

# Neurotechnology with Dr. Nita Farahany

## Ologies Podcast

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Oh hey, it's the bunny that you swear you saw on the lawn, even if no one else believes you, Alie Ward, and here's *Ologies*. Hey, am I a real person? Unfortunately, I am. Am I intelligent? That's up for debate. But this week, we are taking a dive into artificial intelligence and brain data with a scholar in the matter. So, listen, the past few months have been a little surreal, photoshops out there generating backgrounds to cut your cousin's ex-girlfriend out of your wedding photos, ChatGPT is writing obituaries, and frankly, a lot of horsepucky, there's also groundbreaking labor strikes in the arts which we covered in the Field Trip episode from the WGA strike lines; if you haven't heard it, I'll link it in the show notes. But I heard about this guest's work, and I said, "Please, please, please talk to me about how to feel about AI." Are we farting around the portal to a new and potentially shittier way of living? Or will AI say, "Hey dipshits, I ran some simulations, and here's what we have to do to un-extinct you in the next century." We're going to find out.

So, this guest has studied law at Dartmouth, Harvard, and Duke, and been a professor at Vanderbilt University, and is now at Duke's Institute for Genome Sciences and Policy. She recently delivered a TED Talk called "Your right to mental privacy in the age of brain-sensing tech," and just authored a new book called, *The Battle for Your Brain: Defending the Right to Think Freely in the Age of Neurotechnology*.

But before we chat with her, a quick thank you to patrons of the show who support at [Patreon.com/Ologies](https://patreon.com/Ologies) for a buck or more a month and submit their questions for the second half. And thank you to everyone in [OlogiesMerch.com](https://OlogiesMerch.com) shirts and hats and such. Of course, you can also support the show just by leaving a review and I may delight you by reading it, such as this one left this week by environmental lawyer, Harrison\_Harrison\_Harrison, who wrote a review calling *Ologies* an:

*Ooweeee, gooey ratatouille rip-roarin' good time.*

So yeah, I read them all. Thank you, Harrison, for that.

Okay, neurotechnology, let's get into this. How the brain interacts with technology and also, techno-neurology, how tech is striving to replicate and surpass human intelligence, and what that means for us all. So, let's beep-bop our way into a talk about texting, scrolling, cheating, brain implants, mental health, Doomsday scenarios, congressional hearings, apocalypse potential, medical advances, biometric mining, and why suddenly artificial intelligence is on our minds with law professor and neurotechnologist, Dr. Nita Farahany.

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**Nita:** Nita Farahany, she/her.

**Alie:** So good to meet you, terrifying to meet you. Are you the scariest person at a dinner party because of how much you know?

**Nita:** I'm not. I'm not a scary person and I find that people think that it's equal parts fascinating and terrifying. So, if anything, I think I'm a great dinner guest because they're fascinated.

**Alie:** I definitely should clarify that. You, there's nothing scary about you. The information that you hold is like, "[groans] Do I want to look? Do I not want to look? Do I want to look?" It's thrilling, like a horror film.

**Nita:** Yeah. It's, like, people can't look away and that's good. I don't want them to look away, I want them to know. But at the same time, what I usually get is "Wait, this is real? What you're talking about, it actually exists? People are using it? Employers are using it? Governments are using it? And wait, what?"

**Alie:** Do you spend a lot of your time chatting with people trying to warn them or calm them down?

**Nita:** Yes. *[both laugh]* So, on the one hand, I am trying to raise the alarm and help people understand that this whole area of being able to decode and really hack and track the brain is a new frontier and the final frontier of what it means to be human and privacy and freedom. At the same time, I don't want to make people have the reactionary approach to technology which is, "Okay, then let's ban it," because the promise is also extraordinary. And so I am very much equal parts, "Let me help you understand not only what the promise is and why you're likely to adopt it," but also why before you do so and before we as a society at scale adopt this technology, that we make some really important choices that will actually make it good for us and not the most Orwellian, frightening, scary thing possible.

**Alie:** I feel like there are few topics that have this much true ambivalence of so much good and so much potential for misuse. Did your brain become a lawyer brain because of those philosophical conundrums? What drew you to this kind of deep, deep thought?

**Nita:** Yeah, I've always been driven to the questions that are at the intersection of philosophy and science. In high school, I was really interested in science, but I was a policy debater. In college, I was a government minor and science major, and I did in-lab stuff but largely things that were policy.

**Aside:** So, Nita got several graduate degrees studying law and science, behavioral genetics and neuroscience, the philosophy of mind, neuroethics, bioethics, and even reproductive rights in policy in Kenya. And she said all her work seems to gravitate toward this intersection of philosophy and law and science because she had fundamental questions like...

**Nita:** Do we have free will? And do we have fundamental autonomy and freedom? How do we put into place the protections? But I've always been fascinated and really interested in the science and technology itself. I've never been a Luddite; I've always been somebody who is an early tech adopter but clearly sees what the downsides are at the same time.

**Alie:** Where was tech at when you were getting that roster of graduate degrees? Where were we at? Were we at emails? Were we at video calls?

**Nita:** Yeah, so we were not at video calls. We were at emails, the internet existed, and we used it. We all had computers, but we didn't have cell phones. I got my first cell phone after I graduated from college, like, the year after, I had a flip phone and I thought that was super cool. I could type out a text message one character at a time.

**Alie:** Oh, T9? I had a gold medal in T9. I could do it without even looking at the phone. I found it harder when we had a keyboard.

**Nita:** Yeah, and then I had a PalmPilot, like, as the precursor to the iPhone, and then I stood in line the first day that the iPhone was being sold and got one of the first iPhones in my hand. So, I've seen the evolution of tech as I was getting all those degrees.

**Alie:** And what about in terms of neurotechnology, have you seen an exponential growth pattern in terms of technology? Is that growth pattern still valid or have we surpassed it?

**Nita:** Slowly over the past decade or two, neurotechnology has been getting better. The ways in which neurotech has been getting better have largely been hardware-based, which is the sensors are getting better, sometimes the software has been getting better to be able to filter out noise, the algorithms to be able to pick up brain activity without having muscle twitches, or eye blinks, or interference from the environment to pick up different information, all of that has been getting better. But suddenly, we've gone from what were improvements to just the past five years seeing much more rapid advances. Generative AI is making things move in these seismic shifts, where you suddenly just have a massive leap and capabilities.

**Aside:** Just real quick before we descend into the abyss of ethics and possible scenarios, what is generative AI? What is AI? And what is just a computer computing? Okay, I looked this up for us and then I took a nap because it was confusing and then I tried again, and here's what I sussed out.

So, artificial means it's coming from a machine or software, and intelligence, fuck, that depends on who you ask. But broadly it means a capacity for logic, understanding, learning, reasoning, problem-solving, and retaining facts. So, some examples of AI are googling or search engines, the software that recommends other things you might like to purchase, navigating via self-driving cars, and your Alexa understanding when you scream "Alexa, stop!" because she tried to get you to subscribe to Amazon Prime Music again. It also includes computers being chess nerds, that's AI, and generating artwork.

And according to some experts, AI can be separated into a few categories including, on the base level, reactive machines; those use existing information, but they don't store or learn anything. Then there's limited memory AI that can use precedent to learn what choices to make. There's something called theory of mind AI, and that can figure out the intentions of the user or even acknowledge their feelings, like if you've ever told Alexa to get bent in a lot of other words and then she sasses you back. [*Alexa says, "If you'd like to tell me how I can improve, try saying, 'I have feedback.'"*] There's also a type called self-aware AI that reflects on its own actions. And then fully autonomous is kind of the deluxe model of AI and that does its own thing, that sets its own goals, set it and forget it if you can.

So, when did things start speeding up? When did they start careening toward the future like this? When computers got faster and smaller and better in the last ten, but really, two or three years. So, better hardware means more processing power, there's also cloud storage, and that adds up to something called deep learning, which kind of sounds creepy like a hypervigilant mannequin. But deep refers to many layers of networks that use what look like these complicated flow charts to decide what actions to take based on previous learning. So, that's kind of what led up to these startlingly humanlike, generative AI outputs and deepfakes where they can just straight up put Keanu Reeves' face on your mom and then confuse the bejeezus out of me on TikTok. Or ChatGPT, which is one language model chatbot.

Computers are starting to pass bar exams, maybe they're writing the quippy flirtations on your dating app, who knows? Meanwhile, less than 100 years ago, a lot of the US didn't have flush toilets, in case you feel weird about how weird this feels because it *is* weird. Evolutionarily, our flabby, beautiful little brains can barely handle the shock of a clean river coming out of a garden hose, let alone some metal and rocks that are computers that we're training to potentially kill us. We don't know how to deal with that.

**Nita:** So, pattern recognition using machine learning algorithms has really pushed things forward rapidly. A lot of brain data that happens in characteristic patterns and those associations between like, what is a person seeing, hearing, or thinking? How are they feeling? Are they tired? Are they happy? Are they sad? Are they stressed? Those things have been correlated with huge data sets

and processed using machine learning algorithms in ways that weren't possible before. [*"I can read your mind."*] Then you have generative AI and ChatGPT that enter the scene in November and all of a sudden, the papers that are coming out are jaw-dropping, data that's been processed by generative AI to reconstruct what a person is thinking or hearing or imagining or seeing is next level.

My book came out on March 14, 2023. All of a sudden what was happening was continuous language decoding from the brain in really, really high resolution using GPT-1, not even the most advanced GPT-4. Visual reconstruction of images that a person is seeing in ways that were much more precise than anything we had seen previously. And that's happening at this clip that is just, I think, extraordinary. It's just so much faster than even I would have imagined and even I could have anticipated even having written a book about the topic.

**Alie:** That was literally my next question. Because when a person writes a book, that doesn't happen overnight. You've been working on this book probably for a couple of years. Did you have any idea that your book would be so closely timed to such a giant leap in terms of public perception and awareness of AI? I mean, you couldn't have timed it better.

**Nita:** Well, I mean, of course, I'm a futurist; I was predicting it perfectly. [*Alie laughs*] No, no, I wish. In truth, my book is like, a year and a half late from when I was supposed to turn it in to the editor and to the publisher but, you know, there was a global pandemic that got in the way, and a bunch of other things. But I'm grateful that it didn't happen sooner because I was both able to be part of what is a growing conversation about the capabilities of AI and to see, when you say to a person, "Also, AI can decode your brain," you know, that really puts a fine point on it for people to understand how quickly these advances are coming. And to see how it's changing everything in society, not just how people are writing essays or emails but fundamentally unlocking the mysteries of the mind that people never thought before possible. And the risk that that opens up, and the possibilities of mental manipulation, and hacking, and tracking.

Those are dangers that I think a year ago, before people really woke up to the risks of AI, they would not have been having the conversation in the same way that they are around the book. And now they are having that conversation, seeing the broader context, and seeing the alarm bells everywhere, like, "Oh wait, we really do need to regulate or recognize some rights or do something."

**Aside:** So, futurists are urging some foresight, congressional panels have aired on C-SPAN, and there seems to be this kind of collective side-eye and a hope that someone is on top of this, right?

**Nita:** I think people are looking for some guidance and to have somebody come at it from a balanced perspective like, "Wait a minute, there's a lot of good here and there's some serious risks, and here's a potential pathway forward." I think instead of pause, which everybody says of course we can't just pause, or a Doomsday scenario without any positives, like, "Oh, let's regulate AI." I think we need voices at the table who are thinking about it both in a balanced way but also are coming forward with, like, "Here are some concrete things we could do right now that would actually help the problem."

**Aside:** So, we know a few types of AI from googling a source for a research paper or digitally removing your cousin's ex from your wedding photos. But what about technology that's gathering data from our brains?

**Nita:** Let me give you the spectrum. There is medical-grade neurotechnology, this is technology that people might imagine in a doctor's office where somebody puts on an EEG, electroencephalography, cap that has a bunch of different wires coming out of it and a bunch of gel

that's applied to their head and a bunch of sensors; that's picking up electrical activity which we'll get back to in a minute. Then there's the clunky giant machine, a functional magnetic resonance imaging machine, which can peer deeply into the brain. And somebody might have already undergone an fMRI test for something like a brain tumor to look more deeply into the brain. And what that's picking up is changes in blood flow across the brain, which tells us something about different areas that are activated at a particular time and what those patterns might mean.

**Aside:** So, if you've never had an MRI, I guess, congratulations, that's probably good. But this is magnetic resonance imaging and it's pretty exciting how these strong-ass magnets all line up the hydrogen atoms in your body to go one direction and then they release them and from that they can see inside of your body. Now, an fMRI is a functional MRI, and to put it in super simple terms, it's kind of like animation instead of a still picture but it's of your brain. So, when you see imaging examples of how someone's melon illuminates like a Christmas tree to certain stimuli, that's fMRI technology tracking blood flow to different regions of the brain. And this fMRI technology is used in a lot of neuro and psychology research.

**Nita:** And then there's something like functional near-infrared spectroscopy which is more portable and it's also measuring changes in the brain but it's using optical and infrared lights in order to do so.

**Aside:** And that functional near-infrared spectroscopy looks for changes in oxyhemoglobin and deoxyhemoglobin in the brain. These words might not matter to you right now as you're cleaning your shower grout or you're carpooling. But in clinical settings, it comes in handy for patients with strokes, or learning about Alzheimer's or Parkinson's, or even anxiety or even a traumatic brain injury, which my brain would like you to know, I've had. And I will link the traumatic brain injury or the Neuropathology episode about my hella gnar-gnar concussion I got last year in the show notes. But yes, there are a lot of ways to get data from a brain, including CT scans and PET scans with radioactive tracers. But what about non-medical uses? Do they exist? Oh, boy howdy do they.

**Nita:** If you then look at what's happening in the consumer space, you take the 64 or 120 electrodes that are in a big cap and then you have a couple of them that are put into a forehead band or a baseball cap, or increasingly what's coming is brain sensors that are embedded in everyday technology. So, you and I are both wearing headphones, and the soft cups that go around our ears are being packed with sensors that can pick up brain activity by reading the electrical activity through our scalp. [*"You want my tin foil hat?"*] Or if we were wearing earbuds inside of our ears instead, embedding brain sensors inside of those that can pick up electrical activity in our brain activity as we're thinking or doing anything.

Those become much more familiar and much more commonplace very quickly. There are just a few of those products on the market but that's where most of the big tech companies are going is to embed brain sensors into everyday devices like earbuds and headphones and even watches that pick up brain activity from your brain down your arm to your wrist, and picks up your intention to move, or to type, or to swipe, or something like that.

**Aside:** So, to use a medical analogy, you know continuous glucose monitors? These are a powerful tool for diabetics to monitor their blood sugar levels and their insulin needs, and we covered those in the two-part Diabetology episode with Dr. Mike Natter. But now, continuous glucose monitors are starting to become available to people without diabetes, just to better understand their metabolism and their dietary responses, their mood, and energy. So, all of this neuroimaging and all of this data was just used in clinical and research settings by people in crisp coats carrying metal clipboards, but it's starting to pop up on the market now. This is great news, right? Understanding your brain? Yeah... yeah.

But not all the research in consumer applications is solid and some make some wild claims of efficacy, others argue that if a device can enhance our moods and sharpen us cognitively but cost some serious cash, doesn't that just widen the privilege gap even further? But I guess so does college. I don't know. In the US, you need a GoFundMe to pay for chemo, so we've got a lot of pretty large systemic fish to fry. But if you've got money, you can buy EEG headsets that track your mood, emotions, and stress for a few grand. There are others that track your heart rate and brain waves for sleep and meditation. There are VR gaming sets that track brain waves and even a Mattel game called Mindflex that you buy for, like, 120 bucks. But Nita says...

**Nita:** All of those consumer-based technologies pick up a little bit of low-resolution information right now. They pick up if you're stressed, if you're happy or sad, if you're tired, it maybe picks up that your mind is wandering and you're kind of dozing off. And things like fMRI pick up much more precise information. Now that could just be a matter of time, it could be that as machine learning algorithms and generative AI get applied to the electrical activity in the brain that it'll get better, and better, and better.

It's interesting because in a way you can think about AI as being the convergence between computer science and neuroscience. So, computer scientists have been designing algorithms that can process information in very narrow ways and they're very good at doing specific tasks. So, for example, a doctor or a pathologist who is looking at many different samples of tissue to figure out if it looks cancerous or not can only see so many samples in a lifetime. So, they've marked them and labeled the data. And a machine learning algorithm can be trained on that data which is like, "Here are thousands of images that are cancer and not cancer. Now here are new images, predict whether or not they have cancer." And they become very, very good because they can process millions and millions of images and see far more images and get much better at being able to do that specific task of identifying if something is cancerous.

**Aside:** So, those tasks are relatively simple for machines to learn and execute. Computers are like, "Child's play." But...

**Nita:** The human brain isn't so narrow and task-specific, and neuroscience has long understood that the connections that the brain makes are much more multifaceted, they're much more complex. So, the modern types of AI are built on how the brain works, they're built on what are called neural networks. So, this is a deep learning model which is instead of that very specific task of, "Do this. Do that," it's meant to take a huge amount of information, to learn from that information, and then do what we do, which is to predict the next thing or understand where that's going, or to make inferences from more of a deep learning perspective.

**Aside:** So, it's more than machine learning, like the pathology example she gave. Remember deep learning? So, neural networks are modeled after biological brains and they have nodes, like neurons, that consume input that they learn from and then it's processed in several layers or tiers, AKA it's deep, to come up with a result or an action. And things like chatbots, or facial recognition, or typing 'dog' into your phone's photo album to see what goodness comes up, or speech-to-text, those are all done by neural networks and AI that we're already using, and they seem commonplace after having them for just a few years. But since late last year, we're seeing them create more, like how the human brain might.

**Nita:** And those insights about the brain and neural networks have informed this new class of AI, which is generative AI. Generative AI is different in that it is both built on a different model, and it has much greater flexibility in what it can do, and it's trying to not say, "This is cancer," or "That isn't cancer," but to take a bunch of information and then be asked a question and to respond or to

generate much more like the human brain reasons, or thinks, or comes up with the next solution. And that's exciting and terrifying. [*"Yeah, I'll say."*]

**Alie:** What about the information that, say, artistic AI is getting? Are they scrubbing that from existing art? And in the case of, say, the writers' strike where you see writers saying, "You cannot take my scripts and write a sequel of something without me."

**Aside:** And if you're curious about what is up with these strikes, what is going on in the entertainment industry including the WGA, Writers Guild of America, which started on May Day of this year, and was joined in recent weeks on the picket lines by SAG-AFTRA which is the Screen Actors Guild. Again, we did a whole episode explaining what is going on, it's called Field Trip: WGA Strike, that will be linked in the show notes. So, if you watch TV or movies or you ever have, listen to that episode because it affects us all and these entertainment labor unions are known as the tip of the spear for other labor sectors. Your industry may be affected or might be next.

**Nita:** I'm really interested in what happens in this space, not just because of the writers themselves and hoping that they manage to succeed in actually getting fair, appropriate treatment, but also because it's going to be incredibly telling for every industry as what happens when workers demand better conditions and better terms, and the result is greater experimentation with generative AI to replace them.

**Aside:** But why is this such a sudden concern? Why does it feel like AI has just darkened the horizon and thundered into view and we're all cowering at its advance? Is this the first act of a horror film?

**Nita:** So, where does it come from? They're not totally transparent, we don't know all of the answers to that. But we do know that these models have been trained, meaning there have been billions, potentially trillions, we don't know the exact number, of parameters, that is prior data which has been used...

**Aside:** Meaning the material that the machines learn from.

**Nita:** And that could be prior scripts, it could be prior books, it includes a bunch of self-published books apparently that are part of it, prior music, prior art, potentially a whole lot of copyrighted material that has been used to inform the models. Once the models learn, they're not drawing from that information anymore. That information was used to train them, but in the same way that you don't retain everything you've ever read or listened to, and your creativity may be inspired by lots of things that you've been exposed to, the models are similar in that they've been trained on these prior parameters but they're not storing or drawing from or returning to them; it's as if they have read and digested all of that information.

And I was talking with an IP scholar who I like and respect very much and his perspective was, "How is that different than what you do? You write a book, and you read tons of information, and there's tons of information you cite, and there's tons of information that you learned from, that inspired you, that shaped how you write and think, that you don't actually cite. And is that actually unfair or violating the intellectual property or somehow not giving a fair shake to every source that you have ever learned from or every input that you have ever learned from?" It's an interesting and different perspective. I don't have the answer to it yet, but I'm really interested to see how this particular debate evolves.

**Aside:** What do other people think who aren't me? So, a recent study reported that about 50% of AI experts think there's a 10% chance of unchecked AI causing the extinction of our species, with AI getting into little sneaky Elf on the Shelf shenanigans like playing God or establishing a political dictatorship. The Center for AI Safety issued a statement, it was signed by dozens of leaders in

computer science and tech, including the CEO of Google's DeepMind, and Bill Gates, and the guy who started ChatGPT, and the director of a Center on Strategic Weapons and Strategic Risks. And the statement said very simply, "Mitigating the risk of extinction from AI should be a global priority alongside other societal scale risks such as pandemics and nuclear war." So, that's a pretty big statement.

Other experts draw parallels between humans and chimps but we're the chimps and AI is us, so guess who is making who wear diapers and live with Michael Jackson? Yeah. Although, of course, there are computer scientists saying that we need to calm our collective boobies and that AI isn't advanced enough to threaten us... yet... Mm, yet. I love yet. Yet is so comfy. Yet is the space between the alarm clock and the panic of racing out the door because you'll be late to a job interview. Ah, yet. Mm! Just yummy. Just fuck it.

**Nita:** I think from a governance perspective in society, we have near-term risk that we need to be safeguarding against, and this is near-term risk like bias and discrimination and inaccuracies. I don't know if you saw the story recently about a lawyer who filed a brief in a case before a federal judge that the pleading for the case had been entirely written by ChatGPT, which included a whole bunch of invented cases. And the invented cases, he hadn't gone and cite-checked them, or read them. In fact, he has this dialogue where he's asking ChatGPT whether the cases are real or not [laughs] rather than...

**Alie:** No!

**Nita:** Yes!

**Alie:** And he was not doing this to prove a point?

**Nita:** No!

**Alie:** Just a bit of a dumbass.

**Nita:** Just straight up dumbass, just did it. And then the other side comes back and says like, "Hey judge, we can't find any of these cases." And the judge says, "You have to produce it," and apparently, he produces the full citations of the made-up cases. Anyway, it finally goes back with the lawyer then admitting, "I'm so sorry, this is all apparently fabricated, and it's fabricated not intentionally, but it's fabricated because I generated it all using ChatGPT."

**Aside:** Nita says who knows what will happen if and when more people start using bots to kind of cut corners and no one fact-checks it. And around Juneteenth, I saw a viral tweet about ChatGPT not acknowledging that the Texas and Oklahoma border was in fact influenced by Texas desiring to stay a slave state. I told my husband, Jarrett, your PodMom, didn't believe it could get things so wrong, and then he proceeded to have an hour-long fight and discussion with ChatGPT, hoping to teach ChatGPT that it has a responsibility to deliver accurate information. I was like, "Dude, you're fighting a good fight and I wish you luck."

Now, as for this lawyer that Nita mentioned, according to a May 2023 *New York Times* piece about it titled, "Here's What Happens When Your Lawyer Uses ChatGPT," the lawyer in question pleaded his own case within the case telling a rightfully miffed-off judge that it was his first foray with the chatbot and he was, "Therefore unaware of the possibility that its content could be false." And the *New York Times* explains that ChatGPT generates realistic responses by making guesses about which fragments of text should follow other sequences based on a statistical model that has ingested billions of examples of text pulled from all over the internet.

So, ChatGPT is your friend at the party who knows everything, and then you find out that they're full of shit and they're very drunk and maybe they stole your wallet and could kill your dog. Will



they shit in the pool? It's anyone's guess but wow, they are spicing up the vibe. This is not a boring party at all.

**Nita:** It raises this complex question about who is responsible. And we've generally said the attorney is responsible, the attorney is the one who is licensed to practice law, they are responsible for making sure that all of the work that they certify is under their name. Is there any liability for generative AI models? ChatGPT says, "I'm not here to provide legal advice," and is prone to hallucinations. Is that enough to disclaim any liability for ChatGPT?

**Aside:** Just a jacuzzi of hallucinating chatbots saying whatever sentence they think you want to hear, maybe pooping in there too. So, what happened to that lawyer though? Did he get so disbarred? Did he have to grow a beard and move to Greenland? Does he make felted hats out of goat fur now? No, no, he's fine. He kept his job, he was just fined five grand, which if he billed for the research hours that a chatbot really did, he maybe still turned a profit on that deal. But the lessons... those are invaluable.

Now, if you appreciate nothing else today, I just want you to stare off at the horizon for even 30 seconds and just say, "What a time we're living in. Hundreds of thousands of years of people getting boners and falling in love made me, a person standing on a planet at a time where there's plumbing, antibiotics, electricity, there's domesticated cats. And I have a front-row seat to some real madness. What an era." As for what we do, I don't know. Aren't we being watched all the time anyway? What are the watchers doing about this?

**Alie:** Well, forgive the patriarchal caricatures, but where are Big Brother and Uncle Sam? Are they working together on this? Is there any incentive from a governance perspective to step in and say, "We don't know how far this should go," or does it just generate more income for maybe big corporations that can misuse it, so like, "Nnh, it's hard to fight against that"?

**Nita:** It's hard to know. There have been hearings that have been held recently by the government to try to look into both questions that you're asking, which are Uncle Sam and Big Brother. There were hearings looking at whether or not to regulate private corporation use of generative AI models. And it was a very public hearing when Sam Altman from OpenAI called for regulation.

**Aside:** If you're wondering why this is a big deal, Sam Altman is the CEO of OpenAI, which invented ChatGPT, and he spoke at the Senate Judiciary Subcommittee on Privacy, Technology, and the Law hearing which was called Oversight of AI: Rules for Artificial Intelligence, that was in May of this year. He also signed that statement about trying to mitigate the risk of extinction and he told the committee that AI could, "Cause significant harm to the world." Papa ChatGPT himself.

*[clip of Sam Altman speaking]*

*My worst fears are that we cause significant - we the field, the technology industry - cause significant harm to the world. I think that can happen in a lot of different ways. I think if this technology goes wrong, it can go quite wrong, and we want to be vocal about that. We want to work with the government to prevent that from happening.*

And ultimately, Sam urged the committee to help establish a new framework for this new technology.

**Nita:** It was a surprisingly collaborative tone from most of the federal officials who were questioning him very differently than in social media contexts of the past.

**Aside:** But meanwhile in a different building...

**Nita:** That same day, a different hearing was happening, which most people weren't aware of, which was federal use of AI. A lot of the discussion in that context was about how the federal government needs to be innovating to use more AI in a lot of what they do and modernizing what is happening. [*"Today we'll be discussing how AI has the potential to help government better serve the American people."*]

**Aside:** Okay so, tonally the Senate Homeland Security and Governmental Affairs Committee hearing, which was called Artificial Intelligence in Government was a little more optimistic, like, "Mm! Gotta get me some of that."

**Nita:** That would include things like Uncle Sam improving the IRS system, and what does filing of taxes look like? And are there ways to ease the burden? Are there ways to modernize and have different parts of the government talking to each other? And hopefully, those conversations will converge. We won't be looking at how to regulate and limit the risks of generative AI and then infuse it throughout the federal government at the same time. Hopefully, you have the left hand talking to the right hand so that we actually come up with a sensible strategy and a road ahead.

**Aside:** Ah, a road ahead. But which one? Are you feeling confused right now? Because you should be. The inventors and the backers of a billion-dollar technology swore under oath something to the tune of, "Yeah man, this shit could kill us," and everyone is freaking out because it's already taking over jobs and because it's so smart. But at the same time, it's worse at googling than your 10-year-old niece with a book report. And while this is going on, the government is holding two simultaneous hearings on the same day, and one is Oppenheimer flavored and the other is Barbie Land. So, if you are confused by all of this and you don't know how to feel, the answer is yes, that's correct.

**Nita:** But it's happening so quickly that it's not going to be law alone that does anything to reign it in. We're going to need a lot of cooperation between governments, between tech companies. And, you know, if you look at the US, the US has not been good at regulating tech companies. It has had lots of talk about it, and lots of very contentious senate hearings. [*Mark Zuckerberg speaking: "I started Facebook, I run it, and I'm responsible for what happens here."*] And then they have so much money and so much power and so much lobbying influence that, you know, the result is nothing happens and that just can't be the case now. We can't go into this era leaving it up to tech companies to decide the fate of humanity.

**Alie:** Right. What do you do if you're mad as hell and you're not going to take it anymore? What does an average person who does not own a 40-billion-dollar tech company say when they're like, "Don't scrub my brain data through my headphones and stop simulating art! Let some people make some art." Have you seen that meme about how somehow, we've gotten to a place where human beings are still laboring at wages that don't increase, that are not livable, yet computers get to write poetry and make art?

**Nita:** [*laughs*] No! But that sounds right.

**Alie:** It's such a heartbreaking way to look at it where no one can afford to be an artist.

**Aside:** So, the exact words from Twitter user Karl Sharrow, read, "Humans doing the hard jobs on minimum wage while the robots write poetry and paint is not the future I wanted." That tweet was shared 35,000 times because it's true and it hurts my soul.

**Nita:** I haven't seen that meme and now I'm reeling from thinking about which is like, "Oh my god, that's so true." We've outsourced all the things that we like and we're now doing all of the grunt work still and how horrible is that? We're going to send generative AI to the beach next weekend [*Alie laughs*] while we stay home and toil and pay for it, right?

**Alie:** Oh god.

**Nita:** The problem is, on the one hand, we could say, “It’s all happening so quickly so we can’t do anything about it.” On the other hand, that’s just the nature of emerging tech, it happens quickly. It’s not as if there have not been proposals about what agile governance looks like, or what adaptive regulations look like that actually change based on changes in milestones in technology, and it would not be impossible to put some of those things into place. There have been people who have been writing about and thinking about and proposing these models for a long time.

**Aside:** First off, what does agile governance look like and what does adaptive regulations mean? I don’t know. I’m not a law professor, I’m a podcast host who is jealous of a circuit board that gets to watercolor. So, I asked my robot machine Google and agile governance means “The process that brings the most value by focusing on what matters.” Okay. But adaptive regulations, I think mean like, “Watch this space, keep making laws if shit seems like it’s getting out of hand.”

Now in June, the European Union overwhelmingly passed the EU AI Act which classifies different types of AI into risk categories. There’s Unacceptable, there’s High risk, there’s generative AI and there’s Limited risk. “What is in these buckets?” you’re wondering. So, the unacceptable bucket includes cognitive behavioral manipulation and social scoring à la *Black Mirror*, and biometric identification like real-time public facial recognition. High risk involves more biometric uses but after the fact with a few exceptions for law enforcement, but it curbs AI snitching on employees and doing emotional spying, from what I gather. Generative AI would have to disclose that it’s generative and the makers need to come clean on what copyrighting material they’re using to teach generative neural networks. Now, that’s in the EU.

As for America, nnnh, we have not gotten that far yet. That is if everyone could even agree on what needs to happen, then they’d have to agree on voting for that thing to be actually enacted, which is... It’s a beautiful dream that I’m generating with my human imagination.

**Nita:** The problem has been, I think, the political will to do anything about it and to figure out, why should we care about the cognitive liberty of individuals? Why should we care about leisure and the flourishing of humanity? Let’s just maximize productivity and minimize human enjoyment in life. That just can’t be what the answer is in the digital age anymore. We need an updated understanding of what flourishing means and it can’t mean that it’s generative AI making art and writing poetry while we toil away. That can’t be the case.

I’m a philosopher, right? I’m going to go back to how we have all these philosophical conceptions, lots of perspectives on what flourishing is. None of those perspectives, if you go back and look at them, contemplated a world in which our brains and mental experiences could so easily be hacked and manipulated. And the idea of happiness being the primary concept of human flourishing, what is synthetic happiness? Is that really happiness if it’s generated by dopamine hits from being on a predictive algorithm that is sending you little notifications at just the right time to make your brain addicted and staying in place? That looks like happiness, but I don’t think that’s happiness, right?

So, given that all of these presupposed a world in which we actually had cognitive freedom, we need to realize that we don’t anymore. And if we don’t anymore, we need to create a space in which we do so that human flourishing in the digital age is what we’re actually after and trying to make happen. *That* we could put some human rights in place for it, and we could put some systems in place that are actually creating incentives to maximize cognitive freedom as the precursor to all other forms of flourishing. And hopefully, that cognitive freedom would be the right to create art without having it appropriated, the right to write scripts and poetry without having it used to train

models without our permission and without us being part of it that then makes us irrelevant so that the models can play while we work.

**Aside:** So, in her book, *The Battle for Your Brain*, Nita writes that:

*We must establish the right to cognitive liberty to protect our freedom of thought and rumination, mental privacy, and self-determination over our brains and mental experiences. This is the bundle of rights that makes up a new right to cognitive liberty which can and should be recognized as part of the Universal Declaration of Human Rights, which creates powerful norms that guide corporations and nations on the ethical use of neurotechnology. Neurotechnology has an unprecedented power to either empower or oppress us, the choice is ours.*

And one liberty I've taken is never using ChatGPT, kind of like my high school's football rallies. I just don't want to participate, and I don't like what it's all about, even though literally no one cares that a stinky drama student with dyed black hair and braces is boycotting. Nobody misses me.

**Alie:** I've always been a little bit creeped out and hesitant; I've never tried ChatGPT, and I have this absolutely incorrect illusion that if I don't use ChatGPT, it won't get smarter and therefore, [chuckles] I singlehandedly, by abstaining, have taken down an entire industry of AI. It's not true.

**Nita:** Well, it's not true but there is something to this idea that we're not helpless and that there is a demand side to technology just as there is a supply side to technology, and there is a sense in which consumers and individuals feel like they're helpless. It's the same thing you see with voting, like "What's the point of voting? Because my state always goes this way or that way," and that kind of apathy means that a lot of times, elections are decided by everybody else, and you don't have an effect. But this is even more so. Collectively, if we don't like the terms of service, why are we all still on the platforms? And you're right, the models are going to continue to be trained with or without you.

**Alie:** Yeah, no. It's not that radical an act for just me to abstain. [laughs]

**Nita:** But that idea that collectively, we could act differently, if we could motivate and actually work collectively to act differently, we could act differently. One individual person silently protesting against ChatGPT isn't going to do it [Alie laughs] but loudly protesting against it and saying, "Look, the models train based on human interaction, and the more human interaction there is, the more it is trained. So, do you want to continue to feed into that model?" That's a worthwhile societal conversation to have.

**Alie:** You know, I was talking to my husband this morning about how many brilliant engineers end up working for bomb companies because they're going to have the best benefits, they're going to have the most stable employment. How many people in the legal field do you feel like get scooped up by tech companies because it's just an easier way to live? Do tech companies just have more pull to get the best lawyers to advocate for them instead of for, say, greater humanity?

**Nita:** I think it's not just law. If I look at some of the best tech ethicists, many of them have gone in-house to a lot of companies that are not actually that invested in tech ethics, and many of them got laid off in the major tech layoffs that have happened from 2022 to 2023 because a lot of tech companies, I think, have put lip service to being serious about ethics but they haven't as seriously grappled with it. And the money and the power that these corporations have and the influence on society that they have, I think, both makes it hard for some people to resist saying no but also this idea that if you're at a tech company where the transformation of humanity is happening, maybe you can steer it in the ways that you think are better for humanity.

**Alie:** Are there any nonprofits or organizations that you feel like are doing a great job?

**Nita:** There are a lot. I couldn't even begin to name them all. I would say first, I admire what UNESCO is doing.

**Aside:** So, UNESCO is the United Nations Educational Scientific and Cultural Organization, and on their Ethics of Artificial Intelligence webpage it states:

*UNESCO has delivered global standards to maximize the benefits of scientific discoveries, while minimizing the downside risks, ensuring they contribute to a more inclusive, sustainable, and peaceful world. It has also identified frontier challenges in areas such as the ethics of neurotechnology.*

So, as a result, their recommendation on the ethics of artificial intelligence was adopted by 193 member states at UNESCO's general conference way back in the olden times of November 2021.

**Nita:** They're really trying to get out ahead of a lot of issues and to thoughtfully provide a lot of ethical guidance on a lot of different issues. I think the OECD is trying to be a useful and balanced organization to bring important information there.

**Aside:** The OECD, I had to look this up, is the Organization for Economic Cooperation and Development and it's headquartered in France but involves 38 countries. So, what are they doing? The OECD Principles on Artificial Intelligence "Promote AI that's innovative and trustworthy and that respects human rights and democratic values." And then, of course, there's the EU.

**Nita:** I think the EU is acting in ways that are really pushing the conversations forward around the regulation of AI and how to do it, and how to respect everything from mental privacy to safeguard against manipulation. They get lambasted for going too far or not going far enough, and those conversations are better than putting nothing on the table, which is what's happening a lot of times in the US. I think the Biden administration has put out a lot of different principles that have been helpful and those kinds of principles or things around, like, an AI Bill of Rights.

**Aside:** I went and took a gander at this doc and the blueprint for an AI Bill of Rights sets forth five principles which I will now read to you.

*You should be protected from unsafe or ineffective systems. You should not face discrimination by algorithms. You should be protected from abusive data practices... and you should have agency over how data about you is used. You should know that an automated system is being used and understand how and why it contributes to outcomes that impact you. You should be able to opt-out, where appropriate, and have access to a person who can quickly consider and remedy problems you encounter.*

I don't know if that means a helpline, I have no idea. But that five-point framework is accompanied by a handbook called "From Principles to Practice" and it is guidance for anyone who wants to incorporate those protections into policy. So, that's what the White House has put out. They're like, "Y'all, we should really be cool and nice about all this." And it's so sweet and I appreciate it. My grandma had 11 children and just dozens of grandkids and she still remembered all our birthdays and would send a letter with one dollar in it. That dollar meant a lot even if it didn't get you far in the world, but I appreciated it in the same way that I appreciate that AI Bill of Rights. It's very sweet. Don't know what to do with that.

**Nita:** There are a lot of different people coming at the problem from a lot of different perspectives. If anything, there are so many voices at the table that it is, in many ways, becoming noisy where we're not necessarily moving ahead in a really constructive or productive way and there's a lot of replication of efforts, but that's better than having too little activity at the table.

**Alie:** Yeah! I think a lot of us on the outside of it think there's a tumbleweed blowing through a boardroom, and nobody cares, [laughs] so it's really good to hear.

**Nita:** No, I will tell you that I just feel like there are conversations happening in every corner you could imagine right now, and I'd like to see those conversations be turned into useful and practical pathways forward. Calling for governance if you're a major tech company and saying, "These technologies that I'm creating create existential risk for humanity, please regulate it." Or if you think that they present existential risks for humanity, don't just rush ahead. [laughs] Come forward with something positive rather than saying, "My job is just to create the technology, your job is to govern it." That's not the pathway forward either.

**Alie:** I have questions from listeners who know you're coming on.

**Nita:** Oh great! Yeah, please.

**Aside:** But before we do, we'll donate to a relevant cause and this week it's going to Human Rights Watch which is a group of experts, lawyers, and journalists who investigate and report on abuses happening in all corners of the world and then they direct their advocacy toward governments, armed groups, and businesses. You can find out more at HRW.org and we will link that in the show notes. Thanks to sponsors of the show who make that donation possible.

[Ad Break]

Okay, onto questions written by actual human listeners made of meat and water.

**Alie:** Let's start with something optimistic. A ton of people, Lina Brodsky, Nina Eve, Kris Blackthorn, Meg C, Alexandre Catulle, Adam Silk, Caitie McCaffrey, Madison Piper, and Lilmac want to know: Can we use AI for good? Ry\_OfTheTiger wants to know: What will AI's role look like in the fight against climate change? For example. Or should we be using AI for the toils like meal planning and trip planning and things like that?

**Nita:** Yeah. So, I think we can absolutely use AI for good. First, I would say a friend of mine, Orly Lobel wrote a book recently called *The Equality Machine* and it's all about using AI to achieve better equality in society and gives example after example of both how it could be done and how it is being done in some context. I think recognizing that there is this terrifying narrative about AI but that actually, AI is already making our lives better in many, many ways is an important thing to look at. And that we can put it to solving some of the biggest problems in society; from climate change and trying to generate novel ideas, to testing and identifying – and this is already happening – novel compounds that could be used to solve some of the worst diseases, to being used to identify the causes of different diseases, to identifying better patterns that help us address everything from neurological disease and suffering to existential threats to humanity like climate change.

So, I absolutely think it can be used for good, it is being used for good, it could be used for more good. We have to better align the tech companies with the overall ways of human flourishing. If you were to use AI to improve brain health instead of to addict and diminish brains, that would be phenomenal. And it could be used to do that, it can be used for mental health treatment, to resolve neurological disease and suffering. Or it can be used to addict people and keep them stuck on technology. We need to figure out a way to align the incentives of tech companies with these ideas of AI for good.

**Alie:** It'll be so interesting to see if they are getting a lot of feedback from our brains, any mental health challenges, or...

**Aside:** Speaking as someone who has anxiety and is neurodivergent, hello. Hi.

**Alie:** Things like ADHD, autism, those have been so overlooked in some populations, it would be interesting to see people getting a better understanding of their own brains that maybe medicine has overlooked because of demographics for a long time, you know?

**Nita:** Yeah. I have a TED Talk that just came out. The first half of the TED Talk actually focuses on all of the positive ways that neurotechnology can be used, and all of the hope that it offers. Like, us tracking our everyday brain activity could help us better understand what stresses us out. The earliest stages of glioblastoma, the worst and most threatening form of aggressive brain cancer, the earliest stages of Parkinson's and Alzheimer's disease, better solutions for ADHD and trauma. Everything from understanding the impact of technology on our brains to understanding the impact of having that glass of wine or cup of coffee on the brain and how it reacts to it. Gaining insight into our own brain activity could be the key to unlocking much better mental health and well-being.

I think if it's put in the hands of individuals and used to empower them, that will be tremendous and phenomenal. So long as we don't overshadow or outweigh those benefits with the dystopian misuses of the technology, which are very real and very possible, in the same way that companies are using all kinds of algorithms to predict our purchasing behavior or to nudge us to do things like watch the tenth episode in a row of a show rather than, you know, breaking free and getting some sleep, which is important for brain health. If the companies don't use brain data to commodify it, to inform a more Orwellian workplace, [*"Get back to work."*] if governments don't use it to try and surveil brains and intrude on freedom of thought, but instead it's used by individuals to have greater power over their own health and well-being in their own brains, it will be tremendous. We just have to really worry about those misuses and how we safeguard against them.

**Aside:** So, the day before this interview, a TED Talk featuring Nita went live and in it, she discusses the loss of her daughter and the grief that overwhelmed her. And she tells of how using biofeedback to understand her own sorrow and trauma from the experience helped her so much but how an individual's brain data should be protected. This wrenching personal story that she tells, plus her long background in ethics, science, and philosophy makes her very uniquely suited to see this issue from a lot of angles.

A lot of patrons had questions about surveillance and brain data and even neural hardware including Caitie McCaffrey, Ryan Marlow, and Sandy Green who asked about things like medical devices, like brain implants, being used for surveilling or for commerce.

**Alie:** I was curious, so were some listeners too, Pavka34, Omennik, David. In Alex Ertman's words: If we were to implant chips into human brains, what would they most likely be capable of? Would they be more in the realm of modulating real inputs or would they be capable of generating new thoughts? It seems far-fetched but also the truth can be stranger than fiction! So, is that a really big leap philosophically, legally, and technologically?

**Nita:** I think it might be easier to interrupt thoughts than to create new thoughts. [*"However."*] I guess philosophically that is creating new thoughts if you're interrupting thoughts because you're letting other thoughts happen. But implanted neurotechnology right now is very limited. It's very difficult to get neurotechnology into people's brains, and there are 40 people who are part of clinical trials that have implanted neurotechnology right now, a tiny number of people. If Neuralink and Elon Musk has his way, there will be far more people who are part of that but implanted neurotechnology is limited. What it's primarily being used to do is to get signals out of the brain, that is, to listen to the intention to move or to form speech, and to translate that in ways that then can be used to operate other technology.

**Aside:** If you're like, what is Neuralink again? It sounds like a commuter train. But this is actually a side hustle of Twitter owner and Tesla guy and tunnel maker, Elon Musk. And he described this cosmetically undetectable coin-sized brain accessory as, "A wireless implanted chip that would enable someone who is quadriplegic or tetraplegic to control a computer or mouse or their phone or really any device just by thinking." He likened it to, "A Fitbit in your skull with tiny wires that go to your brain."

So, a robot surgeon, also invented by Neuralink, sews 64 threads with over 1,000 electrodes, into the brain matter which allows the recipient to control devices, or robotic arms, or a screen using telepathic typing, which sounds pretty cool. In early 2022, it came to light that roughly 1,500 animals had been killed in the testing process since 2018, some from human errors like incorrect placement on pig spines or wrong surgical glue used in primate test subjects. And some former employees reported that the work there was often rushed, and the vibe was just high-key stressful.

Nevertheless, Neuralink announced just a few months ago that they got the green light from the FDA to launch their human trials. And if you're like, "Hey, I am always losing the TV remote so wire me up, Musk," please cool your jets because they added that recruitment is not yet open for their first clinical trial. More on that as it develops. But I guess, when I said that we could become Bubbles the Chimp, that was really on the optimistic side of things.

**Nita:** What is possible though, and this is one of the things I talk about in my TED Talk, is that it's possible to use neurostimulation in the brain. I describe, for example, the case of Sarah where she had intractable depression and through the use of implanted electrodes was able to reset her brain activity.

**Aside:** This, side note, was conducted at the University of California in San Francisco where neuroscientists implanted what is called a BCI or brain-computer interface, which was initially developed for epilepsy patients, into someone with treatment-resistant depression. And one surgeon on the team said, "When we turned this treatment on, our patient's depression symptoms dissolved and in a remarkably small time she went into remission." The patient, Sarah, reported laughing and having a joyous feeling wash over her that lasted at least a year after this implantation.

**Nita:** So, the specific pattern of neural activity that was happening when she was most symptomatic was traced using the implanted technology, and then, like a pacemaker for the brain, those signals were interrupted and reset each time she was experiencing them. That doesn't create a new thought, what it does is interrupt an existing thought. But philosophically you could say it creates a new thought, it creates, for her, an experience of being able to have a more typical range of emotions. I think specific thoughts would be very hard to encode into the brain. I won't say never.

**Aside:** So, brain hacking and hacking into your brain may radically change the way that you think and feel if we don't blow up the planet first, which is not an intelligent thing to do.

Speaking of intelligence, many patrons wanted to know: What is in a name? Alexis, Will Clark, Zombot, who proposed the term OI, or organic intelligence for human thinking, and history buff Connie Brooks, they all had...

**Alie:** Questions about AI and the term AI. Is it intelligent? Is it artificial? Are they ever going to do a rebrand on that? Does it give people the wrong idea of what it is?

**Nita:** Yeah, so I mean a lot of the technologists out there were computer scientists saying, "This isn't artificial intelligence because that assumes that there's intelligence. These aren't intelligent, they are task-specific algorithms that are designed to do particular things." And that if we get to the



point where you start to see more generalized intelligence, then that's the point at which it makes more sense to talk about artificial intelligence.

**Aside:** But not everyone is so casual about that assessment.

**Nita:** Interestingly, Eric Horvitz, who is the Chief Scientific Officer at Microsoft, who has partnered with OpenAI for ChatGPT, he just published his essay on this AI anthology series, and he talks about how his experience with GPT-4 was to see a lot of threads of intelligence, of what we think of as intelligence. And you see, increasingly, a lot of examples of reasoning more like humans. I think one of the examples I've seen out there is giving GPT-4 a question of, like, "Okay, you have some eggs, a laptop..." it's like five or six items, "How would you stack them?" And then comes out and explains how you would stack them; you would put the book on the bottom, and then you would put a set of eggs that were spread out so that they could be stable, and then you would put the laptop in a particular configuration, and blah-blah-blah. And why that kind of reasoning was more like human intelligence than it is like an algorithm.

And those are really interesting to think about. "What is intelligence?" is really the fundamental question when someone is saying, "Is it really artificial intelligence?" It is to have a particular perspective on what intelligence is and means and then to say, "That isn't intelligence." Or if a generative AI model says it's happy that it can't really be because that's not an authentic emotion because it's never experienced the world and doesn't have sensory input and output. Or if a generative AI model says, "Here's what the ratings of wine and what an excellent wine is," it can't possibly know because it's never tasted wine. [*Alie laughs*] And then there's the question of, is that kind of intelligence what you need, which is experiential knowledge and not just knowledge built on knowledge. There are some forms of intelligence like emotional intelligence which you might think really requires experiencing the world to authentically have that kind of intelligence.

**Aside:** I don't know shit about wine and sometimes I'm bad at my own emotions. Oh well, we can learn. Speaking of learning, many patrons who are students had thoughts and questions like Handy Dandy Mr. Mandy, Nathalie Jones, Josie Chase, and Slayer, as well as educators including Lina Brodsky, Julia Vollmer, Leah Anderson, Jenna Congdon, Theodore Vician, Hudson Ansley, and Nina Eve Z...

**Aside:** There were several teachers who wrote in with questions. Katie Bauer says: I'm a middle school teacher and I just started having students use AI tools to write essays for them. Help! Talk me down! How do we embrace new tech but also teach students how to navigate this new landscape with solid ethics and an understanding of the need to develop skills that don't revolve around AI technology? And Liz Park, first-time question-asker, they're a teacher and they feel that teaching along with a lot of other jobs can't just be handed off to AI and expected to have the same impact because machines, no matter how advanced, won't be able to individualize education and provide warmth, et cetera.

**Nita:** You know, it's funny because I hear almost the same question in both. What is the role of education and human-to-human education in a world of generative AI? And I think that's a great question to be asking and I would say first, I'm so glad that they were giving their student the assignment of working with ChatGPT and trying to understand it because I think there are skills that you can't learn from generative AI, and if you don't learn them, we will not be able to interact well with them and use them well. And these are critical thinking skills. And if the same old assignments are how we're trying to teach students, then yeah, students are just going to go to ChatGPT and say, "Here's the book, generate a thesis statement for me, and write my essay." But they will have lost out on the ability to generate a thesis statement and what that critical thinking skill is and lost out on the ability to build an argument and how you do so, lost out on the ability to write and understand

what good writing is, and they won't be able to interrogate the systems well because they won't have any of the skills necessary to be able to tell fact from fiction and what is good writing or anything else.

So, then the question is, what do you do? And it's the teachers and higher education and K-12 education that need to be thinking about, okay, what are the fundamental skills of reasoning and critical thinking, empathy, emotional intelligence, and mental agility that we think are essential and that we have been teaching all along, but we've been teaching by tasks that now can be outsourced? And then how do we shift our teaching to be able to teach those skills?

If you go back to the Socratic dialogues, there's an art to asking the question to seek truth. And there is an art to asking the question of generative AI models in seeking the truth or in seeking good outputs and we have to be teaching those skills if we want to move ahead.

**Aside:** I wasn't sure what the Socratic method of questioning was, so I asked the literature via computer, and I found that it involves a series of focused, yet open questions meant to unravel thoughts as you go. According to one article, "Instead of a wise person lecturing, the teacher acts as though ignorant of the subject." And one quote attributed to Socrates reads, "The highest form of human excellence is to question oneself and others." So, don't trust my wine recommendations but do cut bangs if you want, text a crush, ask a smart person a not-smart question because worms are going to eat us all one day. But yeah, the point of education isn't to get a good grade but to develop skills that in the future are going to get you out of a jam, so many jams.

**Nita:** And I think your other person talking about that they can never replace human empathy, that's right. But don't be blind to the fact that they can make very powerful personal tutors as well, and they may not be able to tell when a student is struggling, when they need emotional support, or when they may be experiencing abuse at home and need the support of the school to be able to intervene, for example, but they can go beyond a teacher can go.

A teacher doesn't have the capability to sit down with every student for hours and help them work through ten different ways of explaining the same issue to somebody. And so, you help them learn how to ask the questions and then they can spend all night long saying, "I didn't understand that explanation, can you try explaining it to me a different way? Can you try explaining it to me as if you were telling my grandmother? I don't understand what that word means." There's no teacher on Earth who has either the patience for that, or the time, or is paid well enough to do that for every student. So, I think it can be an extraordinary equalizer. Right now, wealthier parents are able to give private tutors to their kids. Okay, now you can have a generative AI model serve as a private tutor that can be customized to every student based on how they learn.

[*However.*] That doesn't mean we don't need teachers to be able to be empathetic and to help students learn how to engage with the models and learn critical thinking skills or create a social environment to help develop their emotional intelligence and digital intelligence. But it does mean that there is this additional tool that could actually be incredibly beneficial and can augment how we're teaching.

**Aside:** Okay, but outside the classroom and into your screens, folks had questions including Michael Heiker, Kevin Glover, Andrea Devlin, Jenna Congdon, GraniteStateOfMind, Kris Blackthorn, RJ Doidge, and...

**Alie:** One big question a lot of listeners had is, as Rebecca Newport says: What's your favorite or least favorite portrayal of AI in media? Chris Whitman wants to know: What is your favorite AI storyline-based movie and why is it *Ex Machina*? Someone else said: Should we turn off Mrs. Davis

if we could? How do we prevent *Terminator 2*? Whether or not you watch *Black Mirror*? Anything that you feel like pop culturally, written by humans, that you loved or hated?

**Nita:** I love *Minority Report*; it's an oldie but goodie. It really informs a lot of my work and I think it's great. [clip from trailer: "I'm placing you under arrest for the future murder of Sarah Marks." "Give the man his hat." The future can be seen.] I think that some of the modern shows that I like, like *Severance*, *Altered Carbon* I thought was a great series, *Black Mirror*, yes. You know, all of those I think are terrific and creepy. I appreciate those stories in really raising consciousness about some of the existential threats, but I would like to see stories that give us a more balanced perspective sometimes. I guess that doesn't make for a good film.

But the fears of, like, we don't fully understand consciousness, let alone how emergent properties of the human brain happen, let alone how emergent properties could happen in an incredibly intelligent system that we are creating; I share those fears, I don't know where all of this is going, and I worry about it. I also don't think anybody has an answer about how to safeguard against those existential threats and we should be doing things to try to identify them and to identify the points and identify what the solutions would be if we actually start to see those emergent properties and they're threatening. We need monitoring systems.

We also in the meantime, need to be looking at the good and figuring out how to better distribute the good, how to better educate people, how to change our education systems to catch up with it, how to recognize that the right answer for the writers' strike isn't to outsource it to ChatGPT and there's something uniquely human about the writing of stories, and the sharing of stories, and the creation of art, and that that's part of the beauty of what it means to be human. And so, those conversations about the role in our lives and how to put it to uses that are good and still preserve human flourishing, that I feel like is what we need to be doing in the meantime before it actually torches us all.

**Alie:** That is great advice and the last question I always ask is, what's the worst part about your job? A lot of people say, might be jetlag, meetings, emails. But I will outsource that to the patrons who wanted to know: Are we fucked? [Nita laughs] So many wanted to know, are we fucked. So, what is the most fucked thing about what you do or learn?

**Nita:** So, I mean, we're fucked if we let ourselves be. [both laugh] And I fear that we will. I can tell people until I turn blue in the face about the potential promise of AI and certainly the promise of neurotechnology if we put it to good use and we safeguard against the Orwellian misuses of it in society. But we seem to always go there. We seem to always go to the Orwellian and do the worst thing and put it to the worst applications and be driven just by profit and not by human flourishing. And so, if we keep doing that then yeah, we're kind of fucked! And if we actually heed the wakeup call and do something about it, like, put into place not only a human right to cognitive liberty but also the systems, the governance, the practices, the technologies that help cultivate it in society. I mean, if we invest in that, we have a bright and happy future ahead. If we don't, it's not good.

**Alie:** Yeah, we're fucked. [both laugh] To be such a globally recognized, trusted voice on this, obviously I was so pumped to interview you...

**Nita:** Thank you.

**Alie:** I came straight out of the gate being like, "I'm terrified of talking to you!" What is it about your work that gets you excited? What keeps you motivated?

**Nita:** I guess I'm also fascinated and terrified. I mean, so, it's almost like a horror show where you can't look away, so I'm just motivated to continue to look and to learn and to research. And I guess at the end of the day, I am an eternal optimist. I believe in humanity, I believe we can actually find a

pathway forward, and that if I just try hard enough, if I just get the message out there and work with enough other incredibly thoughtful people who care about humanity, that we will find a good pathway forward. So, I'm driven by the hope and the fascination, I'm driven to continuously learn more, and I'm just grateful that people seem to respond. I'm encouraged that in this moment, people seem to really get it, they really seem to be interested in working together collectively to find a better pathway forward.

**Alie:** I feel like you walking into a room or conversation is like... Have you ever seen a piece of chicken thrown into piranhas? All of us are just like, [*speaks very fast*] "Can you help? [*gibberish*]" [*both laugh*] The rest of us are like intellectual piranhas being like, "Please tell me everything you know! [*more gibberish*] And give me a hug while you're at it. Thank you." [*laughs*]

**Nita:** [*laughs*] That's a good thing, is I can give hugs too. I'm also a mom at the end of the day. I have two wonderful little girls at home who keep me grounded and see the world full of curiosity and brilliance of all kinds of possibility and I want to help them continue to see the world as this magical place. I want it to still be that place for them as they grow up.

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So, ask actual intelligent people some analog questions because the one thing that we can agree on is that there's some power in learning, whether you're a person or a machine. Now that you know some basics, you can keep up with some of the headlines but honestly, take news breaks, go outside, smell a tree, play pickleball, or something. Or go read Nita's book, it's called *The Battle for Your Brain: Defending the Right to Think Freely in the Age of Neurotechnology*. We'll link that and her social media handles in the show notes, as well as so much more on our website at [AlieWard.com/Ologies/Neurotechnology](http://AlieWard.com/Ologies/Neurotechnology). Also, *Smologies* are kid-friendly and shorter episodes, those are up at [AlieWard.com/Smologies](http://AlieWard.com/Smologies), linked in the show notes. Thank you, Zeke Rodrigues Thomas and Jarrett Sleeper of Mindjam Media, and Mercedes Maitland of Maitland Audio for working on those.

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If you stick around until the end of the episode, I tell you a secret. I'm going to treat this space like a confessional booth if you don't mind. Okay, so once I ran into this guy who I had dated who had dumped me and he was with his lovely new girlfriend and I pretended like I didn't hear his new girlfriend's name right, I was like, "What is it?" as if I hadn't been six years deep in her Facebook the day they became official. And I still feel guilty about that. But I'm telling you that because computers, wow, they've changed our lives. And also, humans, we're so goopy and flawed but you know, everyone's code has bugs and we just keep upgrading our software until things work well enough. Okay, go enjoy the outdoors if you can. Berbye.

*Transcribed by Aveline Malek at TheWordary.com*

## **Links to things we discussed:**

Buy Dr. Nita Farahany's books: [The Battle for Your Brain: Defending the Right to Think Freely in the Age of Neurotechnology](#) (2023) and [The Impact of Behavioral Sciences on Criminal Law](#) (2009)

Dr. Farahany's 2023 TED Talk: [Your right to mental privacy in the age of brain-sensing tech](#)

Follow Dr. Farahany on [Instagram](#), [TikTok](#) and [Twitter](#)

A donation was made to [Human Rights Watch](#)

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[Artificial Intelligence - Office of Educational Technology](#)

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