[MUSIC]

**danah boyd**: The only reason I applied was that this boy in my class told me that it was a program for men, it was not for girls. And I was, like, "Hmfft," I'm going to go. (Laughter.) It was very simple. And, you know, that kept happening, where when people told me I didn't belong, I just became determined to stay.

[MUSIC]

**KEVIN SCOTT:** Hi, everyone. Welcome to Behind the Tech. I'm your host, Kevin Scott, Chief Technology Officer for Microsoft.

In this podcast, we're going to get behind the tech. We'll talk with some of the people who have made our modern tech world possible and understand what motivated them to create what they did. So, join me to maybe learn a little bit about the history of computing and get a few behind-the-scenes insights into what's happening today. Stick around.

[MUSIC]

**CHRISTINA WARREN:** Hello, and welcome back to Behind the Tech. I'm Christina Warren, Senior Cloud Advocate at Microsoft.

**KEVIN SCOTT:** And I'm Kevin Scott. Today, our guest is danah boyd, Partner Researcher at Microsoft, and Founder and President in Data & Society.

**CHRISTINA WARREN:** You know, I'm so excited about this conversation. I have been a fan of danah's, and I've looked up to her — I think I was in high school when I started reading her blog. She's amazing and watching her career and seeing all the amazing things that she's written and things that she's done, I really can't wait to hear what you two talk about.

**KEVIN SCOTT:** Yeah, she — she really is one of my — one of my favorite people in the world. She's just genuinely a fantastic human being. She's so smart. She's such a good computer scientist, and the thing that she's dedicated her life to is trying to study the intersection of, like, very difficult, very complicated high technology and society, and how those technologies both influence and impact society, and how society should be, you know, more sort of forcefully informing the things that we're doing in tech.

So, it's just sort of fantastic to have someone like danah thinking these thoughts, and driving these conversations, and I'm really looking forward to chatting with her today.

**CHRISTINA WARREN:** Well, let's get to it.

**KEVIN SCOTT:** All right. Let's chat with danah.

 [MUSIC]

**KEVIN SCOTT:** So, our guest today is danah boyd. Danah is a tech scholar and researcher who looks at the intersection of people, social practices and technology. She's a Partner Researcher at Microsoft, and Founder and President in Data & Society, a non-profit, NYC-based think tank. She's also a Visiting Professor at New York University's Interactive Telecommunications Program. She's one of my favorite people. Welcome to the show, danah.

**danah boyd:** Thinks for having me.

**KEVIN SCOTT:** I would love — you have such an interesting job and you've had such an interesting career. I really would love to understand a little bit about how you got started. Like, were you a techie kid?

**danah boyd:** Well, so it's a sort of funny path on how I came into it, which is that I was a geeky kid, by which that meant I did a lot of math. And I didn't really fit in because I was geeky. I grew up in Pennsylvania outside of major cities, and I — single mom, you know, working multiple jobs, trying to make ends meet.

And my brother, who was born very early, had visual issues. And so, one of the doctors at one point said, "You need to work on eye-hand coordination. There's these things called video games." And so, she bought him a video game player, and I know there were Nintendos, I don't know if that was the first one.

So, we would play all of these games, it was fun. My brother really got into it and wanted to know how it worked, and so he became obsessed with reverse engineering all of these different systems. He ended up building his own computer and I pretty much ignored him, as a big sister does. And then he started using the phone line, which was just an unforgivable sin. And it was making beepy sounds and I didn't understand the beepy sounds.

One day, I marched into what he was doing and was like, "What is this?" And he's like, "I'm talking to people." I'm, like, "What? That is crazy."

And so he showed me Usenet. And it's always the rest is history. So I spent my high school years on various fora, on Usenet, building my first website as an homage to Ani DiFranco and all of her lyrics, because it was definitely the days of lyrics sites.

And I went to college — well, I guess, first I went to this amazing program called Pennsylvania Governor's School, which took smart kids around Pennsylvania and sent them to Carnegie Mellon for the summer.

**KEVIN SCOTT:** Oh, wow.

**danah boyd:** And I was way over my head because I did not have the education that most of those folks had, and I felt very unqualified to be there. But I learned a lot, and it was also where I was exposed to what elite universities could look like. And I —

**KEVIN SCOTT:** What made you persist there? Because I think it's not actually an uncommon thing for folks to have their first exposure to like very high-level computer science or mathematics or science education seem like really intimidating and overwhelming and like your first assumption is like, oh, I am the unusual thing in this situation.

And like some people give up you know because it's hard and intimidating and some people say, nope, I'm going to get on top of this. Like, what made you —

**danah boyd:** So, for better or worse, I always responded to being told I couldn't do something by determination I was going to prove you wrong. (Laughter.)

This got me kicked out of elementary school in the fourth grade and where I staged a protest against my teacher's inability to teach and made everybody signs to have them walk in circles. That did not go over well.

And so even when I went to Governor's School, the only reason I applied was that this boy in my class told me that it was a program for men, it was not for girls. And I was, like, "Hmfft," I'm going to go. (Laughter.) It was very simple. And, you know, that kept happening, where when people told me I didn't belong, I just became determined to stay. And that fire and that fight has done me well, but it's also — you know, it's also costly. And I think that tension, to me, is where things get difficult.

I mean, my freshman year of college, I went to college —

**KEVIN SCOTT:** Where did you go?

**danah boyd:** Brown University, which I knew nothing about except that they didn't have grades, which is kind of startling to think about at this point in my life. And I was assigned on the first day a supervisor, you know, somebody to mentor me.

And I got this piece of paper and it said, Andy van Dam, and it gave his office. I was, like, "All right, I don't know who you are."

**KEVIN SCOTT:** And you had no idea who Andy van Dam was.

**danah boyd:** Oh, I had no idea who he was. And so, I marched into his office, the door was open, so I just walked in. And he looked up from his desk and he goes, "Who the hell are you?" And I'm like, "It says I'm your student. And I need advice." And he's like, "Why are you in my office?" I was, like, "Uh, hello?" (Laughter.)

And from that point on, I mean, Andy took me under the wing. And Andy was such a key mentor. And in that way where — obviously, it was a different era. My way of speaking was very much street language, was very much working-class street language.

And so there was a period of time where he decided he was going to teach me to speak like an adult. And he would just hit me upside the head every time I said something wholly inappropriate. I was, like, "Hmmfft." (Laughter.)

And, again, looks a little different saying it now, but it was such love and such care. And my freshman year in college, a group of people, I assumed to be a group, accessed a computer. And that computer, it was a Unix machine, and /dev/kmem came in, which is basically the period — piece which told you which user was world-writable. And so, somebody sat and turned it into, you know, the admin position.

And then went into my account and hacked all of my e-mails, all my correspondences, which included a ton of conversations about grappling with sexual abuse, grappling with a mess that I was doing with my family, all this stuff. And they posted it to an anonymous server.

**KEVIN SCOTT:** Dear lord.

**danah boyd:** This is 1997.

**KEVIN SCOTT:** And like why? Other than they were assholes?

**danah boyd:** That year, there was a whole group of us who were women and we were regularly told we didn't belong. And it was — I mean, oh, was it hard. And I was wrecked. And, you know, Andy had my back. And Andy was like, well, let's figure out who — let's investigate and prosecute.

And what I learned was that it was, again, laws were different at the time. For every e-mail stolen was equivalent to a mail stolen, so it was 30 years. And I was like, no matter how horrible this is, that's not the punitive result that I want from this.

And so, I spent a lot of time trying to figure out how I would position myself within computer science to be like, I'm staying. I'm not going away. But it was a hard slog. And, I mean, the number of stories I can tell you of people trying to get me out, right? Like, you know, I remember applying for a job at Silicon Graphics, SGI, and I remember this interview with this guy who was like, "Oh, I thought they managed to get you out by now."

And I was like, what?

**KEVIN SCOTT:** Wow.

**danah boyd:** And, like, this was an alumni of Brown. And I remember, you know, applying for a job at Disney when I was at SIGGRAPH and walking up to this recruiter and saying, "You know what? I want an internship." And he's, like, "Well, we don't have internships for artists." And I'm like, "Well, I'm a computer scientist." And they're like, "But you're a girl."

Right? And it was like that constant story. You know, and I just — I dug my feet in and I became determined, so much so, to be honest, that I stopped realizing what I liked about computer science and what I didn't. And I was just so determined to do computer science because people told me I couldn't, that I wasn't willing to look at the broader field, if you will.

I mean, I graduated Brown with very few classes that weren't computer science or math, because you can at Brown. And it took me many more years to be, like, no, actually, what I love about computing is not just doing software development. I like thinking about how these systems are built coherently, how they fit into broader social issues.

So, it took me a long time, and it was really about Andy that made me go back. I had dropped out of my first PhD program, so I went back, and Andy introduced me to basically with anthropologists.

And I was like — I mean, I knew nothing about anthropology. I was, like, what? How does this relate at all? And it was just this moment of like, oh, studying peoples and culture and practices could give me a different way into it all.

**KEVIN SCOTT:** Interesting. And, you know, it's — I think it's — you've certainly had a really interesting career because you pushed yourself or were pushed in this particular direction.

You know, if anything, I think the world needs a lot more folks like you who are looking at computing and the context surrounding it and like what space it occupies in society and like what all of this sort of complicated set of entanglements we have now between like this thing computing that I think we still think a lot is if it's this like monolith that stands on its own, versus like this enormous impact that it has in the world.

**danah boyd:** Well, I'm really grateful that I can be a hybrid in this because that computer science degree has done me so many levels of good — not the least of is it provided a form of security that I didn't have growing up and I couldn't even imagine. This moment where I could take risks because I had in my head, I can always get a job.

You know, and that's one of the things with the software industry in particular growing was, I can always get a job.

Now, of course, the idea of me doing software development right now is pretty laughable, but it provided, you know, a frame that helped me actually take risk. And it also allows me these moments in my career where I keep coming back to it, you know.

I'm working on this project right now where — with the Census Bureau, the U.S. Census Bureau. And part of it is that they're going to implement the largest instantiation of differential privacy that we have ever seen. And it is so powerful. And they're doing it for all the right reasons, and it is complicated and challenging. And the number of people who know what differential privacy is, you know, can be counted on my hands and toes.

**KEVIN SCOTT:** So, for the listeners, what is differential privacy?

**danah boyd:** So if you think about the census data, they provide tabulations — these files that tell you how many people are in a block and different things about race or age, sex, and they give it to you in a way that they don't want information to be uniquely identified. It's not meant to be personally identifiable. It's meant to provide statistical information.

The difficulty is that computing has advanced and it is not hard right now, with the amount of data that an organization like the Census Bureau puts out, to reconstruct individual entries out of these tabulated forms. So, in other words, you can take all the census data, and you can imagine how — you know, what are individuals? And with that, you can match that against commercial data.

And in matching it against commercial data, you can reidentify people. Now, the key to the census is confidentiality. The public needs to be confident that their data is not going to be abused. And there are horrible points in history where it was abused, and we worked really hard to shore up those laws.

Well, the difficulty is that when you break a technical system through a technical means, you can build laws around it, but they're not going to necessarily solve the most important thing, which is that we have to make certain that we can say to the public, "This data is confidential."

So over a decade ago, the Census Bureau began looking at differential privacy. And why differential privacy is important and what it means is that it's an attempt to not allow that reconstruction. So, in order to do that, it takes tabulated data and it inserts noise. And that noise is not just arbitrary, that noise is very much mathematically dictated based on a set of priorities and values.

So how much confidentiality do you want to guarantee in there referred to as privacy? How much accuracy is important within the system and how do you balance between these? And, you know, where can you allocate that?

And so what differential privacy is, it's a mathematical definition of privacy that looks at those values and assesses whether or not an implementation of noise meets these standards so that you can't allow for reconstruction.

**KEVIN SCOTT:** So how do we have — this is like one of the things that I'm sort of obsessed with right now is figuring out how we can have informed, transparent, public debate about these sorts of things when you have technical concepts like differential privacy that are very complicated, require high levels of expertise to implement, but not necessarily to talk about.

But, you know, as you mentioned, there are just a handful of people in the world who know what differential privacy is, how it can be applied, how to reason about it. So how do we bridge that gap? Because it's getting more and more important right now. And we could probably pick a dozen different topics in the next 60 seconds that have that quality, DeepFix is one, it's just crazy like how this complicated technology — and is impacting our civic life and like how difficult it is at the moment to have informed public debate about these things.

**danah boyd:** Yeah. I think what it comes to is that whether the tech industry likes it or not, we have become in the business of governing. We're governing information, we're governing communication, we're governing how and where people interact. And that's terrifying because we didn't build these systems with that in mind. We built these systems imagining we could connect people, imagining that we could use data for good.

We were quite naive. And that dynamic of governance that we're facing is where this question of “How do you have public debate come in?” So the difficulty with something like differential privacy is it's a governance mechanism. It's trying to take two competing values, right, the value of confidentiality or privacy and the values of public access to data and trying to contend with that.

And who does make that decision? Right? And that is not clear-cut. That is not clear-cut even if you want to just allocate it to the U.S. Government.

So, what happens is this moment of like how do we reckon with accountability here? And I feel as though we're in this — I keep thinking of it as a great reckoning. We're in this weird moment in time where we're waking up to the power that we've built through these technologies, and we're mostly in the, like, "oh shit" stage, we haven't really gotten beyond that.

But we're trying to now say, okay, what does governance look like? Does it mean reverting to nation-state structures? Those are modern inventions, they're not longstanding, and they were designed with very specific ideas of spatiality and economics at play.

Does it mean building a whole new framework that is built on a different set of values? Probably. But defined by whom? Right? And what we're seeing, of course, is a scramble for power to do that.

And that's unsurprising. That always occurs. But then, of course, what's the relationship between a governance structure of something like technology and nation-state governance? Because if it's built separately, we have a whole different set of challenges that we're going to face. So this is the mess I think that we're in, and that's where, for me, when I go back to thinking about how do you have the public debate, the question is: To what end? Right?

And so, I don't think that the public needs to debate differential privacy to debate differential privacy. That doesn't really matter. What they need to be in conversation with is, you know, what does confidentiality or privacy mean today? Who decides? Under what conditions? What protects people?

I think they need to be in conversation about what does it mean to have data for decision-making? Who should have the power to have access to that data, how is —

**KEVIN SCOTT:** And what decision should you be making?

**danah boyd:** And what decision should be making, right? And where can we stop and say, "We do not have enough information, so you cannot implement yet." Right? Like, a classic example for me is, you know, criminal justice. Our criminal justice system is rooted in the first sin of this country, it is racism and slavery through and through.

The data is so, so flawed that to think that we can do analytics on top of that data without contending with the problems of that data is painfully naive.

And so that moment of just, like, well, we're going to clean up the racism problem, you know, the longstanding inequities problem by using analytics. I'm like, this whole system is corrupt. And if we get into that business without contending with those power dynamics, we just become part of the problem.

And that's why, for me, like, I look at all of this and I say, "We have a lot of challenges in front of us. How do we have the higher-order conversations?" And then who needs to be involved in the technical details? And then what kinds of accountability do those people have?

**KEVIN SCOTT:** I do feel like we — and I've written a book largely because of this, that there is some baseline level of conceptual understanding of the technology that I think everybody has to understand. You know, we decided at the beginning of the second industrial revolution at the beginning of the 20th century that everybody needed to be literate and everyone needed to be able to do arithmetic up to some particular level of proficiency.

And I think there's a new set of technical proficiencies that everyone needs to be comfortable with in order to just be a citizen of the modern world.

**danah boyd:** Absolutely. And I believe some forms of technical computational literacy are absolutely essential. But to assume that everybody's going to get at the level of a bestselling author is also naive. Right?

So the key for me is how do we give people the information and training and knowledge to be able to make informed citizens without then placing a burden on them to have to know everything?

Like, one of the costs for me, you know, the flip side is, you know, we're at a point in the United States where we think that the key to retirement is everybody controlling their own financial futures. You know, there are certain people who can actually have more information, more power, more knowledge, more skill to be able to make bets around finances than others.

So when people don't have those skills, we're going to leave them out to dry? Like, why is that the logic? Or if you don't know all the medical details about your cancer, you can't get a meaningful second opinion? That's terrifying.

So, part of it is we need that generalized literacy so that we can have sophisticated conversations and we need expertise. And that's the interesting dance that we're not — you know, in a moment where we're obsessed with individuals, we're putting a lot of burden on individuals to know all the things. And that's, in my opinion, unfair.

**KEVIN SCOTT:** Yeah, and I know even in the tech industry, like if you look at what you contend with on a daily basis as a technical person, like what I try to do in my job, like there is no such thing as being able to know everything. Like, it's just — it's preposterous.

**danah boyd:** Right.

**KEVIN SCOTT:** Like even if you narrow it down to something and say, like, oh, AI/machine learning, like, it's just crazy the big deep learning conference, NeurIPS just had its program decided, and I think they had something — I’ll get the number wrong, but it's something on the order of 2,000 papers were submitted to this thing.

And, like, they're all, like, the submissions are all high-quality technical papers, 20 or 21 percent of them got accepted. And like there's no even single machine learning practitioner who's going to read that entire program and understand all of those papers, and that's just a tiny fraction of one year worth of the collective research output out at the frontier of machine learning.

**danah boyd:** Right.

**KEVIN SCOTT:** So, yeah, I mean, like we all have to rely on each other to a certain extent for expertise and like the trick I think in modern civil society is like figuring out how we can really figure out how to depend on one another so that we can each rely on those expertise and like everything sort of adds up to something that at least is the sum of its parts. (Laughter.)

**danah boyd:** Well, it's also where I — you know, I'm a firm believer in augmentation. So, take for example the parallel of what's happening in the medical industry. Medical research is advancing far faster than any doctor could possibly read, especially if they're actually a practitioner.

So how do we give them the tools to be able to consume all of that information, augment their knowledge, search effectively, et cetera? That's a power of technology. So you want two things there: You want the ability for the networks of doctors to be able to riff with each other, bounce off of each other, understand differences, and you want their augmentation.

And so, I'm living this — I'm on the board of an organization called Crisis Text Line. And Crisis Text Line is a service that allows people to text in via their phones when they're in a crisis and they need support.

And they communicate with trained counselors who are mostly volunteer who help them through right and get them support in different ways. You know, when we're dealing with an act of suicide, make certain that they are safe.

And what's powerful about this work is because it's all in text, it's left traces. And so, we're having this crazy conversation because what mental health institution has a million conversations? What single, you know, psychologist has had a million conversations that they can draw on to make decisions?

So, we're trying to figure out how do we augment all those counselors? First, we have them coordinated within an environment where they can talk so they can say, “I'm seeing this, this is the conversation I'm having, does anybody have any ideas of how to move forward?”

And they're able to pull on the corpus of data to try to pull out information. What could be a next move? And, again, it's not about decision-making, it's not about automating interventions. It's about empowering human decision-makers, human interactants, who can actually go out there and be, like, I am going to help you with as many tools in my pocket as I can possibly pull on right now to make a difference.

**KEVIN SCOTT:** But, you know, again, I think that's a really good illustration of this quandary we've got with data, where like I can imagine all sorts of things where you use the data in the right way and you're literally going to save lives and like have this huge positive impact in people's lives.

If it gets used the wrong way, like you — you know, if it gets disclosed, like it compromises the trust in the system, and then people stop using the system like if it — you know, you don't want people making employment decisions based on this or like insurance — access to insurance decisions.

And so I think it's one of those places where the burden is just incredibly high right now on getting everything right about how you handle this data, and it's tough.

**danah boyd:** Well, and that's where, you know, the way that I've been thinking about it is to imagine that the data that we are all consuming when we're trying to build these systems builds the data infrastructure layer, right? We can call it data lakes, we can call it whatever, but it's infrastructure.

And the thing we know about infrastructure is that infrastructure grows brittle over time if it's not maintained. It has vulnerabilities in it by its very nature. And we need to treat it with that level of respect, where we have to acknowledge that.

The other thing is that once the decision-making or the systems become powerful on top of that data infrastructure, as with everything else, they become vulnerable to different kinds of exploits, right? They become targeted. Which means that in my mind, we have to start bringing in more of security framework. And not just about access to data, and this is where I think when we talk about these issues with regard to privacy, we often think that if we just limit the access to the data, no harm will happen.

Well, that data affects those models. That data has all of these different ripple effects, and it affects decision-making. And so, one of the things that I am deeply passionate about is how do we reimagine a socio-technical security? How do we think about how it would be exploited?

And I started out my career in graphics, and I still remember the first quality assurance engineer that I worked with. And what was so amazing about her was that she could think through all of the ways that my code could be destroyed, and it was an amazing collaboration because I was trying to build the thing, and she was trying to tear it down. And together, we were able to build stronger systems.

**KEVIN SCOTT:** Yep.

**danah boyd:** And when we built a world of the perpetual beta, we lost quality assurance. And so whether we're talking about safety or security, we need a narrative of quality assurance that comes back and really brings into the fold people who are trying to destroy the system in order to make it better.

**KEVIN SCOTT:** Yeah.

**danah boyd:** And that kind of — everything from threat modeling to red-teaming to quality assurance to different forms of **bug** **bounties**, they need to go beyond what we normally talk about in cyber into a much more rich environment, because when people can exploit a search engine by just certain kinds of strategic queries, not to mention SEO, we're not actually thinking right if we think we can just consume clean data and spit out answers.

**KEVIN SCOTT:** Yep.

**danah boyd:** We need to think that through.

**KEVIN SCOTT:** Yeah, and you know, it's an interesting set of problems because I think you nailed it on the head when you said that it's literally impossible — as probably, you know, some sort of undecidability thing, even, for us to be able to like completely think of every possible bad use that could come of a software system or like a set of data that we are — that we're gathering.

And I've operated a bunch of large-scale systems in the past, and like the thing that you try to do with these things to make them robust is you do as much as you possibly can, like using every trick in the book, and you sort of come at things from a gazillion different perspectives to try to stress test it before you start exposing it to the real world.

And then once it's exposed to the real world, like you sort of continue measuring all of these signals that are sort of indicative of bad things happening or about to happen, and you try to build these systems in a way where they're as agile as humanly possible, where as soon as something bad happens, like you very quickly get the problem sorted out.

And I sort of feel like we need to — like we know, like we're talking about a Web service, like a thing that renders a Web page, or like a screen on a mobile application to a billion users, like we know pretty well how to make sure that that thing is reliable and up and the user experience renders in the proper way.

And we've had, what, 30 years, 20 good solid years of figuring out what that bag of tricks is for making those things robust. I sort of feel like we're in the early days of like figuring out what our bag of tricks are for making the sort of data interactions, like data handling stuff as robust as it needs to be.

**danah boyd:** Well, I think "robust" is the right language because so much of what I hear, especially in Washington, D.C., tech needs to fix it. It's like there isn't a fix. There is resilience. There is process that can allow us to respond and iterate and evolve, and that's why I often use things like security as a framework, because security doesn't assume anything is ever secure.

**KEVIN SCOTT:** Right.

**danah boyd:** It's like the parallel, you know, I grew up and there was this weird notion of safe sex, and it was always like what are you talking about? There is safer sex, but there is no safe sex. And so we have to move away from this like we can fix it, we can make it so that nothing bad will happen into a moment of saying, no, we need to take as much steps as possible to limit the possibility of harm, and then we need to grapple with what happens as it unfolds.

And I worry because in a culture of move fast and break things, we don't allow for the possibility that the breaking sometimes is so destructive that we need to step back.

**KEVIN SCOTT:** Correct.

**danah boyd:** And, you know, there's a lot in the move fast, where it's like actually sometimes slow is better. Slow food is better, right? There's a moment where you're, like, come on, let's make things that are healthier. Let's make things that are richer, that people have more enjoyable experiences with.

**KEVIN SCOTT:** Yeah.

**danah boyd:** And so I don't want just the fast system because it's — you know, it's what somebody built yesterday that they thought was cool if it's going to tear down democracy.

**KEVIN SCOTT:** Yeah.

**danah boyd:** And that's what I worry about is, like, you know, how do we get those processes of resilience into every stage? And you know, I think about those days of CD-ROMs, right? Your next possible round was the next rev of it, you know? Anything that went wrong, the worst — the best you could do was recall.

We're no longer in that stage, so that means that the responsibility to be responsive is so much greater. And I will say, as an industry, we — I think we are responsible for figuring out ways of building resilience. And I think that the ways that we're expected to have constant economic growth at whatever cost is just fundamentally dangerous.

And so, I hope that we'll have that moment where we step back and say, you know what? It is worth it to spend resources to actually make certain that we don't mess this up.

**KEVIN SCOTT:** Yeah, I completely agree with you. And I think there are ways where you can get a really good, healthy balance where the tradeoffs between the two I think are less — you know, like progress versus resilience, robustness, safety, probably like all of the things that we really care about, like you can strike a good balance between the two where you're much better off pushing unilaterally in one direction or the other.

**danah boyd:** Absolutely. And I think that the other thing that we have to hold onto is the idea that it's not just the decision-making within one institution, it's actually how it's all connected, right?

So, if I even look at the most troubling exploits going on right now, they're not in one institution, they're sitting between. So, it's the idea that people are manipulating Wikipedia in order to target search engines, right? Okay, who's responsible there? Yes, Google and Bing have serious responsibilities there.

Yes, Wikipedia has responsibilities, but where else? And where is it when that exploit also leverages, say, the news media? Right? A totally different sector.

And so when I look at incidences that we keep seeing where media manipulators and extremists target the news media in order to target search engines, in order to make these two steps. It's like, you know, this has become this moment of, like, oh, it's news media's fault, it's tech industry's fault. It's like, guys, we have a system here.

And so, like that other big challenge for me is how do you build a resilient system with unequal resources, right? Because the news media has a very different amount of resources than the tech industry does. At the same time, it has a different kind of power in this.

And that's what concerns me is that these challenges for me with progress, they have to happen in this collective fashion that's also — we're not really structured well to do. And that — it concerns me because those transitions can be so costly.

**KEVIN SCOTT:** Yeah, well, and we've sort of understood this for many, many years with security. It's unusual to like have a — like an effective security attack be like a you know sort of a single monolithic target. It's usually like a much more complicated thing that people do that's sort of — you know, they like, like you said, they push on the cracks between the systems or the interfaces between them.

And like they use one like slightly vulnerable thing to attack another slightly vulnerable thing and like that adds up to the — you know, to the security incident.

**danah boyd:** And human imperfections are part of that equation the whole way through.

**KEVIN SCOTT:** Oh, totally. I mean, you know —

**danah boyd:** And that's —

**KEVIN SCOTT:** Usually, they're the — you know, the biggest part of the problem.

**danah boyd:** And that's where when we deal with these large sociotechnical systems, we deal with you know, human imperfections at every stage, right? Human imperfections in decision-making and logic, say for example the news media.

Human failures with regard to the public, might be consuming content. Human failures even in the design and building of systems, right? Like what code is bug free? Right? Like, all of these layers.

And that's where the interconnected nature of our society creates a form of fragility that you know, I think we're all sort of feeling and shaking about right now because so many of our institutions, so many of our systems are just barely working. It's like, you know, it's like "duct tape nation," right? And what does it mean that we're all kind of hoping that the duct tape won't fall off before we get through this.

**KEVIN SCOTT:** Well, and I think, too, the thing that I personally am trying to push for and sort of hope for both as a person who is in tech who I'm hopeful about the future of a world with even more tech than we have got right now, like I'm like very appreciative of what tech has done for me and my family and for — you know, like whenever I do the exercise of sort of imagining like what I would have done as a kid in today's tech world, it like looks so much better than like what I had as like a poor kid growing up in rural central Virginia.

But like what I want you know both as a like a tech person and as a citizen of the world is given like the multi-dimensional, multi-party nature of the problem that we've got right now, like I — I really hope that we can get away from these sort of reductive arguments about like you know this one thing is the problem and like I think we need a lot more dialogue and collaboration than we're having right now to like get to a better state.

**danah boyd:** When I think about this in terms of — this is why I keep going back to governance. It's like what is the KPI? What's the key performance indicator, right? What is it that we're all working towards?

And, you know, when it is too narrow of a KPI, you get lost and you don't think about the unintended consequences.

**KEVIN SCOTT:** Yep.

**danah boyd:** When the externalities are built into your KPIs so that you're measuring the right thing, then we can start to talk about forms of, you know, moving in a positive direction. You know, there's — like you, tech, you know, shaped every aspect of my life. And I firmly believe that it can be you know a positive force in this world in many, many ways.

I also believe it's a tool that can be weaponized. And so, the key for me is how to resist that weaponization as much as possible, while creating the right spaces and structures for those possibilities to get realized without getting twisted and perverted.

And so, you know for me, a lot of it's — requires stepping back and being like, what values are we working towards? You know, what is that core commitment? Do we want the world to be more connected? What does that mean? What is it we're trying to hope for? Do we want to address disease? For whom and what does that mean? And who will benefit? And how do we think about that power?

And I think this is the weird transformation of both of our lives, which is that the tech industry, when we were kids, like, it was geeky and it was not nearly as powerful as it is now.

And many of us of our cohort and older still haven't fully gotten our head around how much power this sector and the tools we've built now have. And the idea that we have this much power means that it can be perverted so much easier.

And so that's one of the reasons why I think we all who love tech have a responsibility to figure out how to stop that and how to drive that towards agendas that are inclusive, that are really actually helping rise up the — you know, the next young Kevins like that are actually giving the opportunities for so many people out there, rather than becoming a new form of status quo exclusionary.

**KEVIN SCOTT:** Yeah. So, let's switch gears just a little bit. What, if anything, are you seeing right now in the tech world or at sort of the intersection of tech and society that's like interesting and hopeful?

**danah boyd:** So right now, I have to admit, what I'm seeing mostly is a reckoning, but I think that's — it's cyclical, it's temporal, so it's not about the technologies itself, it's more like – {laughter) “Oh, boy, what did we do?” And I'm seeing people wake up and take that seriously, and that gives me a lot of hope and a lot of excitement.

Because I do believe that innovation comes out of reckoning, like that's a process. So, I don't feel we're at that moment where I like, oh, here's the new thing.

What I'm hopeful for is — there's like small glimmers of it is the various folks who are really starting to grapple with climate with tech and those intersections. Both in the ability to understand how to reduce the cost to climate for technology, but also the possibilities that we can model, understand, and innovate because we have a big, heavy challenge in front of us on that front.

But that's like — those are the like glimmer stages as opposed to like here's where we have tools.

**KEVIN SCOTT:** There's so much opportunity there. I mean, it's unbelievable. Like, if you just look at — if you could co-optimize production and consumption of power, like there probably is on the order of like one or two magnitudes of efficiencies that we could drive, which would be unbelievable.

And then, you know, that's without sort of having the even bigger thoughts about like what could you do with some of these big machine learning models to like design better systems that are like fundamentally more efficient in and of themselves.

**danah boyd:** Well, so here's an example of something that, you know, is a mixed sort — mixed, you know, feelings on.

We also have the ability to model what land will be arable. And we can really think about the future of agriculture, the future of water supply. Who controls that information? Who controls the decision-making that happens from that information? So that's that moment where I'm like, okay, we're getting there. We actually have a decent understanding.

But if we're at a point where that material gets coopted, it gets controlled, then I'm deeply concerned. So, like these are the contradictions I think we're sitting in the middle of because if we can really understand — I mean, where did data analytics begin? Farming, right?

If with can really understand what this will do to ag, we're going to be able to better build resilience. And that's those moments where I'm like, okay, you know, this is not about just NOAA — the National Oceanographic Atmospheric Administration. It's not just about NOAA being able to model, but it's also being able to give that information publicly in a way where it doesn't get perverted for political purposes.

And that's a tricky thing right now.

**KEVIN SCOTT:** Yeah, and you know on the hopeful side of things, you know, what we've even seen at Microsoft with some of the stuff that's happening with this Farm Beats program that's happening at Microsoft Research, is that you can take some of this data, so like the weather data, weather forecasts, like all of the sort of historical information, like stuff that like you used to get embedded into a farmer's almanac, which was almost you know like a little bit like astrology. But like there was real, you know, data and trending that people built into these almanacs that helped people decide, like, very prosaic things like when to put the seeds in the ground. And like we know that if you apply technology to that process to very simple things like when to plant in a particular location given historical and predicted weather trends, that we can make huge improvements in crop productivity.

We see it in India where, you know, some of these very poor parts of India like when you put a little bit of technology in, like you can get double-digit percentage improvements, and like that is the difference between people starving and people getting fed.

**danah boyd:** Oh, absolutely.

**KEVIN SCOTT:** And it's just great to see happening.

**danah boyd:** And the important thing about something like agriculture is it has to happen around the globe.

**KEVIN SCOTT:** It has to happen.

**danah boyd:** Right? It just has to. And same with water resources.

**KEVIN SCOTT:** Yep.

**danah boyd:** We need to understand and model out water resources, because, I mean, just take the continent of Africa, right? There are so many places across that continent where things are possibly fragile if we don't work out where that is or how to deal with it.

**KEVIN SCOTT:** Yep.

**danah boyd:** And so it's both the technology of desalination, which is wonderful, but it's also the modeling to understand what the ripples are around that.

**KEVIN SCOTT:** And there's so many ways you — I mean, this is the thing where I really want people to get like super excited about jumping in because for all of these things, like making better use of your water resources, like there are hundreds and hundreds of ways. Like so for instance, like one of the ways that you can make more efficient use of water in agriculture is like all of the agricultural chemicals that we use — so pesticides and fertilizers and whatnot — are massively diluted with water.

So like the chemical concentration, like, the active compound is like a tiny part of like the thing that gets sprayed over the crop, which means that you're wasting all of this water that the — you know, chemicals are going into places where they're not needed. It's just this hugely wasteful thing.

And there's all sorts of like interesting new technology where you can very precisely deliver the chemicals to the crop without diluting them in water at all, so you're not wasting any water, you don't have any of this like chemical runoff into the water supply, like, it's just fantastic.

And like simple things like using some of the cool new stuff that we are — that we're seeing with computer vision where you can fuse classical sensor data, like moisture meters, with vision models where you can sort of infer soil moisture from pictures that you're taking from above the crops with drones or in places where drones are too expensive, like the Farm Beats folks are literally tying like little cheap cameras to balloons and you have a human, like, walk like a balloon over the crop, you know, tethered to a rope because, you know, in some parts of the world, you can't afford a drone to fly over them.

And from that, like, you can — if you know what your soil moisture is, like, you know exactly how much to water so you don't have to worry about under or over watering a crop, which leads to like way more efficiency.

So, it's just so damn cool what's possible.

**danah boyd:** And that also is like that's also the technology mind, which is like, you know, I live in New York City. And one of the funny things about living in such a crazy urban environment is to wander around and be, like, I can see how this could become more efficient.

Oh, and if we did this and this and this — and that is that moment where you see the real hope and the real excitement, which is that like we can actually do things that would solve problems, especially like nothing to me, you know, is sort of more interesting than seeing all those infrastructure layers.

And I think the question for me is: How do we get not just the technology, but all of the things that are surrounding the technology to make that happen?

**KEVIN SCOTT:** Yeah.

**danah boyd:** And that's where we have to realize that those technologies are only as powerful as the political and social processes surrounding them.

**KEVIN SCOTT:** Yeah.

**danah boyd:** You know, I can talk about how to make my, you know, building that I rent in more efficient, but if I can't convince developers, if I can't convince, you know, the city, who's, you know, setting out the regulations to set these things in motion, no amount of good technology can solve you know really viable problems.

And that's where I think that that coordination becomes so critical.

**KEVIN SCOTT:** Yeah.

**danah boyd:** Which is that technologies, in many way, we're at a point where they're moving faster than the political and social structures to make them function well. And that is why I think we need — you know, even as we invest in having people build up technical skill, we need to invest in people building up the ability to think about the bridge, because without that, you can't actually deploy at the levels to make a difference.

And that's one of the reasons, like, I'm firmly a believer that we need societal kinds of regulation — and I'll use that abstractly, rather than government — so that we can actually advance the inter — the development of these things.

**KEVIN SCOTT:** I think we all have very concrete roles that we can play in it. But like, the thing that I think we technology folks, like, have a special duty and obligation to— and you inherently get this; like, you've been doing this since the very beginning — is like, all of us every day should be asking, like, how is it that the thing that I'm doing right now is going to positively accrue to the overall social good. Like, if you can't answer that question in an affirmative way, then maybe you're doing the wrong damn thing.

**danah boyd:** Right. No, I agree, and I think this is also where I'm a big believer in putting yourself in networks where this is in conversation. So like, one of the things that really struck me, especially when I was, you know, doing old dev days, you can imagine the positiveness, but you actually need people around you who are thinking about it, and how to implement, which is, like, everything from business to policy, et cetera.

You need people around you saying, "And what if this goes wrong?" You need to be doing this in networks, in communities, and you need to be thinking with all of the different, affected communities, or the people that you're trying to really engage and create possibilities, because they need part of that conversation.

And I think, you know, one of the weirdest things right now, as I'm, you know, trying to do this exercise in coordination around differential privacy, it's like the technology will get there, hopefully as fast as we need it to. But it will get there.

But we need that buy-in process. We need people understanding it. We need people really embracing and figuring out how to make it work, or we're going to end up in a weird moment where we have this beautiful object sitting on a shelf that we're going to look back, you know, 15 years, and go, "We had it. Why didn't we put it out there?"

And so, that's where it's like, as you're thinking about the goodness, think not just about, like, the goodness, you know, of that, but like, how to actually build your teams and your communities in ways that actually can make this really be part of it.

And I'll say, one of the most powerful things that I learned from an old mentor is that there is nothing more successful than getting a community to think it's their own idea, right? And so, this is one of those moments where, as an industry, we've gotten into a bad habit of telling people what the future should be, rather than inviting them to co-construct it with us.

**KEVIN SCOTT:** Correct. Right.

**danah boyd:** And that co-construction, I think, is what we need to make all of those beautiful things that we can imagine in our minds become truly real.

**KEVIN SCOTT:** Yeah. Totally, totally agree. So before we run out of time, so for all of the little danah boyds running around right now, thinking about what they're going to be when they grow up, and like, for the moms and dads of those kids who are thinking about their future, what advice would you give to them?

**danah boyd:** Yeah, I mean, so one of the things I always struggle with is this weird pragmatism and idealism, right, which is that, you know, we often talk about going and learning technology because it's pragmatic, because it's, like, the way of getting a job, and that actually doesn't get us there. Part of it, for me, it's like switching, like, what is the idealism? What's the world you want to build, and what are the building blocks you need to get there.

And you know, I can certainly sit there and be like, you know, if I was a kid again, I would be looking at bioinformatics with, like — be, like, "Oooh." That, to me, is like an opportunity, or one of these things, because, like, you look at the puzzles you want to be a part of, the conversations, and you think about all the pieces. And that, to me, is what education is about. Education 's about giving yourself as many of those building blocks as possible and giving yourself the space to learn and love learning.

And I would say for the parents out there of these little people, the biggest challenge is to, as a parent, is how to create the space for children to love learning, to be creative, to have fun. And we're in a moment of high stress, high panic, massive control. I still, you know, when I go out and see young people — you know, I spent so many years talking to teenagers — the amount of anxiety and stress, and pressure on them, that doesn't help build the future. That helps make certain a bunch of people are normalized into a logic that is destructive.

So, I think that as the parents out there, it's like help create those imaginations and create space for those kids to build their social networks, and their opportunities so that they can — they can flourish. And that's that moment where you realize, as a parent, you are — you know, you are a foundation, and you know, you need to be the shoulders that your child jumps off of.

**KEVIN SCOTT:** Awesome. Well, I'm certainly glad that tech has folks like you thinking about all of these interesting challenges that we have right now. So, thanks very much for taking time to talk to us today.

**danah boyd:** Thanks for having me.

[MUSIC]

**CHRISTINA WARREN:** Well, we hope you enjoyed Kevin's interview with danah boyd.

**KEVIN SCOTT:** Yeah, a spectacular conversation, as it always is with danah.

**CHRISTINA WARREN:** No, there were so many interesting things, just sitting here just listening to the two of you talk. One of the things that struck me was something that she was talking about with her background and how she has this kind of tenacity where she was motivated, growing up, by being told, "You can't do this." And you know, she basically decided, even though things happen to her at Brown, "I'm staying," that she insisted on staying in those places. Wow. What great resolve, and what a great thing to kind of take through with you.

**KEVIN SCOTT:** But you probably have that, too. I know that I do.

**CHRISTINA WARREN:** Oh, I definitely do.

**KEVIN SCOTT:** Yeah.

**CHRISTINA WARREN:** I definitely do. It's - like her, I think it's probably a core part of — I think you're probably the same way — a core part of who I am. Tell me I can't, I'll show you I will.

**KEVIN SCOTT:** Yeah, it's the — it's, for me, it's the finest flavor of motivation. And it's not necessarily the greatest thing in every aspect of my life.

**CHRISTINA WARREN:** That's true.

**KEVIN SCOTT:** But it's — it's sort of done okay for my — for my tech career.

**CHRISTINA WARREN:** Well, and I think that's kind of the story, I bet in a lot of ways, of a lot of tech innovators, right, is it's all about doing things that you've been told are impossible, or that can't be done.

**KEVIN SCOTT:** Yeah, and look, I think one of the lessons that we can draw from some of these experiences —and I was thinking of this as danah and I were having this conversation — is what you can do when you see one of these folks who is getting a little bit of pushback, is you can sort of do everything in your power to help encourage them because, even for folks who are wired where, like, their first impulse is to say, "Oh, I'll show you," it's still a hard thing. It feels very lonely.

**CHRISTINA WARREN:** Yes.

**KEVIN SCOTT:** It feels risky. It's like a really uncomfortable place that you put yourself in. And like, one of the things that we could do better at, as a society, is like helping each other, like, when we're in those moments.

**CHRISTINA WARREN:** You bring up a really good point. Having mentorship, supporting people — both the act of finding the mentor, but I think even more, being mentors to others — we've talked about this before. I think that's really important.

And I think in the context of what — you know, danah's story and how she came up, it's — I think there's some proof that she had people in her corner, thankfully, who were, in addition to her own tenacity, were really willing to stand up and say, "No, you've got this."

**KEVIN SCOTT:** Yeah, her anecdotes about Andy van Dam and, like, for those in the audience who don't know who he is, Andy van Dam is like a very famous computer scientist. So, he’s one of the central figures in the modernization of computer graphics. So like, all of those Pixar films that we all enjoy so much, and like it's just become this pervasive part of the way we experience the world, is like, high-performance computer graphics like Andy was a big part of making all of that happen. My computer graphics textbook that I had in grad school was written by Andy (laughter).

And so, the fact that she had someone like Andy who just decided to, you know, look at this, like, very willful young student and say, like, "This is great. I'm going to take her under my wing, and I'm going to, like, help her — help her be her best self," that is really a special and unusual thing, and like, what we need more of in the world.

**CHRISTINA WARREN:** I couldn't agree more. It was interesting. You know, towards the end of your conversation, you were talking about some of the things that she finds interesting happening with technology right now, and she made a comment that I thought was really — really smart.

And she said that, you know, we're kind of in the middle of this reckoning right now where, as a society, we're having to come to terms with —with what control we've let our tech take, and what our tech is doing, but that innovation comes out of reckoning. And she alluded to this, I guess especially when we get into areas of climate. Do you have any kind of thoughts on that, because I thought that was really profound.

And I think that, especially —you know, she pointed out, like, you know, data science, the background is agriculture. When we think about climate, and when we think about the good things we could do with technology, it does strike me that maybe this would be an opportunity for something to come out of this —this reckoning we're having right now with —with, you know, who controls things.

**KEVIN SCOTT:** Yeah. Look, I—I think—and she pointed this out—the fact that we are now reckoning with the role that technology is playing in society is actually a good thing on multiple dimensions. Like, it's a good thing because it means that, like, technology is no longer this sort of appendage that we've attached to society. Like, it's just sort of a reflection that it's deeply integral to our day-to-day lives.

And as a consequence, it is a reasonable and, like, thoroughly good thing that we're having a more robust debate about technology's role. And I think she's 100 percent right. Like, every time that you get a new set of eyeballs onto something that is powerful, like modern —modern software, modern digital technology, or AI, machine learning, like all of these things that we talk about on this show —that new perspective, and like, the scrutiny creates all sorts of fantastic things.

Like, one of the things that I'm really hoping for is that the attention that we're placing on all of this stuff right now results in us, like, being very, very thoughtful, as both a tech industry and as a society, about what foundational pieces of technology that we need to build in order to enable people to do all of these amazing things, like go make our agriculture more productive so that we can feed more people, and so that, like, our food supply is more resilient in the face of climate change.

**CHRISTINA WARREN:** Right.

**KEVIN SCOTT:** So that we can go attack things, like climate change, so that we can go attack things like the cost and availability of high-quality healthcare. Like, I think all of these things are — like, as soon as we're paying all of this attention to, like, both downsides, but like, at the same side that you're seeing the downsides of technology, you're going to see the upsides, as well.

**CHRISTINA WARREN:** There's an opportunity, right? I mean —

**KEVIN SCOTT:** There is opportunity.

**CHRISTINA WARREN:** And I thought that was the most interesting thing, is when we grapple with these questions. And if you look at the history of not just Silicon Valley, and not just technology, but you know, industry as a whole, there are always these pockets where, when these questions are being asked, that tends to be when really big things happen.

**KEVIN SCOTT:** Yeah. And again, you know, I said it to danah and I will say it again. I say it in my book. I'm going to, like, repeat it five million times because I think it's really, really important. Like, we should all, in the technology industry, be asking ourselves every day, like, how is it that the thing that I'm doing right now is going to create more good for society.

And like, it can't be, you know, a trivial, convenient answer that you're giving to justify another important thing that you want to do. It has to be a legitimate, like, oh no, like, I know that this thing is going to produce a good that is bigger than me, bigger than my job, bigger than my company.

**CHRISTINA WARREN:** Definitely. I'm glad you keep focusing on that. Well, we're out of time for this show. Well, we are out of time for this show. Thank you to danah, and as always, we'd love to hear from you about ideas for future guests, or anything on your mind. So, e-mail us at Behind The Tech at Microsoft dot com. Thank you for listening.

**KEVIN SCOTT:** Yeah. Thanks, see you next time.

[MUSIC]