

Tropical Fungi Summit

Liliana: This is the Tropical Fungi Summit and I'm pausing recording until we have speakers and the event is ready to go. Welcome people that know in the chat and enjoy, enjoy this music. Let's see. All right everyone. Welcome. We are so, so, so glad to have you here for the Tropical Fungi Summit. My name is Liliana and I'm the community outreach. So much beautiful music I hope you enjoyed that as you entered in. But we are here today for the Tropical Fungi Summit. And as I said my name is Liliana, the Community Outreach and Events Coordinator for the Maintainers. The Maintainers is a global research network interested in the concepts of maintenance, infrastructure, repair and the myriad forms of labor and expertise that are necessary to sustain our human built world. I'm going to post into the chat here now, and link where you can learn more about the Maintainers and read our code of engagement for events. Hope that you saw that there. The Maintainers Movement Fellowship is a year-long fellowship that advances the movement for maintenance, thinking and action. And it's composed of fellows whose maintenance repair and care work has substantial connections to the environment. Today, your event lead is Rheanna Chen. And she has been a lifelong commitment to sustainable development in the Caribbean, using strong systems thinking, capacity building, communication skills to design inclusive spaces for food sovereignty, climate resilience, and community empowerment in her homeland of Trinidad. Just a little bit of housekeeping before we go ahead and get started. This event is being recorded for our collective reference which will be sent out to all attendees along with notes that my colleague Lauren and I will be taking throughout this event. And in the chat here is now the event agenda. So you have a bit of a sense of what our overview will be throughout the, our time together. And if you have any questions throughout the event, please type them into the chat box and Rihanna will facilitate the questions during the Q&A after each speaker presents. And so to start utilizing the chat, as we all arrive, let's share who is in our ecosystem here by writing your name pronouns and where you're calling in from. Over to you Rheanna.

Rheanna Chen: Welcome. Bienvenidos. Bienvenue. Today is a very exciting day. It's our first ever Tropical Fungi Summit. What does that mean? For those who have an interest in this beautiful platter of mushrooms right here growing in Trinidad, we are going to have a fantastic time. I want to thank you for signing up, all of our speakers gathered today. Because this is going to be full of very useful information, I know for me at least. I'm here as a Maintainers Movement 2022 fellow. And each of us are meant to choose one subject. And I've chosen the kingdom of fungi, I feel in the world with the pandemic, with war, with climate disaster, and a lot of just natural disasters across the world happening that there's a lot of despair. There's a lot of feeling of hopelessness. And again, the theme of solidarity. And as we've talked as a collective of the Maintainers I feel yes, people think of solidarity as people and civilization. But if we go a little bit lower to the soil, and then below the soil, I strongly believe that where there is life, there is mycelium. And what do these networks of mycelium have to teach us? So we're going to be exploring through the summit a variety of angles to look at it, from my mycology to ecology, through agribusiness, to the gastronomy, to the medicinal side, and then over to design. So I encourage each of you to have a pen, a paper a way to make notes, because it's going to be really interesting. Please use the chat and share any of your questions after the speakers and I will curate the space. For those who don't like to write publicly, you can also send a private message to myself. We want to be mindful of that. And every now and then you might hear me with my little mindfulness bell if I go in over time. So if you hear a little sound, it's just a reminder for us

to take a breath. So I just want to ask a few questions. So this is a little game. I know, talking across the globe like this is a little strange sometimes, but each of you have the option of a reaction. Okay. So we're very intergenerational right now. And you can choose any emoji that you want. So just to get a cue, I'm going to ask a few questions. First one. Who here has heard of the Maintainers Movement? Put an emoji up. Anyone that you want. Okay, a few of us. You can take that emoji down. Nice. Next one. Who here is a mycologist of some kind? (Inaudible) and (inaudible) mushrooms? Raise your hand. Okay, I see a few others. I see one from Daniel (inaudible), Louis (inaudible). Wonderful. Okay, lower your hand now. Who here has foraged for mushrooms this week? Or went on a walk somewhere and saw mushrooms that they didn't know how to identify? Put an emoji up. I see Janelle. Great. I see Malia. I see Alexis. Wow. A lot of people even Sam over in New York and Justine. Lower your hand. Very interesting. Okay. Who here has eaten mushrooms? It could be on a pizza. It could have been with your eggs for breakfast. Any form of edible mushroom this week? Raise your hand; show me an emoji. Wow. Okay, I can't keep up lots of people. (Inaudible). Okay, I see Lilia and I see Danielle, wonderful. You can lower your hand now. Who here has used mushrooms in any form of medicinal form? This could have been maybe in chocolates, in a (inaudible). Raise your hand. In a tincture. Okay, a few people. Very nice. I see Sarah, I see Renee. Wonderful. You can lower your hand. And last question is who here believes that mushrooms are the future to teach us to be more caring as society and as a planet? I think that's almost everyone raising their hands. Good. We have a mushroom party. So without further ado, everybody, Tropical Fungi Summit begins. And to open up we have our first speaker. I'm going to introduce Mr. William Goss. He is our Trade Mycologist here with over 14 years of experience. He is a colleague of mine from the University of California Davis. He graduated with a degree in plant genetics and a minor in mycology. He was a growth supervisor at Monterey Mushrooms, which is the U.S.'s largest organic mushroom farm. And he's implemented best practices of maximizing fungal cultivation, including a biotech startup, growing process and mycelium and disrupting the conventional leather industry. He is currently the Mycology Director for the California Psilocybin Decriminalization Initiative. So everyone if we can give a nice warm welcome over to Mr. William Goss he's going to share about what mycology can teach us.

William Goss: Thank you so much for that warm introduction. I'm really honored to be a part of this Tropical Fungi Summit. It's really great to see some folks posted in the chat there from Santa Cruz. Great to reconnect with you Rheanna. So I'm just gonna jump into it. Got five quick minutes. So this will be the fastest intro to mycology ever, and it's gonna hopefully knock your socks off a little bit. And if I can get a verification that y'all can see the presentation that'd be great. Okay, how are we doing? We got the intro slide.

Liliana: Yeah, we can see it.

William Goss: All right, fantastic. So this is maybe the most iconic mushroom *Amanita muscaria*. This is iconic because of its traditional uses in Siberia and Siberia. There's connections to Santa Claus and folklore up in the Northern European region. You may be most familiar with this mushroom because it's the most widely grown the most widely consumed button mushroom *Agaricus bisporus*. These are actually both *Agaricus bisporus* and through selection and breeding we can have these white button mushrooms which came from a mutation or you can have the large open cap Portobello's, which also relates to how it is grown. A lot of people have an

interest in what this mushroom symbolizes, a one up mushroom from (inaudible). And there's obviously a lot of attention right now on psychedelics through the work of people like Paul Stamets or Michael Pollan. But really, with that, I want there to be a recognition of the cultural use and largely in Central, Central America and Mexico and the work with Maria Sabina and the people that have been safeguarding these magic mushroom psychedelic for a long time. When we're out in nature, this may be what you see most often which is known as a fairy ring. And at some point back in the history of this picture, there would have been a spore that landed in the center. And then from that, with the radial growth of fungi which I'll get into, it crept through the soil. You can actually see that it may have actually benefited the soil nutrients. You can see that the grass is a little greener. And then at one point, the mushroom decided to pop up and complete its lifecycle and you get this beautiful ring of, of mushrooms popping out. And so that has to do with how mycelium grows in the soil. If you lift up a log in the forest you may see this type of growth from, from the fungi, this is called mycelium. And you can see the penny for reference mycelium is, is visible hyphae and we'll show you what that means to. This is, on the left you may have a science project gone wrong and then on the right you get that pure white mycelium. And mycelium can be all sorts of colors. But most cultivated fungi are what which is, you know, an example of this being propagated is kind of white and fuzzy. And the left is the bane of mushroom cultivator's existence the Trichoderma green mold. So this is a little nutshell of the fungal life cycle. Like I mentioned, you got the spore, there's fusion, after the spore gets enough water in the right environmental conditions that it's sensing in the environment through various channels, it germinates like a seed germinates, and then it has a hyphal tip. And that's how it grows in general. And this is separate to the way that yeast grow that gives us our nice sourdough bread and wine and beer. We're sticking to the macro fungi with the charismatic mushrooms here with this example. There's lots of different life cycles, and you know, tens of thousands if not millions of species that have yet to be discovered. So when you have the fusion of two different spores hyphae, you have the fusion of genetic material, and that gives rise to mushrooms. And then mushrooms open up usually with gills or pores. And then those gills or pores release spores and the life cycle continues. But there's a lot actually going on in the hyphal tip, which is where the action is kind of like how the fine root hairs in plants have a lot of things going on. The hyphae which are about 1/20 of the size of a root hair are really where the action occurs, even though the mycelium you know looks pretty, if you look even closer with a magnifying glass or with electron microscope, you can see where the action is occurring. So I don't have time to get into all of this, but it's quite complicated. Lots of people have spent their entire lives understanding the nitty gritty processes deep to these steps. And here's a cool another electron microscope picture of hyphae fusing into plant roots. And I believe this is an example of mycorrhizal fungi. And that is a important name to recognize because that is how trees communicate. And that's how forests have, you know, this kind of unifying feature. And so this is an example of a pine tree that has all these mycorrhizal fungi. You know, there could be hundreds of different species connected to this tree. And then the mycorrhizal also have hundreds of different plant species that they can reconnect to, therefore fusing all of these plants and the soil food web all together, you also have all sorts of bacteria and other fungi that are living among them. And it's a fascinating world under that soil. This is a simplified version of that. In addition to the litter degrading saprophytic, sapro relating to what it's eating the dead, organic material. There's also endophytic fungi living in the trees, you know, on the trees. And so it's very complex, but this is going to show that you could have this diversity of plant life connecting to different fungi in the soil. And this is a simplified version of how the tree of life kind of

connects where plants diverge, where fungi diverge. We are more closely related to fungi than we are to animals. And that relates to what our way of obtaining nutrients in the, in the environment is. We do not photosynthesize, and fungi are extracellular outside of the cell.

Extracellular, absorptive they, they open up their hyphae, and they are heterotrophs taking nutrients from the environment. And, and as, as was mentioned, we respire, just like fungi do releasing CO₂ and consuming oxygen. There's, that's a generality, but that's a little bit of how it works. And there are so many fungi, like I mentioned; there's so many undiscovered fungi. So it really pays to go out there and have a warm curiosity in the environment and take someone who's knowledgeable along with you, and maybe you will find a new species. And it's not even mentioning the aquatic fungi that we barely know anything about. But you know mushrooms that we do know a lot about include the truffle, you know one of the prized mushroom species to discover. They're actually they can be cultivated as well which is fascinating. And they are very expensive, and I think there's a 60 Minutes so upset about the truffle mafia. So these fetch a very high price in the 1000s of dollars for near ounces or pounds. So they're very tasty. They're often replicated in truffle oil, which can be synthetics. So make sure you know at some point in your life, have a true truffle experience. And not to be, yeah, not to be showed up. But the true most expensive fungi in the world is *Cordyceps sinensis*. And it's specifically it's endemic to Tibet, and it is what's called an entomopathogenic fungus, or a fungus that eats an insect, the ento roots. Latin roots go a long way in understanding mycology. But this is a particular interest not just because of the monetary side, but in the tropics you have large numbers of invertebrate and insect species and fungi have co-evolved to these specific insects. And so you get this diversity, this huge diversity that is very special to the tropics, I just came back from Mexico and found my first ophiocordyceps species, and it was truly amazing. Kind of resembled the bottom left Cheeto looking mushroom. So there's a really good Planet Earth episode about the jungles or forests relating to some time lapse. And anyway, they have a really cool, very unique lifecycle, similar to the lifecycle to this other co-evolved especially co-evolved species, *Inonotus obliquus*. I believe this is Chaga. It's not a mushroom, it's a sclerotia. It is specifically growing on birch trees. And this is the most highly antioxidant rich species known to us. It's just the like, beyond even like chocolate or different types of algae. So all sorts of medicinal benefits. And it's special. And it's co-evolved to birch trees in a more northern latitude, and I have the good fortune affords these in Maine. And there's all sorts of different medicinal mushrooms out there. A lot of them can be cultivated. And some of them are not known to like those relationships. Those life cycles are unknown yet, because we need more people studying mycology. We need more funding. It's an underfunded mega science, in part because of the mycophobia that we've had in this country for, you know, kind of until now. Now, you know, I and I shouldn't say I'm coming from Santa Cruz in the United States. And I know people are coming from all over. But we've had this kind of rejection of traditional medicine, natural medicine and mushrooms kind of got lumped into that. You know, we're taught at a young age that we should be aware, but they can have amazing properties like helping to improve our brain, neural synapses, which I believe another speaker will go into. And my favorite one of the other mushrooms I can actually feel from consuming is the ratio on the bottom right. And there's a number of species in the *Ganoderma* genus that have medicinal properties. And it's very relaxing, and it's one of my favorites. And in fact, it's one that was used in the company I worked with, called MycoWorks making mycelium leather. So I just wanted to throw a few, a few like mycological supplies in there that you may consider for your growing your cultivating journey. And I've turned into consulting when I've left industry, and

have helped people supply these types of things and source them and do a lot of consulting and how to best arrange your growing, and how to best really develop a better relationship with, with fungi where you're trying to grow. And anyways, that list is quite long because there's all sorts of really amazing things that fungi can do that have all sorts of new attention. So Ecovative Design, which I think another speaker will talk more about, has developed this pure mycelium foam, a packaging material, and even a scaffold for nutrients that gets used as a bacon alternative. So there's all these new applications for fungi. There's an enormous amount of patents that are being filed among not only startups, like the one I worked at, but also established you know, 100 year old companies, and everyone's tackling all sorts of different issue whether it's mycopesticides or mycomaterials or mycoproteins, Proteins are getting a lot of attention as we shift more towards alternative protein and, and they do amazing things. This is an, an example of a like eco architectural exhibit in Europe. And these panels are made out of mycelium. And people are playing music inside and enjoying the nice kind of acoustics and (inaudible) from the, from the panels. And, and so there's a, you know, all of the I hope I kind of starting to end this presentation to kind of open your eyes to the number of applications and, and the need to have more people study this and, and apply it in really interesting ways.

And so this is, you know, a couple, the domes and the, the tri-cooperative communities where I met our hosts. This is where I started to care about materials and sustainable living and sustainable agriculture and food systems. And these buildings were supposed to only last like a couple of years and they're still up and running. And it's not the best materials that they're made with, but they could be made out of mycelium, you know. There's amazing applications that we, we have yet to employ on a large scale. But some of these, these companies are getting the funding to start doing that. But I hope more people get involved whether it's foraging or cultivating or just eating more, you know, enjoying more medicinal mushrooms in their life. Here's a smattering of my own personal background, kind of what got me to this point and really grateful for my experiences. And what led me to mycology was a my orientation leader in college recommending a class. And I you know, I had some experiences before that related to mushrooms, but I wanted to go in as a poli sci major and change the world. And I've kind of come around after I got my degree in like the biological sciences and plant genetics and, and mycology to advocating for psychedelic mushrooms, and advocating for medicinal mushrooms, and advocating for the farmers who are usually the ones left out in this equation, or you know, who, who don't make you know, enough to live on. So support your local mushroom farmer. If you don't have one become one, you know. I really, really encourage you all to step into the mycological world in one way or another. And yeah, I think that's, that's about it. There's my contact information if you want to reach out. And that's me with my prized, says a king oyster king trumpet mushroom that I think it's the largest one, you know. You can break some records in mushroom cultivation or find a new species or, you know have fun with it. There's, there's a lot to do in mycology. And one, one last thing I'll say is to advocate for conserving natural areas. A lot of mushroom species we don't even know, we haven't even identified are getting lost through development. And it's another reason to advocate for understanding the world around you and trying to enforce policies to help safeguard these species and species that we don't even know. There's a great foundation, Fungi Foundation started in Chile. And they've advocated to the point where it's part of the National Charter or part of the national constitution to have fungal education K through 12. Because of all the important things that fungi are related to, whether it's plant pathogens, whether it's you know, wine or fermentation, or bread baking or, or just the wild

eco you know ecology and preserving natural ecosystems. It's really important. So I hope, you know, my life has shown you, you can kind of do it all and that you can advocate and try to stand up for some solid policy. I'm very grateful that I'm in a city where psychedelic mushrooms and psychedelic plants are decriminalized. And it, it's we're only starting. It's got a lot of attention. And there's a lot more work in the advocacy space. And just having conversations with people about mushrooms is advocating for them. So with that, I'll, I'll end and I don't know if there's time for questions, but yeah, you can reach out to me. Thank you. Thank you all.

Rheanna Chen: Fantastic, thank you so much Will. I hope everyone's mind is blown to the possibilities of the kingdom of fungi. And that's perfect. I love what you said that we have more in common with fungi than we even realize. And to be able to speak to someone who's knowledgeable right here in the tropics I'm going to segue to introduce Mr. Carl Fitzjames speaking about ecology. He's a forest guide, one of the leading in the country and possibly in the Caribbean. He's a scientist and naturalist and living in the real community on the edge of Trinidad's tropical rainforests in Brasso Saco. Carl spends most of his time (inaudible) and exploring. So we're gonna head on over to Carl. If you can share your relationship with the mushrooms you've seen along the trails of the Northern Range of Trinidad. Over to you. And while we get set up just a reminder that if anyone has questions, feel free to write it into the chat, or you can send it directly to me, but all questions (inaudible).

Carl Fitzjames: Hi Guys. Okay, I'm happy to be part of this session here because I really got interested in mushrooms. One day I walked in, and I saw a blue mushroom. So that was my introduction to mushrooms. I've been seeing them all the time, but I wasn't really looking. And that fascination with that blue mushroom has led me... now I cannot see a family without taking pictures. And always looking for the ones that we could eat. Yeah, so there are some of the pictures that you see in the summary photograph that I take like this one is an ear mushroom. And it's edible. I've been eating a few varieties also. This one and the other here is another ear mushroom. They come in different colors. And that's something that I was very fascinated by. I never knew mushrooms had all these range of colors. They come in red, they come in black, they come in brown. I never knew that. So now I'm just a newbie into it. And they have, these are called brackets. They have spores underneath like you know very different than the (inaudible). Yeah, the other mushrooms that I eat now like the (inaudible). Another thing that I noticed with, with mushrooms is that, I could be wrong, but I know we have a mycologist. So they have different substrates. So which means like, for example, like the oyster mushrooms that we eat you see, you see them in soft woods like the (inaudible) or like bamboo, you know, and then you would look at the (inaudible), right? And they are in on hardwoods like (inaudible) and other types of hardwoods. So that is something I'm very fascinated. Why? Because I didn't really... I can't really understand why they sit in fungi would have different substrates you know to break it down. So that's very interesting. So anybody who has that knowledge, I would love to find that out. Yeah, this is the one that I'm looking at very closely now that you're seeing on the screen there. This, this has a very different pattern underneath. But I want to believe that this is one that might be also edible because of all the flies and insects that I see eating it. I haven't tried it yet because I'm not just going to try just like that unless I get much more confirmation that it's edible. And that's something to those of us who are looking at mushrooms and looking to eat and be very careful what you're eating. Make sure that you know what it is. And maybe the sense we have this, a lot of people here maybe bounce it off each other and find out properly that it's

something that it's edible or it could be deadly poison, right? So once I'm in it as I said earlier on, I'm always looking for interesting sightings but sometimes we can find it right in front of my compost pile. So this one you see on the screen, actually right there, it came up in my compost pile a couple of weeks ago. So that was exciting to see them actually breaking down all my composts and so that was, I was very excited about that. And this other one too also is in the compost pile. This is very different than this one here. What else? Mushrooms are all around and as essentially for existence as the, as the first speaker was talking about. And what could I say again, except come up to Brasso, let's take a walk and do shrooming. I go shrooming by myself. I need some help some people to go shrooming with me. Yeah, and also you can come up to Brasso. There's a lot of stuff I would learn and you know, because as I said, I would love to be eating much more and finding out much more about fungi. As you know, I have come to understand now that we couldn't even exist without fungi. There'll be no existence last year without fungi. So it plays such an essential part in our existence, existence that most of us don't even think about it like that. So, when you have the time, just come to Grasso Saco and we will go shrooming. Okay. Thanks, guys.

Rheanna Chen: Fantastic. Thank you so much. Carl, I have a question for you from Renee. And the question is about how do we know how to tell what is edible and what isn't? I know you said that's something that we're still waiting to have more science on. But what have you... I know you've gone on trails with Mr. Jeffrey (inaudible). What have you seen in Trinidad with the research around edible versus non edible mushrooms, especially in the rainforest?

Carl Fitzjames: Well, I haven't seen any kind of research in terms of edible or not so that's why I hesitated. But I have a friend who I will bounce it off him. He has a little bit more knowledge than that, than I have in terms of that. So as I said, you know, don't put anything into your mouth and hoping that it's, it's good for you. Make sure that you know what you're eating, you know. So I bumped it off him. And as I said that one that you saw there. I need to look at it much more carefully and do some more research on it before I will taste it, but I think it's edible.

Rheanna Chen: Fantastic. A question from (inaudible) in (inaudible). Can is can we help and implement with a timeline Mushroom Educational Museum in Trinidad and Tobago? What do you think about that Carl? What would be (inaudible) you think?

Carl Fitzjames: I would love that, then you know, because I mean, they come in so brilliant and beautiful shapes and sizes. So you know, I would love something like that, because I will certainly be a part of that.

Rheanna Chen: Fantastic. And then I have one question. What is the role of the kingdom of fungi in the tropical rainforest? I know you briefly talked about decomp the role of decomposition. Could you share more?

Carl Fitzjames: Decomposition. I think, I think the, the earlier speaker touched on it slightly (inaudible). You know there's communication happening all the time. And the uninitiated mycelium and the roots of trees. Trees actually communicate and this is something I noticed that the, so if you go sometimes you would see animal eating a seed from a particular tree, and then on the same, the neck another tree it's not eating the seed. And actually the tree is

communicating with each other. So this they send messages to each other. So the other trees that increase the toxins in the seed, so that it's not palatable for the, for the animals to eat. So that was very exciting to see that, because I didn't know why it is that they eat in this tree and not the other tree. You know. So those are some exciting things that and I'm sure the mycelium has a lot of part to play in that.

Rheanna Chen: Fantastic. Thank you so much Carl and (inaudible) for the wonderful presentation. Again check out (inaudible). And that's a good segue. I know Carl's always wanted to grow more mushrooms, but wasn't sure how to get started. So I just want to show an example of we have this cute little small mushroom here, but then look at the size of this one as well. And like we talked about the gills. So I want to introduce our next speaker, Mr. Chris Martin from the agribusiness lens, who is arguably the trailblazer, the youngest mushroom cultivator right now in Trinidad, and he has over four years working as a distributor supplied the market of locally grown gourmet and medicinal mushrooms as well as extracts. He's hardworking and driven, and he offers a full variety ranging from tinctures, grow kits and fresh and dried reishi oyster lion's mane mushrooms and trametes. He says it's an empowering experience. So over to you, Chris. Take the flow. And while Chris is getting set up, I love all the engagement in the chat so far. So again, any questions feel free to share there and definitely to the speakers. I know Will has been answering some of the questions, but if you see a question you want to answer go for it.

Chris Martin: Hi, guys. Am I being heard?

Rheanna Chen: Yes, you're doing good. (Inaudible).

Chris Martin: Okay. Hi, I just like to formally introduce myself. My name is Christopher Martin. I'm one of the co-founders of (inaudible) which is a mushroom company in Trinidad and Tobago. We are one of the first mushroom companies that specialize in growing (inaudible) and different varieties of mushroom outside of what you usually see in groceries. I decided this year in this short space of time what's been happening with me and this June (inaudible) grew mushrooms (inaudible). One of my main goals has been to make mushrooms. These oyster mushrooms, lion's mane, reishi more affordable than (inaudible) my people also to encourage people to grow. It could be a form of healing (inaudible) path and cultivation of mushrooms that also employing so people can, you know, have some extra (inaudible) stuff. And I have (inaudible). I'd like to start with how I started my cultivation. (Inaudible). How I started by putting together a simple laboratory. Okay, this picture is a little blurry. So I started in a lab. I started with these baby food jars. It was really difficult. I didn't (inaudible) was a very small surface area. And eventually I discovered the differences which are (inaudible) containers they can be sterilized multiple times. They (inaudible) larger surface area and we allowed (inaudible) cultivate a lot more mushrooms. We can see them here with you know my (inaudible). I ended up asking my mom tells me bring mushrooms for them so I can get the best quality will repeat (inaudible). What would I want to say? You know, I like to say that, you know people kind of shy away from the (inaudible). But it's, it's like the most important part of the cultivation process in my opinion. If you really want to learn and know how to grow mushrooms, you have to know how the mycelium moves, you have to know how contaminants look, how they smell. You have to get familiar with it from the foundation and culture which is basically the foundation. You could use many stuff to do culture for their life. I thought even (inaudible) which is (inaudible). And then well that's a much slower

process than just using (inaudible). You can see the (inaudible) but it was alright. Let me go on (inaudible) introduction, which is the second step to once you have your clean mycelium in your culture you can move on to producing. Oh I apologize I'm not seeing my visual representation for my sport. (Inaudible). Okay, so, so far, I found that (inaudible) was the best and most accessible green. You might have seen the (inaudible). It's pretty, pretty straightforward. I tried a few methods, the protogen mycelium only for one. It was obviously other channels in (inaudible). You know sometimes you try to do more than and you're ready to do a short cut. And that, that's one thing I like to advise. Sure, mushroom cultivation usually doesn't end well and you get you get a much lower quality product. You know you want to do it and try and get the best piece (inaudible) mushrooms that you can get and, and that, that'll be (inaudible) you know, really (inaudible) possible (inaudible) release two of the most foundational stuff in this whole process. All right. So let me go on from my most challenging region which was the substrates. This I have this picture. So substrate and (inaudible). (Inaudible) was really tough for me. I didn't have any other (inaudible) specialized mushroom, that's why I had to find a polypropylene which I found at a local food distributor. And I (inaudible) I certainly can (inaudible) with these polypropylene (inaudible) initially meant pack in like food products and whatnot. But we can see sterilization and well we can, I can make the substrates and the before any (inaudible) which was a big pullback for me in terms of rate of colonization and how quick I was able to produce mushrooms to distribute.

Liliana: I just want to let you know that we haven't been able to see your slides. If you want to try unsharing and resharing so we can see the slide.

Chris Martin: (Inaudible).

Liliana: Hasn't been updating but we can see one thing if you want to try to reshare.

Chris Martin: Okay, what I... okay, let me try. New share.

Liliana: We're all learning so much and so interested and just want to see what you're sharing too.

Chris Martin: Yeah, I want you guys to see what I'm trying to talk about. Are you seeing now?

Liliana: Yes.

Chris Martin: Are you seeing there is something else?

Liliana: Yes, we can see different petri dishes, many different photos. Thank you.

Chris Martin: Okay, right. So these... let me show you this. (Inaudible) have a confirmation that you're seeing tables (inaudible).

Liliana: Yes, we can see.

Chris Martin: Okay, good. So, so this was before I, I have an incubation room. I, I basically dedicated two bedrooms on my house for cultivating mushrooms. Yes, my children had to sleep

somewhere else until I grew (inaudible). So yeah, these are the polypropylene bags. So you can see they have no silver patch. What I did was I found a way where I can try and get more done and have less, It's really intense I guess in the sense of producing enough mushrooms that really (inaudible). So in (inaudible) it was pretty easy having to carry around because you know I had to keep all these bags downstairs afterwards.

(Inaudible). Right? So yeah, so the (inaudible) were really tough on me. So I started using (inaudible) substrates; line graphs. I don't know if many of you have seen my video that I, I started. I was using graphs to start with but the graph was really labor intensive. So I couldn't (inaudible) if I wanted to use mushrooms and (inaudible) any amount that I could sell to restaurants and whatnot. This, this picture here, these are... so I found a way to start bringing in some of these specialized mushroom bags which made it a lot easier (inaudible) substrate and sterilizers and (inaudible). There's full length of the back here. So I add the (inaudible) fully colonized. And I mix it down. I get my mushroom (inaudible). Right? So the (inaudible) were really tough and the substrate. So I have competition in formal substrate with chicken farms. So during the rainy season in particular, chicken farmers would move out of the (inaudible) transformers to keep their (inaudible) dry and the chickens healthy. So I had it. It was really challenging sometimes getting substrates right. Now I have a shredder you didn't like how I found that you see mushrooms on a lot more soft wood. So this is the (inaudible) if you guys can see. Okay so this is Trinidad beauty. The first (inaudible) that I call a (inaudible) that you know you guys there is (inaudible). It's not an official name but I, I think it's tricky (inaudible). These are (inaudible) mushrooms. I personally said I found. I found some (inaudible) in the back of a farm, (inaudible) chicken (inaudible) and it's been going since then. It's the most delicious mushroom variety I have. And if your (inaudible) quick colonizer. It's (inaudible). There's a lot of attention for (inaudible) mushroom so I'm going to show you guys some pictures of my successes when I got substrates (inaudible). Now so this is a (inaudible). Right? And these are on the (inaudible). The time it took for them to colonize really doesn't make sense to (inaudible). Right? And you can see this was one of my better data sets and this is a line of Florida for instance.

Oh gosh, yeah, right? And then also my favorite oyster because (inaudible) one is the, the most (inaudible). So I took (inaudible) experimenting with color which (inaudible) mushrooms and yeah I got a little (inaudible) mushroom (inaudible). Let's see what else I have here. And this was one of my better (inaudible) batches. Right? And I also (inaudible). I do not have (inaudible). Oh gosh. Sorry for the delay.

Rheanna Chen: One moment.

Chris Martin: Are you guys seeing? All right so this was my, my (inaudible) really not a lot (inaudible) proper mushroom (inaudible). I (inaudible) in these mushrooms in particular. I've gotten so far a lot of great reviews with these (inaudible) and then helping people with different stuff (inaudible). You know that's something that has been great as well as the level of success. You know tinctures are really... even if you're not producing a lot of mushrooms you can make, you can make, you're gonna make a lot of use out of them because, because extraction (inaudible) you get a lot more to distributes in the extraction. The, they reach a lot more people with the mushrooms (inaudible) in my opinion. I will target a lot more people doing (inaudible)

which you know; I plan to take part in helping people grow more mushrooms. I have no fears of competition. That was one of my main goals in the (inaudible) was so encourage people to grow mushrooms because they are really inspired, and I, I think we will, you know, we will need a lot more people to take mushrooms seriously so that they can all take part in the healing that mushrooms have to offer. (Inaudible) when you're going out and overseas and then connecting with nature, you know, there's a lot, there's a lot to see and do (inaudible). My (inaudible). (Inaudible) anything else I'm missing out. And also another word on the substrates. I found that when you go into the (inaudible) is really; it's really tough to forget one type of (inaudible). So that's one of the, the tougher things about the, the because (inaudible), I really want us to encourage people to do like more by using more sugar cane (inaudible). This is really sustainable. Things like immortelle, hog plum, we can cultivate those plants and use the young branches and they could regrow and you can have a consistent supply of substrates that more people can take part in that process. But you know, with all that said, even (inaudible) encourage people to grow mushrooms, I also would like myself to be more consistent with (inaudible) before I bring, you know I bring stuff to the table, I want to make sure that, you know, I know exactly how to cultivate 50 pounds of mushrooms a week before I tell someone. (Inaudible) the mushrooms (inaudible) so that you know (inaudible) more. You know, I feel like I'll be a more reliable guide if I am (inaudible) in my process. If I know exactly what I'm doing. And I have been at the experience. I want to make sure that I don't want to teach when I'm still really trying to get, get that learning and get (inaudible) down properly. So now to show (inaudible) picture on coming up.

Rheanna Chen: That's okay, Chris. You're doing, you're doing amazing. Would it be okay to ask you two questions?

Chris Martin: Yeah, I'm ready for some questions, yeah.

Rheanna Chen: Okay, great. We have a question from (inaudible) Alan. By the way, fantastic job with your what you're doing. It's been amazing to see the evolution over the years. She wants to know about mushroom ID workshops or cultivation training. Can you share if you have any plans to do any community outreach and education coming this year?

Chris Martin: Well, well, actually, after being part of this I'm now going to get familiar with Carl because I did not know Carl before this. And, you know, I think we can do some work on teaching people how to identify local edible mushrooms. And yeah, I can also do as part of that ID workshop, you know, something simple. I plan to offer (inaudible) once I know I have to be consistent (inaudible) I plan to offer (inaudible) so that people can you know (inaudible) you know when you cut your lawn, and you dry the grass you can use that (inaudible) food for yourself. You know people experiment. People who want see bigger (inaudible) you know. Yeah, I'm open to the (inaudible). Just like I said, I want to make sure that I know exactly what I'm doing. And I have all of the stuff in place so that if there's no, there's no excuses, not just, just mushrooms and that, that's all it should be.

Rheanna Chen: Fantastic. I'd love to see that. And I know we have some other neighbors in the Caribbean chiming in. We actually had a question from Carl's wife Kelly, about the plastic used and grow bags, where you might see alternatives. I know this is a challenge in other islands, like

in Barbados with people going into cultivation, if you could share a little bit more of what the solutions might be to plastics.

Chris Martin: Okay, that is actually a great question. That's actually a bigger... that is a big (inaudible) because I also think about it. But there's a guy who I was listening to (inaudible) mushrooms and he appeared in the production of mushrooms for many other food producing practices, meat production and (inaudible) plastic is really in comparison is a small thing but I know there's a whole situation of plastic on the planet right now and I am also movement towards uniform bags in America to produce biodegradable mushrooms (inaudible). And that'll be (inaudible) Like right now, if I could get the resources (inaudible) bags in and distribute those as (inaudible) people and (inaudible) more five gallon buckets and (inaudible) for like restaurants and whatnot. I plan to make it more sustainable. So I have an idea for 100 buckets and a power washer and see how best I can get a consistent (inaudible) and from there (inaudible) if I can make it work like that. But definitely, I'm going to keep trying (inaudible) make it a more sustainable (inaudible) at each, at every point because you know, that's the way the world is going you know we have to watch our, our what we put out into the environment, our the byproducts of our manufacturing and more (inaudible). We have to be more conscious of it. Yeah, I, I, I am (inaudible). You know, I'm just using what was a little more accessible to me right now so I can get to the next phase is something that I have on my conscience. And, you know, I plan, I plan to do better. (Inaudible).

Rheanna Chen: Fantastic. I look forward to the journey. And then the last question. You had talked about cultivating a local strain. Would you be able to share more about that? Which one would it be? Was it lion's mane that you mentioned? And if you have a photo, that would be exciting.

Chris Martin: Well, what do you mean? I showed you this (inaudible).

Rheanna Chen: I think that was it.

Chris Martin: Yeah. So okay, so this, this is Trinidad. This is Trinidad in the sense (inaudible). Right? So this is literally what we really want to see as the main, the main part of my introduction. There are other varieties. I'm not sure that I have that I'm currently (inaudible) I produce a lot more, a lot more biologically efficient. So that gives you more weight per pound of substrate. But you know, these, these I think if I keep working on these, and I culture them more, and they we form a more symbiotic relationship in a food cultivation process that they will start to produce more and you know, be, be our native (inaudible) food trucks, (inaudible) you know that's my vision. I want people that will buy (inaudible) and say, hey, I want, I want an oyster mushroom (inaudible). You know, that, that, that's the end game for me. You know? Yeah.

Rheanna Chen: Fantastic. Thank you so much, Chris. Really, I think everyone's blown away by what you've done. I'm glad that your children now have a room I think to sleep in.

Chris Martin: They do. They do. I would like to see that I did not (inaudible) because I felt like I didn't really want to present that and I just wanted a trend for more about the journey. And you know, people can visit (inaudible) and they said they could call us on (inaudible) and you know,

we'll get will tell you what we have currently. There's not a lot of consistency right now, but we're getting there. So, you know, and thanks for all the support and all of the well wishes. It's been, it's been, I appreciate it so much.

Rheanna Chen: (Inaudible). Okay. Well, I don't know about you, but I'm starting to get hungry. And I'm very excited to share the next speaker who has actually taken Chris's gourmet mushrooms and transformed them into really delicious dishes for the public to enjoy. So up next we have Chef and Artist Justine Garcia. She has completed her degree at T and T at Hospitality and Tourism Institute. She has worked under Michelin trained chefs and top restaurants across the island to receive the Best Pastries and Desserts Award from the Table Talk Awards in 2015 as Head Pastry Chef for Zazou. And she is a private chef caterer that offers multi course fine dining and is well known for her line of vegan mushroom inspired menu items. So without further ado, Justine onto the stage.

Justine Garcia: Hi, everybody, very nice to be here. I'm very honored to be on this panel especially because I know half of you guys, especially Chris and Anna. Love Anna and Carl. Big fan of yours Carl. Today I'll be speaking about the impacts of mushroom on the culinary world as well as how I personally utilize mushrooms, as well as the plant revolution, the vegan revolution that is coming to pass; how to create a more sustainable future. How mushrooms can help us do that by not only eating it but also helping your restaurant industry with our food waste from (inaudible). Sorry, but how we can utilize mushrooms to help reduce the food waste, as well as the plastic production that we find a lot in landfills, because restaurants can be very unsustainable. It's one of the most unsustainable industries in the world. And we would like to try and revolutionize that in any way possible. So to start off with, mushrooms have always been one of my favorite ingredients. I adore mushrooms. I love to cook with them. I love to eat with them even before I was a chef. But now as I'm a chef, it's become one of my most prized ingredients to work with, especially the gourmet type mushrooms like the oysters, the trumpets, (inaudible), all these different types of mushrooms that have different tastes, textures, flavor profiles that can be used in a different type of way, other than just the regular button mushrooms that we usually consume. Which there's nothing wrong with button mushrooms, that's a classic. But we would like to try and expand especially on a culinary palate level in Trinidad, and be able to get people to try new things and expand their knowledge on mushrooms, and try and get it to be more like... try and start to see the mushroom in kind of a way that we see meat and seafood as a different form of, well, not necessarily protein, but for the flavor, the textures and the versatility that they can produce and provide. So for me personally, I use mushrooms in almost all of my vegan meals and menus. I have 50% of my clientele are vegan, so I always have to try and come up with new ways to satisfy my clientele, especially those that have more of a fine dining kind of palate. And they would like to... they have find it very difficult especially my fine dining vegan clients to find any kind of quality fine dining vegan food in Trinidad. So I try my best to utilize these mushrooms in a way that will be able to awaken their palate, you know excite them a bit and use them in a way that people don't necessarily think of when they think of mushrooms. For example, I sell vegan sushi maybe once a month, sometimes a (inaudible) also salad as well. I developed an entire vegan line of gourmet vegan mushroom sushi to utilize the different textures and flavors as well. So I for example, in my dragon roll which is supposed to be a play on a shrimp roll, we have, I use trumpet mushrooms to mimic the flavor profile as well as the texture of the shrimp and I will just season it to taste as I would usually season my shrimp

or any other seafood that I will usually do for my seafood menu for my seafood sushi menu, and then utilize that in the roll itself mixed with avocado, vegan cream cheese, cucumbers, things like that to create a roll that not only mimics the shrimp but you can't even tell that it's plant based most of the time. A lot of the clients that I speak to a lot of the time when they have the vegan mushrooms for the first time vegan mushroom sushi for the first time, they're blown away that there's no sushi in it because the texture is so comparable to any flavor profile as well as so comparable to that of seafood. Other ways that I have utilized it is in my fine dining multicourse meals with some of my fine dining clients. I'll go to my client's house and prepare either three to five to six courses. Some of them require mushrooms to be in every single course. So of course I have to use my creativity there. Some of the things that I have used and I've done before would be doing gluten free pasta stuffed with king oyster mushrooms. I've also done a triple vegan mushroom soup utilizing three different types of mushrooms. You get different flavor profiles as well as the textures in there too. For my three mushroom soup, I use (inaudible) Portobello as well as normal button mushrooms, and I'll sprinkle king oysters on top of it. Some of the mushrooms that I love to work with are king oysters, trumpets. (Inaudible) is one of my particular favorites. But the simple button mushroom, the simple but mushroom can be utilized in so many different ways. If you dehydrate it in the oven the texture changes. If you just give it a light sauté then it will be a little bit juicier. There's a lot of different ways that you can utilize it. I also use those in my vegan mushroom sushi as well. And instead I would just cut them up, dice them up like how I would dice up tuna for example, if I was creating my spicy tuna roll. Well tuna roll. And I would season it with garlic, sriracha, salt, that pepper and lime to infuse those flavors and have it taste just like a spicy tuna roll.

Moving on. There are other examples that we use mushrooms for in the culinary world starting to expand into how we use them like meat. So a lot of the times some people would... actually a new thing that's been coming out recently is deep fried mushroom burgers or deep fried mushroom zingers. So you'll have a vegan form of a zinger as well as Portobello mushrooms to mimic burgers and get that satisfying bite, as well as mushroom sausages to replace normal meat and beef sausages and pork sausages for a more sustainable product. The future of mushrooms in the culinary industry is going to be pioneered and mushrooms are going to be on the forefront of that because of its versatility as well as it's one of the, one of the natural, the only sources of natural umami in a vegetable farm. And umami is the fifth flavor profile that creates a very deep, rich, earthy flavors that we would usually find in flavors of beef. But as well as soy sauce also contains umami, miso, butter, cheese, tomatoes as well and seaweed. This provides a much very rich, deep flavor profile that we like is that satisfying taste that you get from the taste of meat. And that's one of the only things only vegetable forms that you can get that same satisfying taste, texture, everything that meat provides. Mushrooms can do that and even more. So the king oysters are one of my particular favorite things to just eat. And I would put that above even sometimes even a good steak or definitely a pork chop I would, I would go towards a king oyster much, much faster than that. And as well as the future of the culinary world with so many diseases right now, diseases. We have so many different health crisis's going on the world. Us as chefs we need to start utilizing more nutritional, more nutrient dense and nutritional types of ingredients in our food to combat these types of ways so that we can have a more sustainable future as well. We have many, many health benefits to mushrooms from anti-cancer, anti-inflammatory, supports immune system, supports skin production and hair, brain function, I mean the especially for the different types of mushrooms as well all have their different benefits

too. But I mean the, it's limitless the amount of health benefits that we can get from mushrooms, not only just the edible kind but other types as well. As for example reishi's. You can't just ingest reishi's just like that. You have to make it into some kind of tincture or else it would be poisonous just to eat just like that. But by utilizing it and how do I say creating a tincture we will be able to get that actually Chris, Chris makes. So hit him up for your reishi tincture. You'll be able to get the health properties that you wouldn't necessarily be able to if you just picked it up before and tried to eat it.

Other ways that mushrooms are also going to be used in the future as well as right now is to help with the production with to reduce the amount of waste, especially plastic waste. Now that there's a lot of there is a lot, a lot of plastic waste as well as food waste that comes out the restaurant industry. There's a new form of mushroom that is coming out. (Inaudible) coming out that has been discovered that will be able to be sprayed into landfills and eat the plastic creating so reducing the plastic waste in our not only just our landfills, but hopefully, you know, we can try start utilizing, utilizing it household to household and more as well as composting for food waste and things like that. And having the spores and the mycelium help with the breaking down of the decomposition of such as well. And to wrap up, I was very, very fortunate and back in 2020, just before the pandemic to be able to attend a two and a half hour long lecture with Paul Stamets. And he was able to really in that two and a half hour talk just inspire everybody in the room that mushrooms really is the way of the future in all different aspects from the medicinal purposes to the culinary, as well as the biodegradable packaging aspects of it as they have biodegradable mushroom styrofoams now and things like that that will also help bring down the amount of waste that the culinary world and as well as restaurants use. So, yeah. So I will wrap up there because I think I've just been talking your tails off for a little while. If you have any questions whatsoever please don't hesitate to ask at all.

Rheanna Chen: One quick question. I didn't see any in the chat. So I'm gonna go off to Chris's talk. As a chef, if you could have Chris to grow anything for you what would that be? Would it be the king oyster mushroom you'd expressed? Talk about linkages between growth.

Justine Garcia: I think anytime any one of Chris's mushrooms I will utilize in my kitchen. I've tried his Florida pink one; those tastes amazing. You fry those up with some coconut oil and you get like... it tastes just like a crispy bacon. It's so good. I've had his oyster mushrooms. They're really beautiful in sushi Poke bowls, rice bowls, burrito bowls. I mean, the possibilities are absolutely endless when it comes to mushrooms and the creativity that you can do. I also have and went we've been in talks of doing lion's mane for the longest while which I know is a little bit harder to cultivate. But that, that I'm planning to use for Lion's Mane ceviche sometime in the future to cook to mimic crab meat.

Rheanna Chen: Fantastic. Thank you so much. And I guess lion's mane might be the best exotic mushroom that you'd like to see on the market. Any other?

Justine Garcia: That and oysters. I say I think oysters have a texture and a flavor profile that is like fats and like it really, really mimics it's even better than most meats honestly. I could just eat mushrooms and I would be very happy to just go vegan and just eat (inaudible).

Rheanna Chen: Wonderful. And to the non-vegans in the room you can also eat mushrooms as you want. It's delicious. Okay, being mindful of time I'm really excited now. Just, I invite everyone just to do a little stretch so you can sit down. I know some of you have your camera off. But take your arms out, pretend you're dispersing spores. Let's breathe in, lift the hands up. And let it out. (Inaudible) also breathe. Breathe in, lift your spores up and let's disperse them. Good. Last one. Good job everyone breathe in. And turn your mushroom caps on; maybe let's go over to your left side. Let's move over to the right side. Wow, look at all these great human fungi we have from around the world. And that's it. Beautiful. Now over to the medicinal side. I know we've learned a lot. So I'm bringing on our psychospiritual guide Ana Montano to lend us more info in the medicinal world after people have watched fantastic fungi and heard more about the healing properties. And with the pandemic what can we learn from mushrooms? Ana has a deep passion in exploring transpersonal states of consciousness. She's a graduate of California Institute of Integral Studies. She believes in plant medicine and these substances as allies for both the earth and the cosmos. They're incredible tools that have a lot of power that we can benefit from when respected and used with reference. So without further ado, welcome Ana to the stage. I'm very excited to have (inaudible).

Ana Montano: Right on. Thank you. Hi everyone. Let me get my screen going here for you. Alright, let's see. Okay, you guys can see that? Let's play this right. So I know Rheanna mentioned medicinal but medicinal can kind of lean over into like reishi mushrooms, lion's mane. So just to make a distinguishing factor I'm talking more about the therapeutic use of psychoactive mushrooms. So as a start, I just want to start with a little fun tidbit, I know that Will touched on the idea of Santa Claus and it's alleged that the story of Santa Claus actually came from mushrooms. If you look at the screen to the left these really infamous red mushrooms with the white dots, you will see them everywhere with emojis. They show up in pop culture fairy tales. What's the story behind these mushrooms? So basically, in Siberia, the Shamans would use these mushrooms to enter into transpersonal states of consciousness. But you see there's a few connecting factors here. If you look at the mushroom here to your left and then you look at the image to your right, you will see a picture of Santa Claus and he's dressed in red and whites mimicking the color of the mushrooms. The Siberian Shamans also used to dress in the same kind of color clothing and it was part of their winter celebrations. These mushrooms tend to grow the base of pine trees. The reindeers which is the spiritual animal of the Shamans would eat the mushrooms. So as you can see, there's a couple time threads there. Think about it. You know, what do you put up in your house during Christmas? Christmas tree. And then you could kind of think about it. If you were ingesting a psychoactive mushroom on your spiritual animal as a reindeer, you could kind of see how these guys would fly, right? So you can pull these little parallels here and there. Another fun tidbit is from the famous ethnobotanist Terrence McKenna. He hypothesized the Stoned Ape Theory, which is technically a hypothesis not a theory. But he basically posits that early man would follow game animals and what grows from their dung is psychedelic mushrooms. So he suspects that they played a role in accelerating human evolution by encouraging hyper connectivity between different brain networks, which would result in doubling the size of the brain, which will lead to the innovation of tools inspire religion and language. So some fundamental things you guys know on with your brains. A very brief history. If you look at this image to the left, this was actually found in a cave in Algeria, and it dates back between 6000 and 9000 BCE. They believe that it represents a Shaman and quite interesting like he looks like a bee and he's got all these sort of like mushrooms growing all over him. But so,

moving on to this, humans have had a long standing history with psychedelic substances and not just psychedelic substances, but altering their state of consciousness to transpersonal states of consciousness. And this could have been done through the use of ingesting psychoactive substances, deprivation techniques, meditation, etc. Another thing about this is we find that humans gravitate to these techniques and it spans across time and location. The earliest of evidence, earliest use dates back into Australia, which was 10,000 BCE. Other evidence supports that mushrooms are used in Central America, Siberia, Greece, Egypt, etc. And the main use was for divination, spiritual powers, religious and spiritual use, ritual healing, and of course, medicinal. I know that Will touched on Maria Sabina, but for the essence of time, I encourage you all to look her up. She was a very famous (inaudible) from Mexico, and she's kind of what got mushrooms back into the consciousness of Western society. She's also a beautiful poet, so please do check out her writings as well. So right, the therapeutic use of mushrooms. This is the juice. Psilocybin has been showing lots of promising results for things such as cluster headaches, treatment resistant depression, addiction, existential anxiety that's associated with say like cancer related problems, obsessive compulsive disorder and other anxiety related issues. Places such as Johns Hopkins, Imperial College of London, Yale, The University of California Berkeley, Mount Sinai Hospital in New York among some of the institutions that have established solid psychedelic research and divisions. And some of y'all may have heard of MAPS, the Multidisciplinary Association of Psychedelic Studies. This was founded by Rick Doblin in 1986. It's a nonprofit research and educational organization that develops and researches medical, legal and cultural contexts with people. They're really leading the, the kind of lead like that they're the trailblazers in terms of setting up the protocol for (inaudible) and psilocybin assisted psychotherapy. And I suggest you check out their website because they post a lot of their research. And it's really fascinating to see what they're doing.

And they're coming a long way. A lot of studies have been showing that psilocybin and LSD are not addictive substances. On the contrary, they're actually anti-addictive. If any of you have experienced it, you know. And they also do not cause any organ damage, even in high doses. So how it works, psilocybin, DMT, and other psychoactive compounds help people be more resilient to stressors, they become more understanding, empathetic, they become more open. And the key thing here is that the induced neuroplasticity, which is the brain's ability to change and reorganize thought patterns, and it was once believed that the brain sort of like fixed itself at an age and then that was that. But this is not true. Our brains are malleable and they can change if we want to change them, but it takes some effort. But basically, this is huge, because if you think about it with respects to people with treatment resistant depression and anxieties, this opens a doorway into a different way of being, a different way of relating and processing the world. Psilocybin activates serotonin, which are basically like mood receptors in the brain, primarily in the prefrontal cortex. This is the part of the brain that affects the mood, cognition, so like thoughts and perception. And they also work in other areas of the brain that regulate arousal and panic responses. So you could think of things such as trauma. So this is the key thing here in terms of how they work the default mode network. This is the part of the brain that's crucial for your everyday waking consciousness. It's a group of interconnections within the brain that deal with introspective functions. So this is your perception, your awareness of yourself, i.e. your ego. It deals with self-reflection, self-criticism, thinking, understanding other people's feelings, and then also thinking about the past, present, and future. And it's linked to different mental health conditions such as when the default mode network is overactive, it results in ruminating thinking

and thought loops, which is associated with severe depression, anxiety and OCD. Excuse me. The default mode network develops from birth and response to life stimuli in a pattern way, and develops habitual patterns of communicating within different brain regions over time. And basically what this does is it forms a brain in a very specific and constrained way as we develop, and these pathways become deeply ingrained. So to give you like, sort of a visual, if you go into the forest, and you cut a path, and you keep walking that path every single day for your whole life, it's easy to move through it, right? It's a default way of going. But then around you, there's a whole bunch of bush, right, so you need to figure out how to clear out to make new pathways. So this basically brings me back to the point that these ingrained pathways of communication within the brain becomes your default mode way of being. And then this also colors the way in which you perceive and understand your reality. So now coming to the mushrooms in the default mode network, this is where it gets really interesting. So what they do is when you ingest these psychoactive mushrooms or other psychedelic compounds, they basically dump and then quiet the default mode network. So it shuts down these areas of the brain that are overly hyperactive, and then other parts of the brain can now come alive and start communicating with one another. This is the result of like what people experienced when we have like this self that becomes dissolved or the egoless states. This is really kind of like the pinnacle of what a lot of like psychedelic substances are known for. And it's also what leads to the most transformations as it enables people to experience a new way of being and relating to the world. And if you think about somebody who's suffering from depression, ruminating thoughts, anxiety, this is actually huge. Because you have... you're conditioned to think a certain way about the world. And then you have this experience that kind of shuts it down and then opens you up to a whole new field of thinking, seeing and being. So you can see it as like living from like a pigeonhole versus like a 360 view. And due to this temporary reset in the default mode network, it enables the brain to sort of reconsolidate itself in new ways. This creates new pathways of communication that can be further developed and strengthened post experience. The psychedelic experience enables like a complete reset of the brain. This is when your neuroplasticity comes back in. However, what research has shown us is that you have like a window of let's say, opportunity where for a few weeks following the psychedelic session that your brain is most malleable, and this is where you really, really have to utilize and this is where therapeutic interventions can really come in and strengthen these new pathways and also doing things like being really committed to and intentional with psychedelic integration.

So here's just like a little brief on some psychedelic studies relating specifically to depression. Johns Hopkins sense of a psychedelic, psychedelic and consciousness research. They've taken 24 people with long-term documented history of persistent depression. Just to kind of zoom clearer a little bit. Basically what they did is for an entire group of 24 participants, 76% showed more than a 50% reduction in depression symptoms after the one week follow up, and 71% at the four week follow up. Overall, after four weeks of the treatment, 54% of the participants were considered to be in remission, meaning that they no longer qualified as having depression. Now, this is massive, you think of what, what traditional pharmaceuticals have done, and I'm not knocking pharmaceuticals at all. But if you think of the cycle in which people go through, where they have depressed, they suffer from depression, they go on a drug, they're okay for a bit, they come off, and then bam, they're stuck in this loop over and over again, and you have a natural substance that comes in and can actually take them out of that loop. That is huge. That really empowers people. It gives them their life back. It gives them a way of connecting with

themselves, of connecting with other people, of connecting with the world, connecting with something that's larger than them. You know, this is, this is really a gift. I'm aware that they're looking to synthesize psilocybin. I have my own qualms about that, because I believe as a natural substance, they're imbued with, with life. They have their own spirits. And I believe that when you ingest them, you're also communing with that spirits. And I feel like part of the whole therapeutic process is being in this relationship with the spirit. Another study conducted by Compass Pathways found that participants administered high doses of psilocybin had the steepest decline in depressive symptoms. They reported rapid remission, even at three weeks, and that was sustained at three months. So again, like I have a lot of resources available, if anybody's interested in terms of not just psilocybin, but other psychedelics, I'm more than happy to share these resources. You can read up on the studies and things like that, because it's really, really fascinating what's going on and what these little fungi's are doing. So, right. I don't know if I've reached time. If I do have time, I can talk a bit about Maria Sabina, because that was pretty cool. And that kind of like leads into like how mushrooms came back into the West. So rechecking in with you about that.

Rheanna Chen: If it's okay, I'll go straight to question. But just want to let the audience know we are running 15 to 20 minutes behind. So I want to be aware those of you who are up late or have to eat dinner, etc. Just if you could stay on a little bit longer, but we understand if you have to go. So a question from Johnny Barca. As important medicinal benefits of psilocybin become better known. Can you expand more about the risk of the pharmaceutical industry pushing back and trying to prevent its advancement? And the same way that the fossil fuel industry killed the electric car in the 1980s?

Ana Montano: Yeah, that's a really good question. So what I mentioned before is the fact that they're trying to create a synthetic version of psilocybin. This is primarily for partisan purposes, i.e. profits. Like I said, I have my own qualms against that. Also, too, I really do believe in the essence of these substances and their benefit. And of course, you know, I don't think that these drug companies are necessarily evil, but I think they prioritize profits over really helping people. Another thing is the way in which they're going about doing these things can really make it a disadvantage for all people. One thing that's been coming up in terms of the research studies is the demographic groups like whether they're actually testing efficiently on people of color, because, of course, different bodies respond to things differently. So there's a lot of like different variations and nuances in terms of like the studies, the FDA, the drug companies, in terms of how they can affect all of this. But I really think like when it comes to the psychedelic renaissance, I really do believe it's kind of like all hands on deck situation, because so many people have so many different backgrounds. They're studying different things, they're having different experiences, and everybody has like their own unique gifts to bring to the table. The one thing I'm a huge advocate for, though, is safety. So I think whoever's working with these substances needs to be really well versed in the safe and ethical use of them. I hope that answers your question.

Rheanna Chen: Thank you so much, Anna. Just because of time, you have a few questions in the chat if you'd like to respond to those feel free to do so. That was so much useful information and I feel people empowered now with understanding the realm of the benefits of mushrooms on different levels especially with the healing aspects. So our last speaker so thank you for everyone

who's still here. I want to introduce my fellow Maintainers Movement fellow Sam Bennett with a background in design. She's an ethnographer and a maker, and she believes in slow research that minimally impacts our planet, and advocates for human well-being. So you can find her as a senior researcher at Healthy Materials Lab. She also teaches at Parsons School of Design, Pratt Institute, and New Jersey Institute of Technology in the interior design and industrial design departments. And she's currently exploring how to use mycelium and discarded materials. So without further ado, welcome Sam Bennett to the stage. Very excited.

Sam Bennett: Hi, everyone. Thank you so much Rheanna for having me. And it's just been so inspiring to hear everyone's work with mushrooms, and I feel like design is kind of a place where it all can come together. So I'm just going to get started. We're talking about mycelium and it's bio fabricated and it's biased and bold realities and possibilities, which I'll touch on the definitions of that in a minute. So as we've heard, mycelium is the root system of mushrooms. And it's a super organism because it's responsible for 90% of decomposition on earth. It doesn't photosynthesize; it can metabolize and synthesize chemicals. It can eat rocks if you give it a long time. It's not bound by time or space. It's formless, but it can take any form. It's one of the largest organisms on earth, and it's the original Internet, and it might even be immortal. John Cage is a big inspiration to me. He's an artist, and he was also a teacher at Parsons School of Design where I teach and I went to school. He agreed to become a professor at Parsons if he was allowed to have a mushroom foraging class. And he says that I have come to the conclusion that by that much can be learned about music by devoting oneself to the mushroom. And I think that's true in life as we've all heard from our presenters. He has a beautiful book that came out a couple years ago to. I just wanted to make a note of that. Here is one of his pieces of art that he created a little bit before he passed away. And this really reminds me of mycelium, and I think that's what's so amazing, is that we can see mycelium in lots of different systems, whether it's the universe or the synapses in our brain. And just, just a quick review, as we heard Will talk about how mycelium is grown. It starts with the hyphae and then expands out. We're talking about the bottom of underneath the mushroom, the mushrooms the fruit. I won't talk too much about it except that chitin is an important element to mycelium from a building and bio assembly perspective. Here again, just a reminder of how mycelium grows. It fruits and then it starts the process all over again with the spores and germination. I wanted to touch on one of a book that was really inspired me over the past few years, which is Braiding Sweetgrass by Robin Wall Kimmerer. She says these fungal networks appear to redistribute the wealth of carbohydrates from tree to tree, a kind of Robin Hood. They take from the rich and give to the poor so that all the trees arrive at the same carbon surplus at the same time. They weave a web of reciprocity of giving and taking. In this way the trees all act as one because the fungi have connected them through unity, survival, all flourishing is mutual, soil, fungus, tree, squirrel, boy and all are the beneficiaries of reciprocity. Which I think is really inspiring, and something to think about from a societal perspective.

And so I just want to mention that yes, I am in Brooklyn, New York. I'm in the city filled with concrete, but we do have amazing parks. And I actually we find mushrooms here too. I'm part of the Mycological Society of New York, which John Cage actually revived in the 60s, because he was a mushroom forager. And when he came back from Europe, he, he revived it in New York. But these are just a few things that I found on my walk a couple years ago after a fall rain. And I can't identify any of them, even though I'm part of the group. It's like they're speaking a foreign

language, but I'm learning slowly, but they're just so beautiful as a artist and designer, I would say. And so one thing to note is the spores and so you can capture the spores in spore prints. And this is really important from a design perspective. So as we heard from Chris talking about how he is cultivating mushrooms, you can start with your own kind of spore broth, I would say kind of this mother of spores that eventually you can mix with agricultural waste which I will get to. So a little bit of background about me. I have been a product designer in textiles for a number of years. And when I went back to school, I was really curious about why do people keep things? And so as a designer, I really kind of felt the guilt of producing and so wondered, like mycelium could kind of be this magical answer to that. I love to create things, but I'm very concerned with like how it affects the earth and how long things will last. So in an infinite world, why do we need the new? What if things aged as we did as we did? Which has been a big question of mine, as a designer and as, as a consumer, essentially. So I want to just talk about a little bit about how this applies to design. Biofabricate is a organization that talks about biofabricated materials, a real range of them, so Mycelium is one of those. So biofabricated means materials that are produced by living cells. So these can be microorganisms such as bacteria, yeast and mycelium. So that's where we are. And then I like to just think of them as something that can grow from a cellular level. And then bio assembled is materials that are a macro scale structure that have been grown directly by microorganisms such as mycelium or bacteria. And so that might be like mycelium leather, which I'll show in a little bit. But this is the area that we're working in when we're talking about mycelium and design. So, I think Will already mentioned it. Ecovative has been one of these big companies that began several years ago now, but when I was just getting started in mushrooms about six years ago, maybe seven now. Ecovative was the first place where you could actually kind of get your hands on mixing mycelium with agricultural waste and thinking about it from a design perspective. And this was just, you know, mycelium is not really discovered it's I mean, it's part of the earth. But Eben who is the founder he, he grew up on a farm so he would notice this like white material growing on logs, and he described it essentially as nature's glue.

And so as, as designers, what we are doing or what Ecovative is doing is they're actually taking agricultural waste from farming, from lumber, so we're talking about hemp, corn husks, wood chips, etc, and inoculating it with mycelium and then creating packaging. And so this is kind of the entry point a lot of times for myself and then also for my students that I teach on like how they can like take mycelium and turn it into a design product. So, Grow.bio is one of their like, kind of sub companies, Ecovative sub companies. And basically they provide an agricultural mix and mycelium mix, which there is proprietary information, but I'm pretty sure it's like a reishi and an oyster mushroom mix because they're very hardy, they like kind of instantly grow and reishi's of really strong mycelium mushroom. But essentially, you can see that you in the ideal conditions of moisture, agricultural waste, and a little bit of air and nitrogen, it starts to grow this white fluffy stuff. And that's mycelium. And essentially, it's these little branches that are all like combining to glue things together. So I'm just gonna go rapid pace here. Here's a bag of it and me experimenting, and at the beginning. They get this bag, you mix it with water, a little bit of flour, and then it turns into this fluffy white stuff, glue. This is basically the hyphae is eating the carbohydrates and it becomes white. This is when things can kind of go wrong, you can get the wrong kind of mold, like Will was talking about at the beginning. But things can get really weird, but it's also so kind of ugly. It's beautiful in my opinion. So anyway, I just want to quickly show you some bigger projects of like you can create furniture; you can create building

materials. So here's just me experimenting. I use chipboard because I'm also concerned with plastic use and I will say that I'm using plastic packing tape but the point is I'm making molds that are not out of plastic that I can end up removing the packing tape and then just have the chipboard that I can reuse. And so I designed the shapes on a program called Rhino and then I can export them flat, print them out and then score and make curves using chipboard a thin kind of pressed cardboard material. And here it is being stuffed and you can see how it grows and becomes white and fluffy. Here it's growing even more so this was like looking pretty good but I could still see the agricultural waste and now it's getting even more dense. The whiter and denser it looks the stronger it's going to be. Here's a close up of it. And then I'm removing the materials. The, the mycelium eats any ink or dye by the way. There's a little piece of sharpies marker on this mold so I knew how like deep to pack it. So anyway, here's it here it's growing I removed the form and it's growing this way, and then this is how it ends up. So once, once you, once you're done with your tape and it feels strong enough you can end up drying it. So you can do that with like an oven or you can just air dry it. Again I think that was touched on Chris, you have to keep things sterile. So I've completely skipped the part of like using rubbing alcohol, gloves and masks. It's basically being in the pandemic that's how you treat working with mycelium and molds. Just a quick I'm just going to wrap it go through some slides of me making a lamp. The mycelium is creeping out of the, the, the mold here, and so it's this white fluffiness; it's amazing. I think it's so beautiful.

And then here's the lamp here. Mycelium, once you make the structure it also shrinks. That's the other thing to know. It shrinks about 15% so you have to kind of do some math there. And then me trying to figure out more organic shapes and maybe even how to grow a chair. It ended up being a massive failure but I learned a lot and made me think about like different materials that it can grow in. I saw some of the comments in there. You can... I've been growing it in fabric recently; it loves knits. It really loves linen. It loves cashmere. And also I have been growing it in wet clay so not actually fired ceramics, but clay, and it likes that because the moisture content. I just wanted to... I'll put some links in the chat but this is becoming this innovative building material. So MoMA ps1, hyphae was one that really came out in 2014. Mycelium is cool as a building material because it's strong. It's water resistant, it's mold resistant, and it's fire resistant, which are all these things that a lot of unhealthy chemicals can be added to prevent some of these things. And so that's what's so amazing about mycelium. Here's just some other images. It's also great for acoustic material. It can be made into furniture, and also for the built environment. We have we're a huge proponent of waste. And so actually, you know, Rheanna was telling mentioning that I work for the Healthy Materials Lab. We just had an amazing talk from Red House Architecture Christopher Maurer talking about landfill issues and carbon emissions connected to construction. So his company is actually working with creating a fully built house out of mycelium. And he's working in Africa right now to do that. And we're actually going to have a podcast on trace materials that will have this episode about his work in the summer. So this is just an example of the actual scientific experiments they are doing. Well it's not extremely scientific, but just about how strong mycelium is if it's grown in a certain way. This is a man that says sledge hammering a concrete block versus a micro block. The micro block doesn't break, which is incredible. I'm gonna skip this. It's turning... some Ecovative is doing foam. It's still in... it's still testing but that's just straight mycelium; no composite material. Here it is being grown. It's crazy. And then what's cool is this foam can end up being pressed into different shapes and textures. And so my little leather which I think is turned, turned into called be called

un-leather has been made. You'll see it in different fashion companies now Stella McCartney who's always been interested in innovative material, she's using it. The one practice I will say is that although things are made out of mycelium, it's not always mycelium. So unfortunately right now, in order for this un-leather to be wearable and durable, it's mixed with... it's coated with a polyurethane. So it still has plastic in it. It's not biodegradable, but hopefully in the future we can continue to like use this like natural technology to, to push this, this push the, the plastics out because it's such a huge issue. Last thing I'll say is we're going to have a talk at Healthy Materials Lab next week about fashion and mycelium. If you want to come I'll put a link in the chat. And I just want to thank all my magic spores. So that's my fellows that I'm working with at Maintainers, especially Rheanna for inviting me and Leila who's my, my co fellow who I do this research with. And then all of our Maintainers, Max Tona. And then Lauren, Liliana, Jess and Andy, who keep everything organized and keep us together. So thank you so much.

Rheanna Chen: Fantastic. And I love what you said about ugly and beautiful at the same time, and a magical solution construction, furniture, packaging. Just one question. If you've seen any exploration done in the tropics with mycelium packaging, especially the questions around maybe termite resistance or humidity other factors that may compromise how it can hold up?

Sam Bennett: You know, actually, I have not. But Chris, The Red House Architecture, I would say he's the closest person that I've seen to be doing it fully. Because he is, well, he's working in Africa right now. And he's also working with NASA. So I think he's the one that's really pushing all these like different conditions to see how mycelium works. So I'll make sure to put his, his info in the chat too. Here's all of my info on the podcast but Red House Architecture.

Rheanna Chen: Fantastic. Thank you, Sam. Really beautiful presentation. I think everyone's mind is blown. I think from the microscopic now to the macro. But just because of time again, I just wanted to let all the, everyone know who's here that you will get this resource guide from Liliana. But just to kind of wrap things up. I just want to thank everyone, especially all the speakers to Will, Carl, Chris, Justine, and to Ana and to Sam, fantastic, fantastic is what I meant to say. But also to my, my other magic spores, the Maintainers Movement fellows transit 22 to Max, to (inaudible) to Lila and Sam again. And then also to (inaudible) and Liliana, who have coordinated through Eventbrite in the behind the scenes, and also to Andrew and Jessica, who have selected us as fellows this year. Again, we explored the question of how mushrooms can be teachers for a more caring and regenerative society and planet. So I think as everyone goes home from this that we can really just look at mushrooms in a whole different way. So thank you for your presence of being part of this kingdom of fungi. And I have one request though, if you would bear with me. Those who do have a camera, if you can turn your camera on and we're going to take a group photo. Liliana is going to do this and I'm going to ask you to put your mushroom caps on. So the same little stretch that we did your mushroom cap, you're just gonna raise your hands in front of you and just over your head. You might have to adjust so we can see. But just like thinking caps but mushroom caps. Great, I see Will has a one, one hand think it mushroom cap. Great. So Liliana, when you're ready, you can scroll through the nine pictures to take pictures of all of us. Beautiful. Remember to breathe everyone.

Liliana: (Inaudible).

Rheanna Chen: And let it out. Woo mushrooms. Great. All right, I think Liliana tell me when you're done. Good. She's all good. And so over to her again, thanks to our sponsors who make this possible. And yeah, we hope that each of you have learned at least one thing. So Liliana is gonna give the wrap up.

Liliana: Thank you so much everyone for attending the first ever Tropical Fungi Summit. We so appreciate you being here, staying through until the end. If you have left and you're watching this on later play, we're so glad that you were able to register. One of our success markers for this event was to make sure that you learned at least one thing from fungi from our speakers. If you could take a minute to fill out this poll right now. Let me pull it up. You can take that, fill it out as, as you're heading out. But we appreciate this so much. We're going to send you a takeaway document in the next week here, which will have the recording, the transcript as well as the chat and all the resources from each of our speakers. And we so appreciate you being here. To learn more about the Maintainers and to stay up-to-date on other events from our fellows, you can follow us on Twitter, or sign up for our quarterly newsletter which is here in the chat. And thank you again to Rheanna for having this vision of this amazing Tropical Fungi Summit, and we hope you have an amazing rest of your night. Thank you so much.

Rheanna Chen: I just want to close in surprise. We are going to organize an in-person summit in Trinidad for those here. So stay tuned. Some of the speakers here we will follow up so there could be an in-person event. And I will be writing my second blog post inspired by this summit on Lessons of the Forest. Hopefully with some of Carl's guidance specifically about mushrooms in the tropics. So stay tuned for that and follow along for the journey. Thank you Maintainers Movement. Bye everyone. Mush love.

End of audio