris are making more kid-safe, bite-sized, *Smologies* episodes for you. Truth be told, we had a wonderful advertiser, Dipsea, who was adult-themed, and we had to pause *Smologies* for October until their ad contract ran out. So, *Smologies* are back and even the ads are kid safe. Dipsea, we'll always love you though. Nick Thorburn made the theme music. And my main squeeze, main editor is Jarrett William Sleeper Handsome, of Mindjam Media.

And if you stick around past these credits, I tell you a secret. This is where the spoilers come in, okay? So, if you don't want to hear some *Squid Game* spoilers and trivia, this is your warning: dry your hands, put down your blow torch, press stop, do what you gotta do. Are we good? ... Are we good? Okay, you don't want to hear it, you're out? ... Okay, bye now. All right, come back later, if you're still listening, come back later when you've finished the series and your brain feel soggy with thoughts and trauma from the finale. All right, bye.

All right. The rest of us; we watched, we're ready to talk about it. Some squid game trivia, I collected from reading way too many articles about it because I had a lot of questions. Okay, I'm just going to run through these [*gibberish*]... Okay, so perhaps you've heard that the creator and director first wrote the series as a movie in 2008 and he couldn't get it made and he was forced to sell his \$675 laptop. That is true. But it glazes over the fact that he had a bunch of hit movies in between. He had one called *Miss Granny* that was a giant hit in Korea, it was second only to *Frozen* in the box office in Korea. But he wrote *Squid Game*, couldn't get it made, and he did it to highlight class disparities, and he certainly was familiar with them, he just got more successful later.

Also, adapting the film script into a series, apparently was not easy; it took him 6 months to write just the first two episodes. And at the time, his big goal was having it reach the most watched show in Netflix, in the United States, for one day. He's like, "I just want to touch the top, I want to touch the top for one day please!" That's still my goal for *Ologies* on the science charts... *Hidden Brain*, I can't unseat them. I've been number two for so long. Anyway, I get it. But what's my point? That *Squid Game* was in the number one position in the United States Netflix charts for 21 days, so way to go dude.

The writer and creator was so stressed out in making this that he lost six teeth while making the series. And I don't know if the timeline goes back to like 2008 or not, when he was selling his laptop, but even if it is, six is a lot of teeth, even if you lose them over a decade. If it's just over the last two years of making this, that's too many teeth. So, I hope he can buy new ones.

Also, it shot, I didn't realize this, during the pandemic. So, everything you just watched was shot between June and October 2020 when we were all sitting around wondering like, "Do we leave? Can we go? What's going on?" before vaccines and before all of that. And it did have to shut down for a month due to COVID.

Now, I went on a little bit of a deep dive on the actress who plays number 67. She had never auditioned for an acting part before, and she was the actress who played the North Korean who was trying to help her brother. So, she was the runner-up on *Korea's Next Top Model* and she was known for fashion work and Louis Vuitton ads. But she had this new manager and they were like, "Hey, why don't you audition for this?" And she was like, "Eughh, I've never done a self-tape." And she studied the script for like three days straight, she sent in a tape, nailed it. Apparently, the director knew she was the one immediately and described her vibe as "Wild and free, like an untamed horse." First audition ever. And her character speaks with a Seoul accent the whole time, until she's shown talking to her little brother, and then her character slips into a North Korean accent and a lot of Korean speakers say this was a genius detail that you missed if you didn't have that context and you were just reading the subtitles, so she had to study a lot to learn that accent.

Also, if you don't speak Korean, you missed a bunch of honorifics like how the older or more respected characters were dressed, like the grandfatherly Player 1 was always spoken to with reverence until the very last episode where our protagonist, 456, totally changes his tone and language to super rude and contemptful. I mean, what the fuck, given the circumstance of, "Oh, you're the dick behind all of this?" I was also so sad when he peed himself, and then I went back and I wondered if his character really did pee himself, was it fake pee? Who knows? That older actor, by

the way, super sweet dude in real life apparently, didn't have an agent and his daughter had to field a bunch of calls after the success of the show and be like, "Ahh my dad doesn't have an agent. Ahh, I'll take a message."

Also, you know the giant terrifying red light, green light robot? It's actually not saying, "Red light green light" as the subtitles would have us believe. It's actually talking about the national flower of Korea, I think it's a hibiscus flower, blooming. And when she sings songs, it's to say, "The flower is blooming," which means, freeze.

Also, apparently if you watch back, one article says that you'll notice that her all-knowing robot eyes, don't scan Player Number 1 when he moves and when she's looking for people to pick off, brutally. Good to know, worth a re-watch perhaps. Also, you know that sad shot of Number 1 being all alone with no partner, and it was heavily memed, and it was like, "Who hasn't felt like this sometimes?" Well apparently, some folks have suggested that he was just sitting it out, chilling, because he knew that he wouldn't die if he was left solo for the marble game. Go figure.

Okay, you know the candy? The shape of the candy looks like honeycomb. It's called Dalgona and it's made out of boiled sugar and baking soda and street vendors would sell it a lot in the '80s. They still sell it, but they give you an extra piece or a little prize if you don't break it. The writer himself used to use the licking trick to win all the time as a kid. And then to make all of these for filming, they literally had to bring in, like, a Dalgona expert vendor who was just cranking them out behind the scenes on a really hot day. And the Dalgona candy expert almost quit. Was like, "I'm out of here, this is too many of them and it's too hot, I'm out." But apparently, they were like, "Please stay. We'll be nice to you."

Okay, when they shot the glass jumping sequence, the real thing was a platform about five feet off the ground, so the actors were actually like pretty scared. You try jumping between anything five feet off the ground, you'll be like, "I'm going to crap my tracksuit," maybe. Also, the amount of cash in the piggy bank equates to about 38 million dollars, in case you haven't googled that yet.

Oh, his redhead makeover at the end. I was like "What? That seems like such a random choice for him, cosmetically." But apparently, it might be a reference to *The Matrix* and being red-pilled or finally learning and accepting the secret machinations of evil behind everything in the world. I have to say, I did not think that when I watched it. When I watched it, I was like, "Oh my god, why that collar with a white shirt? If you sweat at all, that collar is going to turn pink. Also, god... I hope he doesn't use hotel towels with that kind of dye job when he gets to Los Angeles. That's going to be an absolute nightmare."

Also, my impression was that he got off that flight to go play again, suggesting maybe that he is just addicted to the gamble, he's just going to chase that dragon. But other people are like, "No, he's going to go become the frontman, or he's going to go stop it all and kick some asses. Apparently, probably going to be a Season 2, so we will find out. But if they don't put at least one squid in there somewhere... hide it in the background, put it in a sandwich, anything. They're really missing a great opportunity for some siphon high jinks, chromatophore trickery, fishing decoys, just consider it.

Okay, thank you for tuning in, please hydrate, get some sleep, don't devise any mass killing for the sake of billionaires' blood lust, okay? No matter how bored you are. All right... Berbye.

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



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