

Getting Curious with Jonathan Van Ness & Dr. Shuchi Talati

JVN [00:00:02] Welcome to "Getting Curious", I'm Jonathan Van Ness. And every week I sit down for a 40 minute conversation with a brilliant expert to learn all about something that makes me curious. On today's episode, I'm joined by Dr. Shuchi Talati, a geoengineering governance fellow with the Union of Concerned Scientists, where I ask her "What exactly is geoengineering anyway and how can it save the world"? Welcome to "Getting Curious", this Jonathan Van Ness. We have the most exciting guest this week and we met in the most incredibly exciting way. If you picture it, it was Washington, D.C. I think I was wearing a leotard and a high waisted skirt.

DR. SHUCHI TALATI [00:00:42] It was a super cute skirt.

JVN [00:00:43] It was a really cute skirt. And I was minding my own business, walking by the Capitol building. When I look up and I see Dr. Shuchi Talati and you're standing there and I'm on these steps and I think I was doing a photo shoot. And you just so happened to walk like right next to us at the right place, at the right.

DR. SHUCHI TALATI [00:00:58] And I was totally staring.

JVN [00:01:01] But like it was really just an incredible moment because like, I think like Mother Nature or like someone told me, like, you need to talk to them because, like, that person has a story. And next thing I knew, we were talking and I really, my intuition couldn't have been firing on any more of all cylinders. So basically tell people like what your title is, because it's not what I keep saying it is. But you have like a really incredible title.

DR. SHUCHI TALATI [00:01:25] So I'm that geoengineering governance fellow at the Union of Concerned Scientists.

JVN [00:01:30] Let's say it one more time. The-.

DR. SHUCHI TALATI [00:01:32] The geo-engineering governance fellow at the Union of Concerned Scientists.

JVN [00:01:37] So geoengineering is such like a \$75 word.

DR. SHUCHI TALATI [00:01:41] It is. It is a strange topic, but one that we definitely need to talk about.

JVN [00:01:46] It's not strange. So an engineer is?

DR. SHUCHI TALATI [00:01:50] So an engineer is bas-, it's like a scientist, but it's more about applying the science to the real world.

JVN [00:01:56] And a geo, a geologist?

DR. SHUCHI TALATI [00:02:00] So geologists studies the earth. And so geo engineering is kind of a misnomer. It's it's a set of approaches that are large scale interventions in the earth's climate system.

JVN [00:02:12] So let's take it way back.

DR. SHUCHI TALATI [00:02:14] Yeah.

JVN [00:02:15] You're minding your own business. You're just like growing up. You're like, all right. The world's cool. I'm in school. Like, when did you realize that you wanted to be a scientist?

DR. SHUCHI TALATI [00:02:24] Pretty young. My parents are both scientists. And I think that was just the path that I was going to take.

JVN [00:02:30] What kind of scientists or what kind of science do your parents do?

DR. SHUCHI TALATI [00:02:33] My mom's a doctor and my dad's a mathematician.

JVN [00:02:36] Wow.

DR. SHUCHI TALATI [00:02:37] Yes, they're they're impressive folks.

JVN [00:02:40] I really can't imagine, to be honest. It's I, math, is really, it escapes me. I signed up for astronomy and thought that it was going to be about like Aries and Pisces and stuff like I didn't realize I was going to be so mathy. So I'm really into like scientists, mathematician, people's brains, cause it's just not how mine works. So I respect you so much because you're just, you're working on a wavelength that I don't think I've ever visited before. So you realized that you wanted to be a scientist. And what about like engineering? And then further, like, was it a natural progression for you becoming a geoengineer or like did you realize that there was kind of a blank space there in the science community? And you're like, let me like, was it a passion thing.? Was it like, like, how?

DR. SHUCHI TALATI [00:03:23] Yeah. So I started as an environmental engineer in college and I actually interned on the Hill while I was in college 'cause I was like, I am really interested in politics too. How do I do this? And when I was there, I started learning more about climate policy and I totally fell in love with it. So I decided I wanted to learn more about climate science. So I went and got my master's in climate science. And that's where I started learning about geoengineering. And I thought this was just this really fascinating topic that's really controversial, but something that we might need, really need to talk about. And it seems like this kind of space that needed more voices. And so I got my PhD in engineering and public policy. And that was mostly all about climate policy, too. And, you know, it was during the Obama administration. So we had you know, we're working on the Clean Power Plan. We were working on, you know, building on energy systems, it was such an exciting time. But, you know, after after the 2016 election, you know, climate policy has taken kind of a backseat in our national conversation and, you know, in terms of what's happening in the administration. And so I thought, you know, I wanted to come back to geoengineering because it's this topic that, you know, it can be very controversial. But there are so many interesting parts of it that are starting to come up in really big reports like the IPCC report that came out last year.

JVN [00:04:38] Was that the one that came out on my birthday about the 11 year thing?

DR. SHUCHI TALATI [00:04:40] Yes. So that's the Intergovernmental Panel on Climate Change. And so they came out with a special report last year about what we would need to stay under 1.5 degrees of temperature rise. And so within that, they talk-

JVN [00:04:52] Now why it's 1.5 degree of temperature rise important?

DR. SHUCHI TALATI [00:04:55] So that's basically a threshold we found that above, above which we're going to start seeing a lot more catastrophic changes. 2 degrees, even more catastrophic changes. And so 1.5 degrees is something that the community has come together to decide that this is something that we should stay under.

JVN [00:05:10] And when you say that geoengineering is or can be controversial. There's contro-, controversial topics within it. Like, what does that mean?

DR. SHUCHI TALATI [00:05:16] Yeah. So let me take a step back and explain kind of more in depth what it is. So I had said earlier, it's it's intentional large-scale interventions in the climate system. So there's two different sides of it.

JVN [00:05:26] Oh, that's what geoengineering is.

DR. SHUCHI TALATI [00:05:27] That's what geoengineering is.

JVN [00:05:29] Wow.

DR. SHUCHI TALATI [00:05:30] So there's two different kinds. So the first, the first is a set of methods that's focused on sucking carbon dioxide out of the atmosphere. So that's called carbon removal. And there's another side of it called solar geoengineering. And those are approaches that reflect sunlight to cool the planet.

JVN [00:05:46] Solar?

DR. SHUCHI TALATI [00:05:46] Solar geoengineering.

JVN [00:05:47] Ok, ok, ok.

DR. SHUCHI TALATI [00:05:48] So carbon removal, there's there's kind of a spectrum of approaches in there. There's, there's like nature based solutions that are like planting more trees. Right? Or there's something called blue carbon, which is about coastal wetlands and how they absorb carbon dioxide.

JVN [00:06:03] So coastal wetlands absorb better than just like, like?

DR. SHUCHI TALATI [00:06:07] Just like normal land.

JVN [00:06:08] Yeah.

DR. SHUCHI TALATI [00:06:09] Yeah. They absorb it at a much faster rate and they actually can store it for many, many, many years. So actually when we degrade wetlands, which is bad for so many reasons. Another reason in that, is that it actually becomes a source of carbon. And so if we restore wetlands and protect them, they can actually become a carbon sink and help store carbon dioxide.

JVN [00:06:28] So it's kind of like, that's a like another reason like way like losing wetlands is like obviously very much sucking.

DR. SHUCHI TALATI [00:06:32] Yeah. So it's bad for so many reasons and that's just one of them.

JVN [00:06:36] Ok, so I have like a wider question that I don't really know if we like really talked about or if you're, I just am curious. And so basically you were saying that you came up in the Obama administration like when you were going to school. So does that-. I'm guessing that we were probably born in the same age box, like I was born in '87.

DR. SHUCHI TALATI [00:06:52] Me, too.

JVN [00:06:53] Fierce.

DR. SHUCHI TALATI [00:06:54] Yes.

JVN [00:06:54] So my question for you is, is like. Are there, what's the generational difference that you noticed? Like I mean, I don't want you to like talk shit about anyone in your co-working-, but it's like what is the generational difference in, within the science community? Do you? I mean, it seems like all of the voices are pretty united on, you know, the temperature changes, like how long we have to achieve it. But I just was thinking as you were talking, like, I wonder what the scientists who have been doing this since, like, you know, our parents in the climate change space have noticed how differences in fundings and like government approach in America has like stymied or stagnated our ability to like study it, to approach it better, to have moved faster and better on it, because I always think about like with HIV treatment, if the Reagan administration hadn't been spending like seven years not talking about it and, you know, downplaying the seriousness of it, how much further we, would we have gotten 'cause when we did start to focus on it like we got so far, so quick.

DR. SHUCHI TALATI [00:07:52] Totally.

JVN [00:07:52] And I think that this is one of those things where, you know, because we don't see necessarily like the you know, with HIV AIDS in the 80s, like we were seeing like tens of thousands of people, you know, having their lives like really severely impacted. I think with climate change, like if you don't see it in front of your face, there is just that ability for people to say, like, I don't understand how this affects me. And I think that if scientists could be like, well, you know, I was just wondering if in the 80s there wasn't very much research on it, like, well, this and this, like the sort of thing started to happen in the 80s. And if we would have like thought about it more. I don't know. Do you guys ever talk about that?

DR. SHUCHI TALATI [00:08:22] Yeah. No, I think it's a really big conversation and how the conversation has evolved and you know, how, you know, this new generation is starting to, you

know, raise their voices so much louder than we have before. There were scientists in the 80s who were trying to bring this to people's attention. You know, I think the first scientists testified to Congress in the mid 80s about climate change. And, you know, in the first Bush administration, you know, that's when we actually signed, you know, the Rio Summit that started these like annual U.N. climate meetings in 1992 in Brazil. But then, you know, and in the Clinton administration, you know, climate and environmental policy was really important, but it wasn't something we were seeing, like you said. So there wasn't this like rise to act. But like that said Al Gore as vice president, it's something that he cared about, too. So he was trying to bring it up. And that's when I don't know if you remember, the Kyoto Protocol happened as one of these U.N. meetings that that the United States Senate didn't ratify. And so and then, you know, we have the second Bush administration. And it's so crazy because if you look back at the presidential debates in 2000, they were actually debating climate policies in those debates. So we had Republicans on board. And then you go to, you look at that administration after Bush won and all of a sudden, we've like hit peak climate denialism. And I honestly cannot tell you what happened, but we went from debating climate solutions to completely denying its existence. And I think that was when we started to like on this roller coaster of just like ups and downs of like denialism and like new ways of denying the science.

JVN [00:09:49] Is that a fossil fuel industry thing?

DR. SHUCHI TALATI [00:09:51] Definitely. I think there's been a lot of fossil fuel company influence in the messaging and in paying candidates, you know, and so a lot of Republican candidates will either, you know, lobby for specific policies or shut policies down that are around climate. And so we had a really big cap and trade bill come up in 2008 that, you know, got completely squashed because of all these factors at play. And then, you know, when the Obama administration came in, you know, we had, you know, a climate person in the office. But it was, we still had such controversy around even believing the science that, you know, there wasn't a lot of action we could take in the administration because we didn't have, you know, the full Senate and the House to, you know, make these moves. And so, you know, only until, only like near the end of his administration, the last few years did he come out with like the Clean Power Plan and, you know, different climate things that he can only do in the executive branch. But, you know, for, you know, massive structural change, you need Congress to act, too. And so and now, now we're just here. At this place.

JVN [00:10:52] I mean, 'cause the EPA has just had like been run by like completely bad people.

DR. SHUCHI TALATI [00:10:56] Right, and they are stripping regulations. They're, you know, dismantling science boards. I mean, the Clean Water Act, like you've talked about on your podcast before.

JVN [00:11:03] But so, so the science community is aware that like, painfully aware I'm sure, that like you have experienced it in your career, that like this current administration is like really actively engaging in climate denialism and like trying to rollback regulations and kind of-. So when you're talking about that a little bit, I was thinking like, what do you say to climate change deniers? Because, like, I was thinking about like Prince Charles 'cause I was watching "The Crown" and like he was talking about this like in the late 70s, early 80s. And people thought he was like way out of left field. But like, it's so interesting. So, I mean, at this point, since the early, since 1980, that's been like 39 years, almost 40 years. I mean, that it's been talked about and mainstream, even if it was considered like fringe when they were talking about it like in the early 80s. So it's like that, I think in that time, like I remember 1983 growing up on the Mississippi River, we had this huge,

massive flood. And then like Houston had like it's like second like gigantic flood, so do you think that some of these climate things that we are seeing in these weather patterns like could really be the effect of climate change and let's you think that that's a, like, what would you say to a climate denier? Like, do you have to deal with them on like a, did you ever have to deal?

DR. SHUCHI TALATI [00:12:14] So I do have to deal. Luckily, not super often, but it's really hard and it's hard not to be combative. Right? And so the approach that I take is usually just to ask, why do you believe that? 'Cause I want to understand where they're coming from, because usually, you know, we come, we've come from this history of really trusting science. You know? We trust science to provide our water, to provide our food, to provide our iPhones. So what is it about this particular topic that is making you say that? And that's usually how I start the conversation.

JVN [00:12:40] Because it would require people to have to like change and be less-

DR. SHUCHI TALATI [00:12:42] To be introspective.

JVN [00:12:43] Yeah.

DR. SHUCHI TALATI [00:12:43] And be like, why? Why do I believe this?

JVN [00:12:44] Do I have to eat less meat? Do I have to drive a car less? Like, if it requires an inconvenience, it's like, ew.

DR. SHUCHI TALATI [00:12:48] Yeah. And, and I think the thing about this is that it's not just about personal sacrifice. Right? It's about, you know, vote and getting massive structural change. Right? Changing out like a plastic straw for a paper straw isn't really going to make that much of an impact compared to a public policy that is sweeping. So, yeah, and I think that's the message that I'm trying to send the most. But in terms of your question about like relating climate events or weather events to climate. We can definitely do that. So, you know, we can't necessarily attribute like a single event to climate change, but the signs around attributing that is rapidly advancing and we can see how much climate has affected the likelihood and intensity of a certain event, which is so fascinating. And so like, for example, for Houston and Hurricane Harvey, climate change made the rainfall three times more likely to be that intense and 15, 15 percent like that strong. And so, I mean, we can like say that with the science.

JVN [00:13:45] Compared to like a hurricane in the 70s.

DR. SHUCHI TALATI [00:13:47] Right.

JVN [00:13:49] Interest.

DR. SHUCHI TALATI [00:13:50] Yeah. And so there's there's been a few studies that have found that some recent heat waves have been so extreme that they wouldn't have existed without climate change.

JVN [00:13:59] That's really scary. We're going to take a really quick break. We're going to be right back with more. Dr. Shuchi Talati after this. OK, so basically we were just talking about like if, the comparisons that we can draw to like the intensity and frequency of weather events over the last

like 30, 30 years to climate change. And you were talking about Hurricane Harvey, which I think is very interesting. I was also wondering about just generational differences in people's approach to climate change and the severity of it. So one thing I was learning about, so policy change versus like personal changes, right? Like someone eating like cow meat a few less times a week because of like the methane and, and the climate, like the climate change causing gases that like cows making the farming industry makes or like the fossil fuel industry by driving our car a lot or flying a lot. So it's like, you know, if someone buys offsets or if someone uses less gas or eats less meat or like, you know, changes to a metal straw, that doesn't make as much of a change as sweeping policy.

DR. SHUCHI TALATI [00:15:05] Totally.

JVN [00:15:05] My question is why? How do we explain that?

DR. SHUCHI TALATI [00:15:08] So, policy-.

JVN [00:15:09] And I believe you. I just am wondering.

DR. SHUCHI TALATI [00:15:12] So policy can force corporations or like, you know, fossil fuel companies, you know, car manufacturers to act a certain way. You know, people can choose to buy electric car, but if there were a policy which I'm not advocating for, but to have all electric cars, that's obviously going to make a much bigger difference. Right? If we had a policy where fossil fuel companies had to be accountable for their actions, that would make a huge difference.

JVN [00:15:35] Is a good example of that like with how these airplanes, I was just reading this thing about how like airplanes, like will do this thing, they're like for weight they'll like give way more fuel than they need and then they burn it and dump it because it's like backloading or something? So it's like they can, and there's like policy where it's like they want to make that illegal so that like they can't like, because it's a costing like, I don't know if, we can look that up. But it's. I just was reading an article about it. But it's like some policy like that where like an airline company wouldn't be able to, like use like, because it's also like if they know that if the prices are going up, they'll like get more like at a time, then they dump it and like burn it. It's like a thing.

DR. SHUCHI TALATI [00:16:07] Yeah. So like that's exactly like what a regulation would address. Right? So it's like, you know, the reason we had the Clean Water Act is because people were just dumping it without any sort of accountability. And unless people stop them, which is what the government is there to do, is for oversight, then were not going to get those those actions.

JVN [00:16:23] So, ok, I got that. I got that. Now, with, what is the Union of Concerned Scientists? Because that's where, you're like a literal multi-hyphenate there.

DR. SHUCHI TALATI [00:16:35] Yeah. So we are a national organization and we conduct rigorous techno, technical analysis and we develop and advocate for policies to address global problems like climate change or nuclear war or sustainable energy. So these are the kinds of things that we do and so and so in the Trump administration, we've also been trying to expose kind of the manipulation of science by political operatives or special interests. And so it's, it's a really cool organization.

JVN [00:17:01] Push it. I mean, that's I'm trying to, ok. So but when you, when you were tell-, when you were telling me about, like what geoengineering in the beginning, you were saying it can be controversial because, you know, it's talking about like, is the controversy because like some people are like, "You're playing God", like changing like temperature and stuff so like that's where like it's like a separation, it's like a church thing.

DR. SHUCHI TALATI [00:17:18] Yeah. No, totally. And so there are a few risks that people are worried about. And so one of them is kind of this playing God situation, because we already have, you know, cause climate change. Right? We don't know what the risks are of doing solar geoengineering. You know, another risk that a lot of people are worried about is this thing called "moral hazard". Right? So if you do this. And so, so the way solar geoengineering works is that you would put these aerosols into the upper atmosphere in this layer called the stratosphere. And those particles reflect sunlight to cool the planet. So you're not actually dealing with emissions. And so a lot of people are worried about, you know, will fossil fuel companies just keep emitting because they can and so will they, and so will we no longer have an incentive to keep using renewables and reducing our mission?

JVN [00:17:59] Because these, because one of the them ok, oh, that makes sense. Ok, ok.

DR. SHUCHI TALATI [00:18:02] So that's something that people are really, really concerned about with this kind of technology.

JVN [00:18:06] So would another geoengineering thing be like how Trump was talking about like nuking hurricanes?

DR. SHUCHI TALATI [00:18:11] I mean, I guess technically that would be a geoengineering approach. It is not a sane one.

JVN [00:18:16] But for dummies. Yeah. Yeah. Oh, you know, another thing I was thinking like the canals in Amsterdam, like is like building like a canal like, is that geo engineering or not really?

DR. SHUCHI TALATI [00:18:24] Not really. Geoengineering is more about like intervent-, intervening in like the climate system.

JVN [00:18:29] So with what you study specifically, and like what you kind of work on is you-, aren't you like all about like that carbon removal? You know about like that, and like that the aerosols in the stratosphere? That whole thing.

DR. SHUCHI TALATI [00:18:43] Yeah.

JVN [00:18:44] I have so many more questions.

DR. SHUCHI TALATI [00:18:45] Yeah.

JVN [00:18:46] I want to talk about. So I kind of am curious about like how you, oh I'm really curious about it. How did you get to that destination? So like you're minding your own business at undergrad somewhere really smart.

DR. SHUCHI TALATI [00:18:56] At Northwestern.

JVN [00:18:57] Yeah. So you're minding your own business studying?

DR. SHUCHI TALATI [00:19:01] Environmental engineering.

JVN [00:19:02] Yeah. Which is major. So you're learning about environmental engineering things. You're like you're doing math, you're doing science. Like your brain is expanding. You're like acquiring much knowledge.

DR. SHUCHI TALATI [00:19:10] Allegedly.

JVN [00:19:12] No, I mean it is. And then the next, and then you go to, like how did you get into this? With the, with the, the aerosols in the atmosphere and the lowering temperature?

DR. SHUCHI TALATI [00:19:22] Yeah. No, so I learned about that when I was learning about climate science during my masters and it was so interesting to me and, you know, they were, at that point, it was like, it was like ten years ago and these topics were not really talked about as much. But I found them to be so interesting because we might need them, but we're not talking about them. And especially for carbon removal, I think is something that we need to talk about even more. And so-.

JVN [00:19:45] 'Cause what are the risks of too much carbon?

DR. SHUCHI TALATI [00:19:47] So, I mean, climate change.

JVN [00:19:48] Yeah.

DR. SHUCHI TALATI [00:19:48] I mean, massive, massive risk. Right? And so with carbon removal. So one of the reasons I got even more interested in it is that, you know, in a lot of this, like modeling studies that have gone on and looking at how we can make sure when we stay under certain temperatures, we're starting to find that there is almost no way to stay under certain-, like 1.5 degrees without using carbon removal. No way. And so we need to-.

JVN [00:20:12] Because it's just already been done? Like we already did the dam-, things, so it's already raising too-.

DR. SHUCHI TALATI [00:20:16] We've already gone too far. Right. And so we have to, you know, really start talking about, you know, these different approaches within carbon removal. And so and I'm not advocating for like any particular approach because different ones have different kinds of risks. There's a lot of different, you know, conversations we need to have, but we do need to start having, you know, more R&D in the administration, more demonstration projects and just more investment in this space.

JVN [00:20:40] So what are the ways?

DR. SHUCHI TALATI [00:20:41] Yeah. So there's a pretty broad spectrum. So that we have like nature based stuff like I was talking about like blue carbon and afforestation.

JVN [00:20:46] But you've don't think-. But right now, your team doesn't think that there is any way to do it, like which is like a plant more trees, eat less meat approach? Like we're gonna have to do one of these things to get there you think?

DR. SHUCHI TALATI [00:20:57] I think we're going to have to. And I think-.

JVN [00:20:58] 'Cause it's within eleven years is the, is the breaking point? Is that when we have to do it by?

DR. SHUCHI TALATI [00:21:01] So I think that's that's an interesting point. So I think, so what the IPCC report said was basically that, well, first, most importantly, that when you get to net zero emissions by 2050 now to get there by 2030, we need to be on a robust, aggressive path to carbon, carbon mitigation. We need, like our emissions need to be going down drastically to make sure we stay under this one and a half degrees of temperature rise. Right? So nothing's going to happen in 2030. Like there's not gonna be like some sort of apocalyptic event that happens, but there's gonna be way worsen-, worse climate impacts by then. And the best available science says that, you know, there's there's a rapidly closing window of time. And so, you know, the next 10 years are crucial. And I think so I think the deadline mentality is like not quite accurate, like nothing's going to happen in 2030. But if it's motivating action then that's, I'm totally fine with it.

JVN [00:21:50] Because really, like, it's I mean, I think people are like I think that's part of why it's hard to create that sense of urgency because it's not like, you know, we could get like some crazy asteroid we haven't seen could hit us tomorrow. You could walk in front of, it's like, you know, people or like have that whole approach too, you know?

DR. SHUCHI TALATI [00:22:06] Yeah.

JVN [00:22:07] And so it's like without that, like, you know, smoking gun thing, like where people can see it, it's like I wonder, like, how are they going to really like, you know, get it together? So it's like just paint a picture where we keep doing what we're doing and let's say it's like 2075. And we just keep on going. Like, do you think there's a world where Manhattan is like Venice?

DR. SHUCHI TALATI [00:22:28] I mean, there's going to be a lot more flooding. There's going to be way more storms. We're gonna have problems with food. We're gonna have problems with water. I mean, it's, it's just going to be a really dire situation. And there's going to be places that are way more hard hit than we are in the United States.

JVN [00:22:42] 'Cause is climate change hitting the ocean worse than land? Like is it affecting our water worse than land or both equally?

DR. SHUCHI TALATI [00:22:49] I mean, it's affecting both and it's causing ocean acidification, which is really important. So it's, it's causing huge changes in our ocean ecosystems. And so that, which will affect fisheries, which is a huge food source for a lot of the country. It's going to affect, you know, coastal erosion and sea level rise. And, you know, we have so many people living on the coast, not just in the United States, but over the world. The majority of the population lives up the coast.

JVN [00:23:12] What is our emissions like? Like are we a bigger contributor than like a lot of people to what the issues are?

DR. SHUCHI TALATI [00:23:19] What do you mean?

JVN [00:23:19] Like, do we have like, is our carbon emissions, is our carbon footprint like worse than other countries?

DR. SHUCHI TALATI [00:23:24] Oh, totally. We used to be the biggest emitter. China surpassed us recently. But, you know, cumulatively in terms of like, you know, the last few decades, we're definitely still the biggest contributor to climate change.

JVN [00:23:35] OK, so now let's talk. I'm so sorry, I keep getting away from the things that you do, I just-

DR. SHUCHI TALATI [00:23:39] No worries.

JVN [00:23:39] Have so many questions. So yeah. So you're, so yeah. Before I interrupted you and went off track again, you're finding out about carbon removal. Yeah.

DR. SHUCHI TALATI [00:23:46] Carbon removal. Yeah. So I was talking about, so we have these nature based solutions, but it's also technological solutions, right? So there's something called "direct air capture", which are basically these giant machines that suck carbon out of the atmosphere and then we either store that carbon or we use it for something.

JVN [00:23:59] Oh. What can we use carbon for?

DR. SHUCHI TALATI [00:24:00] So we could use it, we could use it as like a cement building material. We could use it, so it's used also to extract oil, which we don't want necessarily to continue.

JVN [00:24:09] No.

DR. SHUCHI TALATI [00:24:09] But that's a big use right now. We could use it, you know, to carbonate sodas. You know, there's a lot of-.

JVN [00:24:14] Really?

DR. SHUCHI TALATI [00:24:15] Yeah. I mean, it's not a huge, you know, product that CO2 would be good for, but it's one of them. But yeah, but building materials, I think is a huge one that can-.

JVN [00:24:24] To bad we can't make gas that's not from fossils.

DR. SHUCHI TALATI [00:24:27] So an in-, one interesting thing actually. So there is a company that is, is pulling carbon out the atmosphere. They have a pilot plant and then are, they're using it to make fuel. So it's basically like a closed loop system, right? It's still a fossil fuel. It's still, it has a car-, it's a carbon based fuel, but it's a closed loop. They're not extracted yet. They're pulling out the atmosphere and then using it as a fuel.

JVN [00:24:47] So that's better than getting it-.

DR. SHUCHI TALATI [00:24:49] Yeah, it's better than pulling it out and were not, they're not actually contributing any emissions. And so that's a potential use. I think the best thing is to actually stored it underground in a geological formation where it can stay for thousands of years. And that, and that actually is something called a "negative emission". Which is where we want to get to.

JVN [00:25:05] Why?

DR. SHUCHI TALATI [00:25:05] Because they're actually pulling it out of the atmosphere and putting it in underground. So no longer exists in the atmosphere anymore. And so, so when people talk about net zero-.

JVN [00:25:12] Is there a danger to a, to storing carbon in the ground? Like can it leak and poison water or something?

DR. SHUCHI TALATI [00:25:17] So there are, there are some risks and stuff, but it wouldn't poison water. And the, the, the places that they're stored are pretty secure formations. We do need to research it more, but it's something that we've been researching for some time and that we're already using for some on a very small scale right now. But that, you know, we're pretty aware of the science in that space. But yeah, and so when people talk about net zero by 2050. Right? We probably won't be have like completely zero emissions by 2050. Right? And for like aviation emissions or industrial emissions, where we can necessarily zero those out, we need negative emissions to get to zero. And so when people say net zero, that's usually what they're talking about.

DR. SHUCHI TALATI [00:25:54] So negative emissions would be something where it like actually takes out and makes it not exist. So really is the only way to get to a negative emission is to store it underground?

DR. SHUCHI TALATI [00:26:03] Yeah. And, or something like plant-, planting a tree, technically, if like the tree's still alive before you know it, it's pulled it out of the atmosphere. And so that's technically a negative emission.

JVN [00:26:12] How much does a tree really pull out of the atmosphere?

DR. SHUCHI TALATI [00:26:15] Not that much. And so that's why, you know, really large scale, afforestation probably isn't a way to, you know-.

JVN [00:26:20] Oh, afforestation is like replanting trees?

DR. SHUCHI TALATI [00:26:23] Or planting new trees. So reforestation is replacing-.

JVN [00:26:26] Oh I thought you said afforestation.

DR. SHUCHI TALATI [00:26:26] No. Afforestation is the thing. Yeah, yeah. So reforestation is replacing trees that have been cut down, like in the Amazon. Afforestation is planting new trees or building new forests. So that's so it's like-

JVN [00:26:37] So afforestation is not as good as reforestation or it's the same, but just different?

DR. SHUCHI TALATI [00:26:41] It's, it's the same. It's the same. It's just planting more trees. But afforestation is adding to the trees that we already have versus reforestation is like restoring the trees that we've cut down.

JVN [00:26:51] OK. We're going to be right back with more right after the break. OK. We're right back with Dr. Shuchi Talati, we're talking about afforestation versus deforestation. So do you, is there like, does like a weeping willow take out more than a palm tree, you know about that? Or like, is that all kind of the same?

DR. SHUCHI TALATI [00:27:15] I don't know about like exact tree species. I'm guessing it's like all pretty much on the same scale. But on the scale that we need for carbon removal, trees are probably not enough. We definitely need them. 100 percent need them.

JVN [00:27:25] Yeah.

DR. SHUCHI TALATI [00:27:26] But they're probably not enough. And so what the IPCC report said is that by mid-century we probably need about 10 gigatons a year of carbon removal. Now, to put that in perspective, we the United States emits six gigatons of year of carbon dioxide. So it's a crazy, crazy scale.

JVN [00:27:43] So we need to remove 10?

DR. SHUCHI TALATI [00:27:46] 10 gigatons a year by probably mid-century.

JVN [00:27:48] And we emit 6?

DR. SHUCHI TALATI [00:27:51] 6 gigatons right now.

JVN [00:27:51] So we need to get to negative 16?

DR. SHUCHI TALATI [00:27:53] In the United States. Right? So 10 gigatons will be global. But just to put that in perspective of what 10 gigatons means, it's, it's a huge, huge amount. And so the scale at which we would need carbon removal is probably amongst one of the biggest things we've done in human history.

JVN [00:28:07] So one thing I notice about Republicans is, is that the only thing that motivates them is like money or like potential to make money. So, you know, because China's becoming like a bigger, more powerful economic force. It's like and doesn't it seem like they're doing a little bit, or like the count-, the government of China is doing more in kind of a solar panel, like aren't they getting a little bit more curious themselves about like, you know, like more sustainable ways of, of, of energy?

DR. SHUCHI TALATI [00:28:35] Yeah, China totally is. They've invested so much in solar and wind. I think they've become one of the biggest producers of solar like parts. So, yeah, China is definitely there. They're also, you know, still producing a lot of coal.

JVN [00:28:49] Well, I'm not saying-. Oh, they are? Interest. So a lot of coal mining going on in China.

DR. SHUCHI TALATI [00:28:54] Yeah, and a lot of coal, fossil fuel, energy production.

JVN [00:28:58] Huh. I wonder if that's why Donald Trump and like other Republicans, are so like put, like pro-coal in America because they want to create competition or something because of like a hideous trade deficit. I'm not saying it's like cute, it's like bad, but like because one thing that I keep thinking about is like if we go to all this trouble to like do the Paris climate agreement like blah blah blah, it's like, well not that we're doing it anymore, but like when we go back, it's like it kind of takes everyone.

DR. SHUCHI TALATI [00:29:20] Oh, 100 percent takes everyone. And I think in terms of like why Republicans support coal here. Honestly it's because the mining is going on in their own states. And, you know, the coal production is such a big part of their communities and their money.

JVN [00:29:32] So that's why, I keep writing down money. So is there money in carbon removal? Is there an industry that we could create here?

DR. SHUCHI TALATI [00:29:38] Yes. So it's really interesting. The thing about carbon removal is that it builds some weird coalitions. Right? You have people who support coal and coal power plants actually onboard with researching this technology. And so it's both-.

JVN [00:29:51] That's because they want to be able to-.

DR. SHUCHI TALATI [00:29:52] Right. So it's both good and bad. Right? So you have, you have, you know, these Republicans on board with this type of technology. You have fossil fuel companies on board with this type of technology because they're the ones that can help, you know, build the technology. Right? Because the technology for carbon removal is similar to like carbon capture and storage, which we also need. But it comes from fossil fuel technology. Right? And so what a lot of people are worried about is that if we are investing heavily in carbon rule, especially like direct air capture, are we going to become dependent on the fossil fuel infrastructure that we don't want to be dependent on anymore? And so that's, that's a big question in this space.

JVN [00:30:25] So back to what you study again, I swear to God we're going to land it this time, is you like so you're doing your masters work and you start to learn about this like wide-scale carbon removal about a decade ago. So in how, so what is it? There's like the aerosol kind?

DR. SHUCHI TALATI [00:30:41] Yeah, so the carbon removal is one kind. And so the other kind is called "solar geoengineering".

JVN [00:30:45] Yes, yes, yes. S.G. is what I wrote down.

DR. SHUCHI TALATI [00:30:46] Yes. So there's a, there's a few different kinds of solar geoengineering. So there's the aerosol kind, which I talked about, which basically aims to mimic a big volcano. So when, when there was a big volcano in 1991, call Mount Pinatubo. And so when it erupted, it erupted, the eruption was so large that it sent aerosols into the upper atmosphere, into the stratosphere. And we notice that we had almost half a degree of cooling for some time. And so we started looking closer at the modeling and how this works. And so basically it would aim to put up aerosols. Similarly, using planes. And so it would build a layer around, you know, around the whole globe to reflect sunlight and to cool it in the same way.

JVN [00:31:26] What were the aerosols from inside the volcano made of?

DR. SHUCHI TALATI [00:31:28] So they're made of sulfur. So those were sulfate aerosols. And so we don't necessarily know if that's the best aerosol to use. That's gonna-

JVN [00:31:34] Like sodium aero sulfate?

DR. SHUCHI TALATI [00:31:36] Just sulfate. So just-

JVN [00:31:38] So just the sulfate part?

DR. SHUCHI TALATI [00:31:39] Yeah.

JVN [00:31:39] So what's sulfate?

DR. SHUCHI TALATI [00:31:41] So it's, it's an element. So sulfur is an element. And so when it would go into the stratosphere, become hydrogen sulfur, sulfate aerosols, these little particles of sulfur. The only real danger that we're concerned about is that maybe there could be some sort of ozone depletion because of the sulfate aerosols. Now, we don't know if this will be enough to cause a problem. We also don't know if there could be a better aerosol to use, and that's what research is about, right? We need way, way, way more research.

JVN [00:32:07] Is your guess that it would be sulfur because nothing seemed like bad that happened last time when the volcano went off?

DR. SHUCHI TALATI [00:32:12] I would say I have no idea yet. We're like super nascent in this stage.

JVN [00:32:16] Oh what's nascent? Just means like a newborn baby?

DR. SHUCHI TALATI [00:32:17] Very early. Yeah. Super baby.

JVN [00:32:19] Love. Love it, like we're learning so many big words today. So the aerosols one, one way.

DR. SHUCHI TALATI [00:32:24] Was one kind. And so another kind is something called "marine cloud brightening". So basically we would put up like salt particles in these special clouds that are over the ocean that would make them brighter. So now when something's brighter. It increases its

albedo, which is basically its reflectivity. So basically we will be reflecting more sunlight. So that's that's another way.

JVN [00:32:46] So we would put salt and water?

DR. SHUCHI TALATI [00:32:48] So we would take like salt and we will make it really small and then like throw it up into the clouds. And so those salt particles would help make the clouds brighter. Which is crazy.

JVN [00:32:57] Why? How?

DR. SHUCHI TALATI [00:32:59] So basically the salt particles are something called "cloud and condensation nuclei". So basically would increase the condensation and make it brighter.

JVN [00:33:07] Interest.

DR. SHUCHI TALATI [00:33:08] Yeah, but the the method it has like the most attention I would say are the aerosols. And so there's a few different reasons for that. One because we've seen it work with volcanoes. Two, it's at the direct cost for that are actually really low. So the cost to like maintain this like system, you know, could be potentially pretty cheap, which is really concerning. Right? You know, it could lead to like a lot of geopolitical problems. Right? So say, for example, India is experiencing a lot of extreme events. The cost of this could be so low that it's something that India could do on their own without asking for permission, without any sort of, you know, system to oversee this. But Russia, for example, might not like that. Right? Because they're benefiting from the hotter temperatures because of Arctic melt. We could have a huge geopolitical conflict because of that. And so there's all these geopolitical risks and instabilities, too. And so the thing that scares me most about this, which is the reason my title is what it is, is that there's no governance around this technology. We have no governance on an international scale, national scale, state scale. There's no oversight, there's no monitoring, there's no public engagement. It's really scary.

JVN [00:34:22] So theoretically, like any country could just like try out this throwing up aerosols in planes thing?

DR. SHUCHI TALATI [00:34:28] Basically, I mean like we don't quite have the technology yet, but it's not a hard engineering problem and somebody could figure this out pretty quickly and do this on their own. And, you know, even like a company could afford to do this on their own.

JVN [00:34:40] What if you used it like for worse stuff? Like to not fight climate change, but like, couldn't like it be used like in like scary ways?

DR. SHUCHI TALATI [00:34:48] It could be, you know.

JVN [00:34:50] So how do we protect our baby selves? Like, why how do we get, how do we get governance on a world scale for this?

DR. SHUCHI TALATI [00:34:55] We've got to have more conversations. It's something that people aren't really willing to talk about. And the thing is, so there's, there's some groups are really

opposed to this technology. And there are some groups that, you know, want to have a lot more research on this technology. And you know, what I think is that you need governance no matter what. If you want to ban this technology or if you want to promote the technology, we have to have governance. And I think that's the most important part of this.

JVN [00:35:17] Because you've not only study the science but you also have studied policy. So what do you see as I mean, for I mean, and you also worked at the White House under the Obama administration, which like I cannot believe we're just getting to now, I'm so sorry. But like I had so many questions. So what was your time like there, working with an administration? Did you in your opinion, did you feel like it was really well funded and really well sought after? At the time or really well like tended to at the time and now, like, what is your experience been? In that regard.

DR. SHUCHI TALATI [00:35:43] Yeah. So when I was there, I was at the Office of Science and Technology Policy. And it was this really fantastic place because science was so important to the Obama administration. It was this really thriving atmosphere where they were bringing in all these scientists and these really incredible people to work on, on climate change, on, you know, national security and on all these really important scientific topics. Now, you know, OSTP still exists, but it's a much smaller kind of thing than it was before. You know, they don't have the power that they had under the Obama administration. It's not, science is not something that's really funded in this administration. And so it's really disheartening to see, actually. And I really hope that in the next administration in 2020, knock on wood, we're going to see this robust growth again and even better than it was in the Obama administration.

JVN [00:36:32] I mean, to me, it seems like, you know, the Trump administration and other, you know, kind of xenophobic, racist, isolationist, like, you know, like just nationalist more than isolations, just nationalist governments. They they have this feeling of like wanting it to go back to the way that it was or, you know, really being in this idea that, like, things were so nice, you know, like and really fighting this like idea of, you know, just being aware of like what's going on. And so what are the real world implicate-? I mean, obviously, climate change, but like because we aren't doing any, you've been on the front lines of this on an administration that was being on the forefront of this. And now you have been on the frontlines of this in an administration that is completely removed ourselves from the conver-, conversation, and really taken us back like 50 years and their approach to climate change. So it's like, what are we really at risk of other, like spell out some of the risks that we're at from a government, from a governance and governmental regulation standpoint? Like other countries could do X while we're doing nothing?

DR. SHUCHI TALATI [00:37:39] Yeah. Other countries could innovate. Right? You know, the United States prides itself on being number one in science and technology. Well, that might not hold true. You know? China is accelerating their research technology. India. You know, Europe. I mean, people are going to move past us if we don't start investing and, you know, picking people up. Right? We need more people to, you know, start dedicated their lives to science. We need to build up STEM, which is science, technology, education and math. Right? We need, we need more women and we need more women of color. We need, you know, we have to build up our coalitions to be competitive. And I think a lot of people forget that. Right? You know, they think we're number one right now. Like, we don't need to fund science anymore. The only way we stay, number one, is by continuing to fund science and scientists and engineers and lifting up new people and new, like people that don't necessarily have access to the space to start coming in with new ideas that we never would've thought of before.

JVN [00:38:34] So do you feel more of a real world threat to daily life under a Trump administration because of their neglect for science funding and science research?

DR. SHUCHI TALATI [00:38:44] I do. I think, you know, you, you it's not something you necessarily will capture in your, in your day to day, but you're gonna see like programs start, starting to just get defunded and shut down. You know, certain researchers might not get funded. Some people might not get grants. You know, certain offices like, you know, NASA, like their climate offices, might not be able to fund as many students anymore. So the students don't end up doing climate and they do something else. We might not feel that right now, but we will feel that in ten to fifteen years.

JVN [00:39:09] But are you already feeling that in some respects now? I mean, even like the office that you were just talking about, like under the Obama administration, it's like not the same.

DR. SHUCHI TALATI [00:39:16] Is not the same. Yeah. Like we don't have the same kind of like momentum and work towards like climate adaptation or even mitigation.

JVN [00:39:24] So climate adaptation is?

DR. SHUCHI TALATI [00:39:26] So climate adaptation is preparing ourselves for the impacts of climate change. And so that's things like building seawalls or even like as drastic as evacuating a city because it's no longer inhabitable due to climate change. It's like a whole range of different, different things.

JVN [00:39:42] And that's part of what the concerns or the Union of Concerned Scientists studies? Like there's like a faction of concerned scientists that are studying that?

DR. SHUCHI TALATI [00:39:48] Yeah. No, adaptation resilience is like a huge component of climate. You know, we have to adapt. Everyone's gonna be affected by climate change. So we all have to prepare.

JVN [00:39:57] And it's like New Orleans or Houston would already be in the thick of this?

DR. SHUCHI TALATI [00:40:00] Right. Well, they should be, anyway. You know, whether they have the funding and the policy, infrastructure and interest to be funding climate adaptation is something I'm not sure about. There are definitely cities who are, who have climate adaptation plans. New York being one of them. But there aren't enough. And because different communities are going to be affected in different ways. This has to be a local based, you know, planning.

JVN [00:40:23] So when you think about being a voter, like wouldn't, I mean because we are coming up to an election. It's like how do you research a candidate, especially local candidates, on not only like what local candidates policies are, but like how do you research or like know about like votes that are going on in Congress that would, you know, rollback back regulations? Like do you keep your eyes on that stuff? And like, if so, how do you find it?

DR. SHUCHI TALATI [00:40:44] Yeah. I definitely keep my eyes on it. And it's, it's, it's paying attention to even like outlets that are more science oriented that focus on, you know, particular policies. It's just kind of keeping tabs on it. You know, even when really big things happen,

obviously the bigger outlets will cover it. But there, you know, some like science oriented magazines and, you know, websites.

JVN [00:41:04] Do you have any faves?

DR. SHUCHI TALATI [00:41:07] Um, oh my god, I'm totally blanking.

JVN [00:41:08] No, it's ok, no, we'll include. We'll include later 'cause I totally put you on the spot. So, I mean, I feel like we really, Dr. Shuchi Talati, I just thank you so much for your work and your, just your work, your expertise, your time. I really love that you mentioned, you know, we need more women of color in science. Is there any, like, words of wisdom or encouragement that you would give to any, like, women of color who are listening to this right now who want to get into science? Women who want to get in science or like men who are supporting women who want to get into science? Like what? How could people been more supportive to you? Like in, at work, in, in talking about science? Like, what's your word to the wise?

DR. SHUCHI TALATI [00:41:50] I feel like I wish I had more mentors. And so my advice to aspiring young women would be to reach out to women that you want to be like. You know, women are super open to talking at least everyone that I know in this field loves talking to young women. And so reach out and you will get a response.

JVN [00:42:06] Oh, I love that. Dr. Shuchi Talati, thank you so much for your time.

DR. SHUCHI TALATI [00:42:10] Thank you. This was so fantastic.

JVN [00:42:12] You're amazing. Thank you so much. You've been listening to "Getting Curious" with me, Jonathan Van Ness. My guest this week was Dr. Shuchi Talati. You'll find links to her work in the episode description of whatever you're listening to the show on. Follow us on Instagram and Twitter at CuriousWithJVN. Our theme music is "Freak" by Quin. Thank you so much to her for letting us use it. If you enjoyed our show, introduce a friend and show them how to subscribe. "Getting Curious" is produced by me, Julie Carrillo, Rae Ellis, Chelsea Jacobson and Colin Anderson. Our socials are run and curated by Emily Bossak.