Bill Glovin: Hi, and welcome to The *Communicating Brain Science* Podcast, where we focus on research and issues that have to do with neuroscience. I'm Dana Foundation executive editor, Bill Glovin, and today we are in Chicago at the annual meeting of the International Neuroethics Society (INS) with incoming president Nita Farahany. Nita is a Duke professor and founding director of Duke Science and Society, chair of the Duke MA and bioethics and science policy, and principle investigator of SLAP Lab. SLAP is an acronym for, Science Law And Policy Lab. Nita is also co-editor-in-chief and founder of *the Journal of Law and The Bio Sciences* and editorial board member of the *American Journal of Bioethics* and on the board of Advisors for *Scientific American*. She's also the past chair of the criminal justice section of the American Association of Law Schools and a past recipient of the Beta award, which is given annually to an outstanding legal academic under 40. It sounds like you're kind of busy. Thanks for joining us. For people who might not know about the International Neuroethics Society, can you give us a little background about what it is?

Nita Farahany: Sure. So, the International Neuroethics Society is an academic and scholarly society that is dedicated to promoting the field and study of the ethical, social and legal implications of developing neuroscience research.

Bill Glovin: Do you have a specific agenda to tackle as incoming INS president?

Nita Farahany: I do. So I think that the society has done a very good job of engaging scholars in the field and really helping to define the field up until now. What I find is that it's a field, neuro ethics, that's really defined as a field of practical ethics. Meaning that many of the people who are in the field are really interested in figuring out how to translate the research that they do to impact the responsible development of science and technology in neuroscience. And so my focus is really how can we help people better do that? How can we help people go from the scholarship that they engage with, the academic pursuits that they have, and to translate that better into impact in society to really help guide research going forward. I think to do so, one of the trends that has certainly become apparent over the past number of years, is that increasingly corporations and industry are funding a lot of neuroscience research and the technological development of the tools in neuroscience.

Given that there is this focus and shift and funding and resources into industry and the fact that the International Neuroethics Society, like many academic communities, hasn't really spent a lot of time engaging with those industry partners, one of my big areas of focus is how do we better create that dialogue? How do we better help create partnerships with industry and with corporations that are focusing their efforts on the development of neuroscience? And I think that that benefits both communities. I think the academic community, who is focused on scholarship and studying and understanding the impact of these types of developing technologies, are better served if they're having direct conversations with industry partners and understanding truly on the ground the issues that they're facing and where the technology is going.

And I think industry partners recognize, and are starting to recognize, the breadth of the impact that their technology and their research may have. And they're looking for guidance and they're looking for engagement from a community of scholars who are focused on the questions of what are the broader implications of the work that they're doing. So I'd say the biggest area of focus for me is how do we bridge that gap and how do we bridge that gap in a way that will enable greater impact on developing neuroscience and technology.

Bill Glovin: Tell us a little about yourself, including what inspired your interest in neuroethics?

Nita Farahany: So I started with a background and an undergraduate focus really as a pre-med person. I came in with a deep interest in behavioral genetics and genetics in college, but didn't really understand the ways in which I could engage with that professionally other than by going to medical school. I think this is a story for many people who come into college is they, if they're interested in science, they think that the path that follows from there is to go into medicine. It was pretty obvious pretty early on for me while I was in college that every internship that I would seek was policy oriented rather than being an intern to a physician or in a hospital. I spent time in Kenya working on issues of women's health in small remote villages for a good part of my junior year. I worked with physicians at Dartmouth, in the hospital, who were focused on the policy implications for women undergoing obstetric procedures.

Each of the different types of things that I was doing were really much more policy oriented, so much so that I ended up minoring in government when I was in college as well. From there, rather than going into medical school, I decided to take a few years to really try to figure out what my next steps were going to be and I worked in strategy consulting, focusing on biotechnology. It was in my pursuits of biotechnology, later getting a master's degree in genetics and neuroscience, that I started to see a pathway that could develop between my interest in genetics, my interest in neuroscience, which was really an interest in the biological and neurological underpinnings of human behavior. How that research intersected broadly with law and philosophy and other areas. It was mostly through my coursework and actually my master's program and in my work working in strategy consulting that I discovered that there were a lot of intersections of studying human behavior and understanding how it applies to legal institutions and social institutions.

That ultimately led me academically, and my next steps in my career, which were on the intersection between genetics, neuroscience, and law, where I went to Duke to get a J.D. and a Ph.D. in law and philosophy focusing on the intersection of those things. What I found that has been incredibly beneficial is that that look at the intersection between the neurological and genetic underpinnings of human behavior, together with understanding of the

philosophical and legal institutions that they might play in, has given me a lot of opportunities to engage broadly with policy in this space over time.

Bill Glovin: In my capacity as editor of Cerebrum, a lot of the, especially neurodegenerative kinds of articles, talk about genetics and gene modification as the next best hope for a lot of treatment, possibly cures and there are certainly neuroethical issues involved with that. Do you find that to be a growing concern?

Nita Farahany: I do. I really think that these fields of genetics and neuroscience overlap so much. If you're trying to understand both how human behavior works, how human diseases work, how we might ultimately come up with treatments and solutions to them. And it's understanding the interrelationship between the really neuro biological components to behavior and disease, I think that are where we are right now in terms of research and study and I think there's a tremendous amount of potential in the next decade for being able to address many of the contributions to complex disorders and complex diseases that we face. But we'll only get there with the responsible progress of the science, which is why I think it's so important that the ethicists really partner with and be kind of keen to understand where the science is going and how they might help influence its direction to ensure that it really inures to the benefit of society.

Bill Glovin: You were a member of the Presidential Commission for the Study of Bioethical Issues from 2010 to 2017, which is quite a while. What did that accomplish? And what did you learn from that experience?

Nita Farahany: That was a terrific experience. I was really honored to be a member of the Bioethics Commission because my colleagues who were on it and my colleagues who've led that commission were extraordinary individuals that it was an opportunity for me to learn a lot from people who had spent a lot of time thinking about the responsible progress of science and technology in society. The opportunities that we were given were to respond to issues that were arising, and particularly vexing, for President Obama and his administration during our tenure on the Bioethics Commission. That included topics ranging from synthetic biology and the discovery and publication about the first synthetic organism that had been announced by Craig Venter, to a two volume study looking at the implications of the US Brain Initiative and growing and developing neuroscience across the world and these initiatives that are being funded and supported by governments around the world to really help us develop better tools to understand neuroscience and how it affects humans.

As part of that commission, I think what I really learned the most was how to go from having the ability to see the issues that arise with these developing technologies to having to come up with pragmatic and practical recommendations about how they should proceed. It's really easy as an academic to say, "That's a really good question" or "That's a really hard question" or "That's a really interesting question, and what do you think?" And that's really our role, oftentimes, as professors is to help people think about

issues, but not necessarily to have to come up with the solutions ourselves. And as a member of the Bioethics Commission, it was clear that we were being asked for specific and practical recommendations and we were being asked to come up with specific and practical recommendations through a consensus model where there were different people with different views on the Commission, different ideologies that would guide how they would approach a problem.

Our chair, Amy Gutmann, who is the President of the University of Pennsylvania, was very committed to us having consensus recommendations and reports recognizing that if the 13 of us couldn't come up with a consensus set of recommendations, how could we possibly expect society to do so? We did so by engaging stakeholders far and wide, hearing their perspectives and their views, doing detailed research to understand the background of the issues that we were facing, but then ultimately by deliberating together to try to come up with recommendations that could guide policy going forward, for different areas ranging, as I mentioned, from synthetic biology to anthrax vaccines to thinking about developments in neuroscience. And so I think that has really shaped and influenced how I think about this part of my career and what I hope to bring to the International Neuroethics Society, which is how do you go from recognizing ethical conundrums and issues and potential problems to developing practical solutions that can help advance those technologies to the benefit of society.

Bill Glovin: During the meeting it was stated that the Society has been around since 2006, which isn't that long. Could you talk about the growth of the Society and especially, I was really taken with kind of the international flavor of the membership, which is quite impressive. Is that something you've seen or experienced a growth of?

Nita Farahany: Yeah, I think there's been a very significant focus in effort to try to be as internationally minded and as internationally inclusive as possible for the organization. It started with, already, a group of international scholars who came together to plan and found the organization, but its reach has expanded quite a bit, as there've been an active efforts to both recognize other organizations around the world who are similarly focused and similarly committed to trying to devise solutions for the ethical, legal and social implications of developing neuroscience and partnering with those organizations, whether it's through co-sponsorship of events or through interactions with and exchanges of scholars who might attend various conferences, to understanding what the unique issues are that are faced by each of the different countries and participants and members who exist across the world.

So I think the recognition that ethics is an international issue, that science doesn't develop in a vacuum in one country or another, but develops really on an international stage and that the only way we can truly make an impact and have a difference in the ethical development and progress of technologies if

we're working together and recognizing that cultural differences may guide different solutions, but ultimately if we work together, we can come up with global ways to address the challenges that we face from emerging science and technology in neuroscience.

Bill Glovin: Yes. Speaking of global differences, I was watching your TED Talk and you brought up the fact that EEG sensors were required to be worn by workers and if the workers demonstrated that they were not in a great mood or functioning at a high productive level, that they were sent home. That's a bit scary, isn't it?

Nita Farahany: It is a little bit scary. I think the reasons that it's scary we have to examine. Part of what's scary about it is the science isn't necessarily there yet. So you know, what are the signals that we're detecting? Are they reliable? What happens when we use what is unreliable science in high stakes settings? The second is there are no really rules or frameworks to help think about how we're going to create a balance between individual rights and liberties and interest, versus a drive to really understand and decode the brain. And what I talked about in that TED Talk where factory workers or train drivers on the high speed train lines are required to wear these EEG headsets, is really just the tip of the iceberg. We see that already across classrooms in China, across primary schools the students are being required to wear EEG headsets to track their performance and their attention in the classroom and that information is sent to their teachers and to their parents in real time.

It's happening in other countries as well. In Australia, in mines, it's being used to detect carbon monoxide exposure and drowsiness. Bus drivers and truck drivers in various countries around the world are being asked to wear these headsets to monitor their brain activity while driving. And in the United States, there's a significant drive by a lot of companies to start to develop broad consumer based applications, whether it's through Elon Musk's NeuroLink, who hopes to one day develop technologies that can improve human cognition, to Facebook's announcement that it'd like to acquire the Company Control Labs that has technology that could really become quite widespread for detecting EMG rather than EEG and could be used as a way to decode some motor activity from the brain that's sent to our hands.

It's sort of companies and countries seem to be doubling and tripling down on the potential widespread use of this technology. I think that's exciting because I think there's great promise in the technology. I also think that it's frightening when it's happening much more quickly than ethics and frameworks are keeping up with the ability to address and anticipate what some of the possible misuses of that technology can be.

Bill Glovin: Has the Society tried to make any inroads in places like China or India or Malaysia?

Nita Farahany: On this particular issue, not really. It is one of the issues that I hope will take on. So as I mentioned, the better engagement with industry. I think understanding that industry is driving a lot of this research and driving a lot of much broader consumer based research that could have a significant implication for all of us in society, means that I think the Society needs to move into actively engaging with those partners and being part of the dialogue and part of the development of those technologies. Helping to come up with what the frameworks might be to help guide its introduction and use.

Bill Glovin: Were there any sessions or presentations yesterday, or earlier today, that really resonated with you?

Nita Farahany: Gosh, I think they were all good. I always enjoy the public program and I thought the public program last night was quite interesting. Particularly thinking about different applications that people are using for psychiatric treatment. I think it's, again, on the side of broadening the reach of a neuroscience based tools to a much wider set in society. I think it's really interesting to think about how that's being done, what the implications of that are, how successful it is, understanding the empirical evidence of it. I thought it was great to have a session really dedicated to what it means to engage in neuroscience. Consistent with the idea of trying to have a broader impact and translation. You don't see in a lot of scholarly disciplines, people trying to develop specific frameworks to implement their ideas and what we heard from in one of those sessions is a real focus on that. How to do that at an international level, how to be engaged and not simply sitting in an ivory tower, but truly part of the conversation and part of guidance going forward in the development of science and technology.

Bill Glovin: In addition to all your Duke work and your role as the incoming president, I also read that you're working on a book called “Cognitive Liberty,” which discusses the ethics of enhanced brain technologies. How do you finding time for that and how is that going?

Nita Farahany: It's not that easy to find time for it. I try to carve out a few hours each week that that is non-meeting time and just for writing time. In periods where it's really quite busy, I'll get up early in the morning and I'll have that be my quiet writing time for an hour and a half before the rest of the world wakes up. I go to sleep earlier probably than a lot of people because I get up a lot earlier than a lot of people do, but I find that my brain works better in the morning than it does at night and so trying to fit in writing in the evenings is never successful for me, but first thing in the morning or carved out dedicated time, that's blocked on my calendar that nobody else can schedule me for, is how I get the writing done. It's going well. I have a complete framework for the book and a couple of chapters that are written and I'm hoping that it'll be published within a year.

Bill Glovin: So not much TV watching on your part.

Okay. Any anything else that you want to add that I failed to mention that you think is important?

Nita Farahany: I don't think so.

Bill Glovin: No. Covered it. You a Duke basketball fan by any chance?

Nita Farahany: You can't be a member of the Duke community and not be a Duke basketball fan.

Bill Glovin: Do you, have you met Zion Williamson?

Nita Farahany: I haven't met him. Well I didn't see him in person. I saw him in person in Cameron stadium when watching a game, but beyond that...

Bill Glovin: Oh, you got in. You got into a game. That's very impressive. You must have good connections.

Nita Farahany: I have friends who have good connections and they sometimes invite me to basketball games.

Bill Glovin: I was there once and huge thrill. The place, it feels like a cathedral for basketball.

Nita Farahany: Yeah. It's such an intimate space to watch such a high caliber of basketball that it's a really different experience than another places. I think even though it could make sense given tickets that Duke could sell to the basketball games to tear that down and have a much bigger place. The experience of Cameron is such that I think few people want to see that go and give way to a bigger stadium that is with more luxury box seats.

Bill Glovin: Yes, yes. So for people who are really interested in brain science, you know we also have our basketball side for our podcast as well. So thank you very much for being on this podcast and good luck with your new position and keep it going cause it's a very important great thing.

Nita Farahany: Well thank you for Dana's partnership in this and helping us to continue to be able to serve a broader population of individuals who are interested in this space.

Bill Glovin: All right, thank you. Thanks again to Nita Farahany, incoming president of the International Neuroethics Society and a major force in the field of neuroethics. This and all of our other podcasts and articles can be found at dana.org, and check out our new website, which launched about a month ago. I'm executive editor, Bill Glovin, and thanks for listening.