**Kumar Garg:** Well, thank you, everybody, for having me. I got a chance to look through the 175-page booklet. I started bookmarking all the researchers I wanted to follow up with. I thought it was actually pretty good. Let me start with the beginning and then end to now. I showed up in DC about a decade ago. I came and served in a fellowship position for the White House Office of Science and Tech Policy, under President Obama. I was part of this new group of people that showed up in DC. I started doing it in the spring of 2009. In a couple of months into the administration, they still invited me to the, you did all eight years of the Obama White House Party, even though I was technically a little under.

I served all throughout that time. What was fascinating for me was, I went all the way from knowing nothing about how to do policy work to somebody who was treated like a grey beard by the time I was leaving, even though now I have some grey hairs, but I didn't then. What it struck me as was that the work of policy and being involved in policy conversations is actually a practice, not this expert based exercise. The way you get involved in the world of policy is by actually just doing it. You can actually level up and become relevant in it quite quickly.

Lots of ideas that I had- I was pretty permissive with coffee dates if somebody said, "Hey, I would love to pick your ear. I know you're working on this stuff. Can I give you my idea?" What I will tell you is, most people's first ideas are bad. They're bad not because the core idea is bad. It's that actually what they think the government can do about their idea is way off. They're like, "That's why the President should have a commission on this." Which sometimes works, but most of the time commissions don't go anywhere, or if only the President talked about this, and then I'll say, "Actually, the President does talk about it. That by itself is not going to do it.

If you actually out of those say, "Okay, well, we figure out what thing is stopping this from happening." One of the big initiatives I worked on inside the administration was an initiative that would expand access to broadband in classrooms. One of the big things that in these conversations that came up was more than half of classrooms where teachers were trying to teach with using something that involved digital technology. You will get that crazy hanging screen or the thing just wouldn't load. As, when it comes to technology that happens to you two times, and you just don't do it again.

That was having a huge gap on our ability to implement lots of educational technologies. Okay, so that's a broad area. The classic thing would be like, "We should go to Congress and get more money for low-income schools. That in the political environment we were in was not a very viable option. The interesting thing was out of that first conversation, I said, "Well, what are the ways that we're actually doing this right now?" They said, "Well, there's a program at the FCC called the eRay program, which actually invests a good amount of money to actually help school districts get ready for the internet.

It was created in the 90s. Actually, that program could be updated to really focus on broadband. I was like, "This are the makings of a really good idea." Many months and development later, President Obama announced something called ConnectEd, which actually has led to more than $20 billion dollars worth of investment and taken basically- We were under 50% to basically 98, 99% of classrooms by the end of this decade will have broadband in the classroom. That came out of a conversation with somebody who cared a lot about that topic and thought really hard about what we could do.

We thought about all the ways the government could help. For me, that's very inspiring. That's why I think public service is so exciting because the work that you all do can actually be translated into big wins for the American public. And there's the role of being a public servant is actually doing that. I was hooked and I did it for all eight years and left in January of 2017. The role that I have now, I work at a philanthropic organization started by Eric Schmidt, the former CEO of Google. We're a pretty young entity just under two years old. A lot of what I do is carry over a lot of the work I did inside the administration around thinking about the way science and technology could work in the public interest and do it the small scale, is the best way to think about it.

We we make small early investments and interesting ideas and interesting people who have some powerful research that they're doing or technology they're working on that could impact the public good. One area where I've been focusing a lot of my recent energy because my interest in both education and workforce has been in where the computer science community could pair up more closely with the learning science community. Our internal tagline for this is called Learning Engineering. Really, what it's trying to figure out is, computer science is the fastest-growing field in science right now.

Both on enrollment and interest and dollars. What are the ways most of the students when you interview them when they're in college or in graduate school and you say, "What applications or computer science are you most excited about?" They can name a handful they can say, "Here's what we can do Vision. Here's what we can do on Speech. Here's what we can do on Cars. They are all interested in education. We run a program where we recruit top CS students to work with Schmidt Futures. If you say to them what issues you care about the most, where you would love to have an impact, education is really high up there.

When you ask them, what are the ways you could be using your CS skills on it? They don't know that Duolingo actually has a whole AI team that is actually developing new methods for how to learn languages more quickly. One of the goals in learning engineering program is actually starting to marry these two fields more closely together. Some of the guys think this conference is really about. Think about how do we build a field of folks who have a CS and data science background, but are also working really closely with folks who are coming out of learning science, cognitive psychology, and related fields.

We're starting in this area. We've been talking a lot to some of the largest platforms that have a lot of the data that don't do enough work with the research community, which I think it continues to surprise me. You will say, "You have all this data, you're doing all this work, how many researchers have used your data to publish papers in the past year?" There's this silence that prevails. One of the things that we've been trying to work with some of the largest education learning platforms is, what would it take to actually open up some of your data to the research community.

At the same time we've been working with, on how do we drive the best talent into this space? How do we get earlier whether it's postdocs, graduate students, and undergrads and those who have interest in computer science and data science and get them interested in applied versions of having an impact in education? That's one of our example programs. Ultimately, I think NSF and IES and the federal agencies are going to have to be big players in this area, but I think it's an exciting area and example of why meetings like this are so powerful?

**Russ Shilling:** Thank you. One of the things that I've noticed at the conference so far is there are really, I think more than a lot of research conferences I've been in, there are a lot of people talking in the halls about the impact they would want to make. I think they're on board with you about wanting their research and the work they're doing to make a big societal impacts. We had a small gathering right before the conference started yesterday where we took some of the participants up on the hill to talk to staff from the House and Senate, on AI policy. We know that people want to get involved. Especially in learning sciences, but across the board, what would you want from our group in this?

**Kumar:** It's a great question. Let's take this idea of the intersection between AI, machine learning and others and the federal policy. I think one of the ways that the community can have a real impact is to actually widen the aperture of where AI policy intersects with federal agencies. I'll give you an example. If you think about the role that assessments can play in workforce, there's a federal regulatory regime that exists for workplace assessments. If an employer wants to implement an assessment, for hiring, they have to get reviewed by federal regulators.

There is a whole field of new companies and others that are entering into the space of starting to develop new analytical models that are predictive on future workforce performance, and they're using big data and data science approaches. I have talked to folks inside the federal government who work on this and I'll just name the companies. They're like, "Oh I did not know," and when I say, "Oh some of these Albert make approaches can actually be better at some of the inclusion goals that we have."

So for example, one example I always give people is we regulate work by his assessments. We don't regulate the minimum qualification standard that employees use when it comes to higher education. Right now we have an economy that is relatively healthy so employers are fighting over labor, but let's say you have slacking economy. One way employers can just commit against employees that they can just say, "Oh we're just going to hire or we're just going to make the minimum qualification for this job or for your degree." That knocks out a bunch of possible applicants.

That is unreviewable right now in the way we review workplace assessments, but if you did the same thing, but you did as a test it would be reviewed. Well that's an example where I think folks who actually work on assessments going to have a really powerful role to play, to actually work and talk to the regulators and say, "These are all the different things that we're finding around new methods or around assessments, ways that those methods could increase bias ways of those methods could reduce bias.". Some of those connect to intersect with AI. Now if you had said to somebody like, "What is AI policy?" I don't think they would think, "Oh AI policy is working with the regulatory agencies that do work in these assessments."

**Russ:** Yes exactly.

**Kumar:** So usually people focus on-- They think there is some other conversation outside of their expertise, and that's where the policy conversations are happening. I would say the way to think about where this community could be involved in passing conversation is actually in the area of your expertise. So if you work on assessments there are actually parts of the government that are also working on assessments and one of the ways that what you're learning is feeding into those conversations.

I would think about that because the government is way bigger than you think and actually figuring out which parts of the government could benefit from your expertise is actually a really powerful role you can play. So I think it's great that the role that you're playing and the role the association is playing in helping connect it's members, the passing conversations, but I think actually going and having those meetings ends up being very useful.

**Russ:** Right. Again for those who aren't familiar with ADAR, policy in government's staff are very active in trying to do just that. So we try to get us-- When we see a need in the government where our experts across the association can be useful in helping establish policy on both the federal institution side and on the upper side of the government. We try to hook them up wherever possible. So again these are explained comments about trying to get people more involved. So come to us as your advocates and we can help at those things going as well.

A little bit of a broader question and relating both back to your current job and the administration, you and I have a lot of discussions over the years about innovation and education and of course you're now interested in workforce. What do you see about the future for them? I mean where is it going if you could think 10 years from now, where would you like to see education being on a workforce level?

**Kumar:** I don't know. These end up being the harder questions as the part that-- I'll answer the part that I have a strong opinion on which is part of the reason why I got interested in the push to we're having around learning engineering is we would-- Whenever we had the president or someone else gave a speech on education especially on the innovation side, I had a set of talking points we would use. Let's say, "Look, the rise of the internet, the rise of-", it's changing everything. Then what was funny was somebody actually showed me the Clinton talking points.

It was like '94, '95 it's like, "Oh man", it's like, "We're going to put the library of Alexandria into every CD ROM." The part that was depressing about it is on one level the potential for information technology is to change everything has happened in certain domains. When it comes to education we keep having this idea that there's like this horizon at which point, "Oh what's happening on-", we've got so much computing power,we've got so much data, we've got so much information. That's just going to change the landscape and we keep using that talking point to say, "It's coming and it doesn't come.".

So part of the reason why we've tried to sort of-- I don't think this is full answer, but one of the things that we tied up say is like, "Why is the engine not working as well as it could?", and part of the theory was under the hood-- So one way I asked about this is, "How many education papers have been published in the past year that have an end over a thousand?"

By that what I mean is just like the where the number of students that were in the trial, it was a large scale study. It's not three classrooms and we could talk about that there's a surge of data it should allow us to ask lots more questions, it should allow is to do in a sub-group analysis and ways, but how many papers are there?

When you actually start going to these large platforms as they said, you find that the number of large platforms that researchers actually have access to in a sustainable way is really limited. So what ends up happening is you have research funding. You end up-- you got to get going and so if the platforms are hard to access and so that's one area where I think we can have some impact in just saying, "Okay can we find a handful of platforms across any subject areas, learners and others that are interested?" So I'll give an example of one that we're working with which is Neil Heffernan's assessments platforms which is math at home.

The goal that Neil has set is to help 60 research teams be able to use his platform to collect research data over the next two years. Which I think on other fields will be like, "That doesn't sound like a lot," but I think in education that might be a lot which is-- These are people that he's not co-authoring with. He's just making his platform available for them to run a research study they find interesting which is-- If we can get the cost of testing and running an experiments down, I think that increase of the rate of which we can both fine new ideas, tests new ideas against each other and do more. So we're in the process of now trying to talk to lots more platforms and say, "We'll be a potential to do more of this work.".

**Russ:** Yes. So I ask you one more quick question and then we'll open it up to the audience. I really suggest everybody do this. If you Google Kumar or look on his Twitter, you'll see his whiteboard from the White House and you'll see what the inner workings of the LSTP Kumar brain going on there. The one thing I was impressed with working with you guys from the Department of Education was the interdisciplinary nature of the gathering. If you had a gathering on Hollywood, you had psychologist, you had technology, you had a really broad worth of experts so that's what we're doing here. This is an inter this plenary group. We don't have enough into those plenary conferences obviously. What are your thoughts about what we should be doing in this space more?

**Kumar:** Yes, as Russ was saying the cadre for this is so I came into the White House over the course of being in a White House we build up a team of about 20-25 people to where I was serving as the deputy. It was a tech innovations team so we had a really broad range of topics. We at some point couple of years and I just start to write down some of our internal memes for the team. One of them was like find your doers which are shorthand for you can't get done anything done in government unless you can find like the go to partners and the agencies are outside that are like rest of the world.

When he was at the department of Ad or adopa that are actually going to drive the work. We had again it sounds simple, but like you've tripped people all of the time like think of the end at the beginning. I was all in these meeting with government whether like we're fighting about something and we were like, "Well what are we trying to accomplish?"It's like people are like, "We're trying to get this thing out or like what are we trying to accomplish?".Just simple things that we use to run our team and be a lot more effective.

Then when I was leading the White House I posted the board and it got lots of people interested in it. They came from totally other domains. I thought it would mostly appeal the passing audiences. I once got stopped by somebody who's a surgeon and he said, "Oh I took the picture of the board and I have it now in my op room." I was like, "I find it really useful as like a quick huddle with me and my nurses." I was like, "That's just like a totally odd things of like a board of it. A bunch of policy wonks use as a way to organize their day."

**Russ:** [laughs] There were a couple of things that we did when we thought about gatherings that I think would be interesting. One is we rarely thought about the gathering itself as the production function for getting work done. By that what I mean is when you're in the White House, sometimes the urge is like, "We should do something. I don't know what to do. Let's just get some people in a room together" That's a step we can take. One thing that we would always say is that the meetings should be the middle point, not the beginning point. As in we should have some theory about what we're trying to accomplish and the meeting is the excuse to get people to take the first step.

One of the things that we would do is whether it's getting 100,000 math and science teachers, computer science for all, the President's BRAIN initiative is we would say, "What is the goal whether we stay publicly or not that we're excited about?" Then let's think about everybody that we think could potentially contribute to that goal and not be particularly tied to a particular sector or answer. When it came to the President's BRAIN initiative, the President's BRAIN initiative was the idea that neuroscience and neurotechnology had advanced to a point where instead of either just doing brain scans or doing research on single neurons that we had the potential to start to do it on thousands of neurons and potentially make much faster advances in the field.

We said, "If that's the core theory behind, why we should invest?" NIH really loved this effort. Who are all the different people who could contribute? What's interesting was people said, "Well, if we're going to have this huge research designs, we're going to need a lot more cloud computing." What are ways that the big tech firms could be providing big cloud computing services as a givaway to the researchers. What are the ways folks were doing really interesting work on instruments? Could be stepping up and thinking about how those instruments could be re-applied to neurotechnology.

What are the ways that a lot of the disease groups could be brought in early on to be talking about key patient needs that might be relevant. Part of I think what made us interdisciplinary is we would first think a lot about the goal and then think like, "Who's everybody who could contribute to the goal." It made it interdisciplinary, but we didn't have like, "We should invite everybody" and then got lost in the sea of anybody you could invite because ultimately a meeting has to-- You can only fit so many, 150 people in the East Room. I think that was one.

Second piece of it was always do pre-work and post-work. We would always say to people like, "Hey, we're going to give opportunities to X number of you to present specific steps you're taking against this goal. We want you to come ready." That would be quite motivating. People would be really ready coming in and then we would come out of the meeting with next steps. It created a lot more momentum. It all sounds like obvious stuff, but I'll just tell you that lots of times, you're in settings where the pitch is we'll get people together and sparks will happen. I think sparks do happen, but it's very hard when you're on the-- We're trying to get stuff done and then act on those sparks because you didn't know what they were beforehand.

That was at least one way we tried to be somewhat deliberative about how are we using our power to convene because putting on meetings takes a lot of work no matter what you do. If you can do a little bit more to figure out where you're trying to go, it can have a big impact.

**Russ:** Thank you. Why don't we start getting some folks up to the mic to ask some questions. Do we have any questions because I can ask more?

**Female Speaker:** I have a question.

**Russ:** If we've got a couple, we want to try to do a couple at a time if we can, but we can do one.

**Female Speaker:** Hi, you mentioned about having access to data by the Gen who had the educational business. When you look right now, you've got a lot of online education by state. They're offering both charter school and public school online, which means you've got that all rich data there that's available for research. What are your thoughts about that and the application to research on the education field?

**Russ:** That's great. Why don't we move on.

**Camille:** I’m working on -my name is Camille Nebeker, I’m at UC San Diego, and I do tech ethics and research ethics, working on a project with artificial intelligence to promote healthy ageing. We've been working with older adults. I bring computer science and engineering students with me. In one of the papers we wrote, we talked about the need for technology literacy among the older adults, but there's also a need for ageing literacy among engineers. I'm wondering what your thoughts are about infusing more HC, human computer interaction, people interaction among engineers?

**Kumar:** That's great. Both are great questions. On the first part of Russ's online education, I generally agree in principle which is the fact that there's more online education happening in general, whether it's higher ed or the K-12 level, should increase access. The thing that I have been surprised about is at the practical level of just is it happening? I won't call out any platforms while sitting on the stage, but I've talked about lots of leading platforms. When you ask the question how many researchers have access to your data to publish something in a journal? In the past year, the number is vanishingly small.

Then the question is what is reason? People give me lots of theories. They'll say, "The theory is companies don't want share. They've other goals" They'll say, "There's other restrictions." What you find is that a lot of the concerns that-- It's true that not every company is interested in this area, but a number of companies have actually been spun out of university. They actually have people in their core teams that are researchers at hand. Even they are not-- The data is not available to research community. What we find is that it just takes extra work.

What are the ways that you can actually make that extra work happen? We funded a postdoc to MATHia Carnegie Learning which a big math platform. It was a really productive partnership. One of the things that both Carnegie Learning and the postdoc told us is that once-- He was actually full-time at Carnegie Learning. He actually came up. He started working really closely with the engineering team. He came up with a series of things that they could be doing to be advancing on the learning science. He said, "We could build an internal AB engine to test different learning science ideas."

Carnegie Learning has 400,000 student user base. The research potential is quite substantial. Most of the time when Carnegie Learning is out in the market, the things that the market is asking for are full-blown efficacy trials like, "Should I buy this product as my math software?" What they're not asking for are research trials, the way researchers think about them, which is, should we teach this concept before this concept or should we do spaced repetition as a way to increase knowledge of our particular topic? Which I think are fascinating and really important research questions around how should we actually teach.

Part of it I think is just taking what your question is and saying what are the next steps we can take as a community to actually create research windows in these platforms to make it easier for the research community to have access rather than having to individually recruit their research subjects. The analogy I always make is to the telescope, which is, if we made every astronomer build their telescope, which is what we made them do 200 years ago, they would be less astronomy research, right? If you make everyone recruit every subject and that's part of their cost of the actual experiment, it happens a lot less.

What we make a lot of education research do is both design the instrument, recruit every subject and run the trial. In astronomy today, the reason why we're making big advances is we have these big telescopes. They collect all the data. You're a top-shelf astronomer by generating really good questions and then running them against the data. What are ways that we could take that same analogy? I think on the ageing question, I think in general, there's a big question whether it's ethics, whether it's human-centered design.

I think the field is generally saying like, "How can we up the capabilities of the engineering core. The part that I don't know the right answer to and I think it's a big open debate, where are the best levels. There's a lot of folks. I know the National Academy of Engineering has a grand challenge scholars program which tries to say, "Let's get engineering students and get them working on big social challenges as part of the undergraduate time and graduate school so that they're getting more of this applied work."

There's lot of folks who are interested in thinking about this. Once folks are actually working in various companies, there's certainly more awareness that this is a missing gap and there's a need, but I continue to think that we have to think harder about folks who are actually just already working. There has been a set of folks who've been thinking a lot about analogies to law which is 30 years ago, the idea of pro bono law, was this relatively random idea. People did it sometimes. It wasn't very organized. The legal field got organized and said, "Part of being a professional lawyer is you give back.

You can do sabbaticals that are one, two years where you're giving back and you're working on a pro bono case." Even when you're working at a company, you're spending certain, 20% of your time on pro bono cases. I don't think those opportunities are really given to engineers and technologists to say, "Here's the ways I'm going to be working on social problems as part of my career, as structured sabbaticals or as part of my time." I'm getting exposure to lots of different ways to approach it. One of the things that I found really interesting when we ran.

As you guys know, if you guys remember, Healthcare.gov happened and out of it came a surge of technology talent that came into the government, partly because we were like, "We're not doing this very well." We were able to recruit top technologists from around the country to come work in DC. One of the things that I think they found really interesting about the experience is what's different about government and what's powerful about government is government worries about the edge cases. When you're building a piece of technology as a company, you might say, "Look, our total addressable market is one million people."

You're like, "Here's all the people who can't access the technology because they don't have the device." They have other reasons why they cant access. They're like, "That's just not part of our addressable market." Problem solved, right? What does government think about it? Government says, "If we're going to build a service, we have to make it equitably accessible." We have to think about who are all the people who can't access it through the main of accessing it? That's one area where I think technologists, it just depends on what your goal is.

Are you going to spend a lot of your mental energy saying, "If this can get out to a billion people, we're done" or you're saying, "Well, here's all the set of people that it leaves out and how are we going to build on-ramps for everybody?" I think that's a real-- Once you actually have that mentality, I think going back and forth becomes much more powerful, but I think you have to give people that lived experience of saying, "Now, spend all that mental energy thinking about who is not included and how you would include them? How to build trust? How to think about governance?"

All these things that when you're in government, you think about all the time because they come up constantly. You may or may not be getting them in other roles and giving people the ability to experience what it means to be a technologist in all those different settings I think is very powerful.

**Russ:** Let me ask you a question, a follow-up on the ethics side and then we'll go to another question. At least from my observations while I was working, before this, I worked with Chan Zuckerberg and the Gates Foundation on some work, I think there's a certain shynessnow about privacy concerns on education software platforms. What do you think we need to do in those areas because again and you may disagree with this, but I have the sense that worries about those issues are actually slowing down progress in developing innovations in education technologies.

**Kumar:** I think generally we're behind on privacy issues across a lot of things. If somebody was like, "Are we doing enough on privacy?" I think the general answer is no. We in the administration tried multiple times to do things that seem very like, "This is the low-hanging fruit." Like a consumer bill of rights on privacy. Here's what should you be able to know how your data is being used, is it being sold to another party? Things that-- I think lots of people expect and we've got no traction on trying to get that done. I think some of what's happened in the past couple of years have brought that issue back.

I still have not seen action in Congress to take basic steps to give people, "Here's what you should know about how your data is being used. Here's privacy safeguards." I think that's the general landscape, which is even as concerns are going up, I've not necessarily seen a big level setting on privacy part. In education, I think the problem is that you can do a lot of work that is privacy enabled and still try to think about using data for social good and for developing, but you actually have to invest in it. If you remember, at the Department of Education, there were only a handful of people who modulated and had expertise on the privacy side and knew something about the technology. Really weird things would happen.

I remember this case where, we had a military families initiative in the administration. It was focused on all the challenges military families faced. One of them is military families move a lot. They move bases, re-deployments happen. That means your kids move if they're in school. A lot of the folks who are serving are on the younger side. How do you move your school records? Seems like a basic question. We did not have consistent guidance on how two states could send over the records of a student when they were moving between school districts.

Parents would say like, "They just gave me this thing. They said, "Please take that because I know we're not going to get trouble if we print out everything and just give it to you." That did not seem like the best system. you've already got a big move when somebody says, "Which is going to print out everything we have on you and good luck." One of the things we worked on was just like what are ways that states could have sharing protocol. These two school districts could share information when two families are moving. I think part of it is just like, "We need folks who are bilingual on this."

They have an understanding of the privacy laws that we have and some of the privacy needs and they understand what some of the data science and technology parts are. They can actually develop privacy-enabled solutions, but I agree with you that in the absence of it, you get like either there's nothing happening or then people get really worried and they say, "Look, maybe we should just stop." I think progress looks like we have to embed privacy into the work, not added at the last minute and say, "Well, now, it's working" or "it's not working."

**Russ:** I've got a few more questions I can ask, but I'd like ask some of them. We've got people. I didn't see you over there.

**Kumar:** Sorry, the lights are bright.

**Female Speaker:** You covered some of it, but the question I was going to ask is I'm in cross section of health and education, and I'm noticing that in education, some of the testing that parents are not fond of are going toward computers, but if we have all this information digitized, there's still the parental access that you have to get in all this other stuff. Whereas, in medicine, it seems like records are more easily shared between practitioners. I guess, I don't if it's a question or anything like that, but the observation is whereas education is moving forward, do you see the possibility of accessing people outside of these corporate ideals because it seems like those are targeting a specific group of kids. They have specific things in common. Whereas, a broader spectrum of children might be gleaned through the testing that's at least taking place in New York.

**Russ:** That's a good question.

**Kumar:** Great. Why don't we--

**Female Speaker:** We don't even really know each other, but my question is also somewhat related to what you were saying. COPPA is more than 20 years old and it's this thinly-veiled, antiquated protection for children's data, how are we going to improve this? I think it does have to come from private industry because I think the government is afraid to touch it because there's all these liabilities but as a technologist, I know that when we try to implemented in on websites, it's crappy. We're just basically putting your date of birth. Then, "Oh, you're an adult, and you can use the site." I was just curious what your thoughts on how we could move that forward?

**Kumar:** That's great.

**Female Speaker:** I have a question.

**Kumar Garg:** Yes.

**Female Speaker:** I'm interested in your thoughts about the quality and the amount of scientific advice that comes to the federal government. Are we doing it right or are the panels right? They're focused on the agencies now. There might be gaps or valleys, so I'd love to hear what you think about that.

**Kumar:** Let's do those three. Those are great. I don't have any big thoughts on scientific advice. I think there's been a lot of news coverage in general about the real narrowing of scientific advice on handman issues that the current physician does not agree on. So there's been lots of squashing of centric advice when it comes to issues of climate and a range of other related topics. People are alarmed about it, they should be alarmed about it. The reason why it ends up having a huge impact is the government works by collecting evidence and then analyzing and using that evidence.

For example, when the government thinks about a regulation, it says to the agencies, "Well, what do we know about what will be the impact of this regulation? How many lives, let's say, what are the possible economic downsides or benefits?" How you collect that information ends up being a big part of the analysis because when you the government agency, then say, "Here's everything we learned. Here's our analysis that goes to OMB, OIRN and other things." One thing I will just say is even as the formal advisory committees are being narrowed, which I think is a real problem, you have a huge opportunity to continue to have an impact on the issues you care about just by submitting your scientific expertise against open regulations and rules.

Because the way notice and comments works for the government is that the agency has to respond substantively to every comment it is given. If your area of expertise is a particular pollutant, and you're like, "Oh, I cannot believe--" CEO Duolingo. He's had incredible success in other platform, it's going really well, but the the data point he really wanted to talk about was, I'll make you guess this. What do you think is the highest used language in Miami for Duolingo?

**Russ:** I've actually heard this, but I can't remember it out, and it's not the obvious ones. I can't remember now. Which is it?

**Kumar:** English. It's like a second language platform, but it's being used to learn English in the United States. For him, given his background and everything else, this is immensely gratifying, and he's been trying to think about how could Duolingo do more with adult ed, and adult providers to build on this. I think education is a natural area where we can have this idea that it can be more inclusive. I think the other things that you generally find is I think most of the time, people don't know where they stand when it comes to STEM diversity, so people have this feeling like, "I think we're probably okay."

Then they're not okay actually measured it and figured it out. One of the things that I always recommend to people is have an accurate sense of how well you're doing. Figure out should there be certain things that you can do? Freeman Hrabowski, when he did a big commission, on how can increase underrepresented representation in STEM, they found all these things that were, in policy terms, low hanging fruit. They found, "Oh, there's all these underrepresented students who are pursuing a STEM degree who are within 10 credits of graduating, and for whatever reason, they had to leave school."

As somebody who does positive work, I was like, "Oh, I've never seen this in any of our reports or documents." Thinking about if you actually can measure where you're having folks drop out and think about systematic ways to bring them back in, I think could have a big impact. I would measure, I would have actual plans, and I would bring a strong social dimension and do the work.

**Russ:** Okay. I think we have time for one question, and then we'll let Kumar actually have a few final words.

**Male Speaker:** Great. Thank you. My name is Mark Serkan. I'm representing Division 13. The Society for Consulting Psychology. I have two related questions. The first is, what do you think are the policy implications of what happened with Cambridge Analytica in their use of personality data to do what they did and advise their clients accordingly? A related question is, do you believe that privacy is a fundamental human right?

**Kumar:** Those are great questions. On the Cambridge Analytica, I think because we're two years into it, at this point, lots of the early takes have already happened. I think there were a number of different things that we learned through this process. One was, when folks say, "We don't know how our data is being used." That is true. So just this whole question around how much transparency there is around data use remains a huge challenge. Then this question that if we're going to be really clear about data for research purposes, we actually, on the research community side, have to have clear norms, ethics, controls around that because if we don't, and then people say, "Oh, well."

In general, when it comes to privacy conversation, people will say, "Well, there's privacy concerns, but of course, researchers should have access because we're trying to improve the human condition by taking the data and learning more about," but then I think it's incumbent on the research community to sort of have strong ways to sort of protect things that aren't actual research purposes. I think there's just what do people expect will be their data will get used for, not for who it will be shared, but-- I think this is a live debate, because if you said to people like, "Oh, here are all the ways the platforms you are using are using your data in lots of ways, whether it's advertising and everything else."

The people would be shocked. I think thinking systematically about like, "Oh, how do we bring more public participation into what researchers think will be the next wave of positive uses of big data," and rather than saying, "Oh, we're just going to figure this stuff out and it will be great" Actually bringing in both users and other folks into these competitions early, I think sometimes, people feel like, "Oh, that will take a lot of time." Rather than forestalling these questions around trust, the ways you build trust are by bringing people in.

This comes from is from government background, but one of the things that government does all the time, it just think like, "Hey, we have to always think about trust as a core part of all our work."

You have to do the work. It's like in government, you're like, "Oh, we have to convene stakeholders." That sounds like, "Oh, why does the government convene stakeholders?" It's just a quick way of capturing the idea that there are folks who have been in a particular space, and the way you build trust is by telling them what you're going to do before you do it, getting their input, and then building that into the design. That's a powerful way, and it's powerful muscle memory that you want to have when you're building these things. As to whether I think privacy is a fundamental human right? I do.

I think the part that I don't know the answer to is that I don't know why we have had such a schism between people feeling, having this feeling that privacy is important, but where we are in the policy space. Where I think we have not had major pushes on privacy in the United States that are kind of met the moment, so I don't know what that skew is, which is I think people feel that we should be doing more on privacy, but we're not actually doing more on privacy. Why is that? I think one of the ways I do that from wearing my old posse hat is you say, " Well, lets at least under the hood, make some progress on some of these things." I do sometimes, on other things where people really worry and care, you see that in our-- One of the things that I'm really interested in is just, there's a big conversation that's been happening about more scientists running for Congress, more technologists who are serving in government roles. I do think that's going to have to be part of the answer. The part of the way we're going to embed privacy more strongly into technology is by just having more people with expertise in doing this, coming into government, serving a Congress, being staffers and helping shape that landscape rather than just waiting and hoping.

**Russ:** Okay, well, thanks, Garg. Do you have any last thoughts as we're winding down today?

**Kumar:** Well, I want to thank all of you for the work that you're doing. I think the folks in the research committee often don't get thanked enough. I think the part that I would just leave you all with is just, though it always feels like the advocacy and the policy piece might be someone else's job. Like, "My job is to focus on the next question. I think the only thing I would leave you with is, it's our job. Only by submitting those comments, showing up in those meetings, showcasing your expertise, getting involved, big and small, does all the work happen and every idea we ever worked on the administration came out of conversations with folks who are deep in the work. That would be my leaving message. Thanks again for having me.

**Russ:** We stand out here to help. Thank you, Kumar.

[applause]

**[00:51:59] [END OF AUDIO]**