

Scott Hanselman: This is ACM ByteCast, a podcast series from the Association for Computing Machinery, the world's largest education and scientific computing society. We talk to researchers, practitioners, and innovators who are at the intersection of computing research and practice. They share their experiences, the lessons they've learned, and the own visions for the future of computing. I'm your host today, Scott Hanselman. Hi, I'm Scott Hanselman. This is another episode of Hanselminutes in association with the ACM ByteCast. We are very pleased to have on the show today Dr. Juan Gilbert. He is the Andrew Banks family Preeminence Endowed professor and the chair of the Computer and Information Science and Engineering Department at the University of Florida where he leads the Computing for Social Good Lab. Dr. Gilbert, thank you so much for joining us today.

Dr. Juan Gilber...: Thank you for having me.

Scott Hanselman: So you have done so many things in software engineering and computer science, research, inventing, educating that you were not only awarded the Presidential Endowed Chair at Clemson, but also recently, I understand were given an award by the president himself.

Dr. Juan Gilber...: Yes, that's correct.

Scott Hanselman: That is pretty fantastic. What is the name of the award that the president gave you and was that for your work in voting?

Dr. Juan Gilber...: Yes, I received the National Medal for Technology and Innovation. It's the nation's highest honor for technological achievement and it's bestowed by the President of the United States.

Scott Hanselman: When something like that's coming down the pipe, do you hear whispers or do they just call you one day? Does it show up in your spam?

Dr. Juan Gilber...: Yeah, that's exactly what happens. You don't know. I did not know someone had nominated me for this honor, and I just get, out of the blue one day, an email in 2019 saying that you've been nominated and if you are willing and interested in this award, your university has to approve it. But this is confidential. You can't say anything. You had not been selected, but you're on the list. So that happened in 2019 and it wasn't awarded until 2023, so it took several years for it to actually happen. But yeah, I didn't know.

Scott Hanselman: And you just have to sit on that for four years. That's like someone calling you and saying, "You're the next Marvel superhero, but you can't tell anybody for half a decade."

Dr. Juan Gilber...: Yes, that is true. It's very challenging. It was just the previous administration didn't award any national medals and then the new one comes in and says, "We're going to do it." But then it didn't happen for a few years.

Scott Hanselman: Well, that's fantastic though. Congratulations.

Dr. Juan Gilber...: Thank you.

Scott Hanselman: Am I understanding that you grew up in Hamilton, Ohio, was getting an award from the president, something that you're thinking about when you're bumping around in Hamilton?

Dr. Juan Gilber...: Not at all. Yes, I'm from Hamilton, Ohio, southwest Ohio. But yeah, I never, this was beyond your wildest dreams. I can't even put it into words.

Scott Hanselman: That's fantastic. Now, the project that I think they were the most excited about is called Prime III. It's called One Machine, One Vote for Everyone. This is an active project and it's at [primevotingsystem.org](http://primevotingsystem.org). It's called the First All Accessible Voting System. What does that mean, all accessible?

Dr. Juan Gilber...: So the story is back in the year 2000, we had a presidential election and in the state of Florida we had some little controversy. After that controversy, Congress passed in 2002 was called the Help America Vote Act, HAVA. In HAVA, they had a requirement. It said every voting precinct was required to have at least one accessible voting machine for people with disabilities. When I saw this legislation, I said, "I understand the intent behind it, but they got it wrong. They made a mistake."

The mistake was they created inadvertently, a separate but equal approach to voting and as you know separate but equal doesn't really work out very well. And when I reported this concern, I was told, "There's no other way to do it. We have to have a separate way for people with disabilities." And I said, "Oh, no, you don't, and we're going to do it." So we went and created a universally designed voting machine to allow people to vote the same way. If you can't see, if you can't hear, if you can't read, if you don't have arms, you could vote on the same machine as anyone else. And so that's where it all began.

Scott Hanselman: And this is a term that you've used is barrier-free design, we hear about accessibility A11Y the shorthand for accessibility, but I've heard design for all. I've heard inclusive design, but I really like that term barrier-free. It's surprising that that's in any way controversial.

Dr. Juan Gilber...: Yeah, you would think so. But at the end of the day, universal design, barrier-free, all these things communicate the same point, which is separate but equal hasn't served us well and with technology and the things we know we can design for everyone. And that's the point.

Scott Hanselman: Yeah. The idea that it is not considered to be, I don't know that it's considered controversial at all, to be inclusive and try to cover all bases seems surprising to me. Now, I understand that these machines use multi-modality. They're not just

touchscreens, they can talk to you, they can communicate with you in any way that you can be talked to. Correct?

Dr. Juan Gilber...: Yes. That was the design originally, the idea was that it would have audio feedback so the machine would speak to you. So if you're blind or visually impaired, you could hear valid information and things and you could respond either with your voice or through switches or buttons and things like that. And with your voice we didn't do speech recognition, we did something different. We used a conversational approach so if you wanted to vote for, I don't know, Joe Biden, you wouldn't say, "Joe Biden." It would say, "You're voting for president to vote for Joe Biden say vote." And you could say, "Vote." Or you could blow into the microphone as a response. This doesn't sound like a big deal, but if you think about it, it gives privacy because if I said, "Joe Biden." Everybody knows who you're voting for, but if you're just saying vote, you'll never know who this person's voting for. So they got privacy.

Scott Hanselman: Yeah, that's a great point because it's not just about the accessibility of it, but it needs to be equal to everyone else around you who also has privacy. They can get inside the booth, they can hide their vote, they can have that vote be between them and their government, which is the way it's supposed to be.

Dr. Juan Gilber...: Exactly, exactly.

Scott Hanselman: Very cool. So this is not the main focus though of your work. The main focus of your work is human centered computing. You're putting the human at the middle of everything. I've heard rumor that there's signs up in the lab or a sign up in the lab that says change the world.

Dr. Juan Gilber...: Yeah, that's one of our models. But yeah, human centered computing. The idea for the Computing for Social Good Lab, the work we do is we like to build innovative solutions to real world or applied problems. And we do that by integrating people with technology, policy, culture, et cetera. So the idea is that we can identify a problem, design solutions with the relevant stakeholders and create interventions, technologies at times, and then evaluate them with the relevant stakeholders. So that's essentially who we are and what we do.

Scott Hanselman: Do you think that the personalities of people, and I'm pointing at myself, who get involved in technology sometimes just do tech because it's cool and forget that there's humans at the center and is there room to do it because it's just cool, like we're doing this tech because it's amazing, we should just do it versus human first and then having the human look for the solution?

Dr. Juan Gilber...: I think there's room for all the above, to be honest with you. Doing tech because it's cool, there's certain contexts where that makes perfect sense. I think there's other contexts where the human first and those tend to be places where tech can replace a person and take away a job or something. I think there's room for

all the above and you just got to evaluate it appropriately given the relevant context.

Scott Hanselman: So you bring up tech taking away a job, whether it be a robot and an automation of some kind in the early 1900s where we're creating assembly lines and arguably one could say making people more productive and others could say taking jobs away. We're at the beginning of this hockey stick graph of AI, and everyone is concerned that it's going to take jobs away, but the more positive people, the more optimistic are saying, "No, this will just take away toil. It'll take away the boring part of the job." Where do you see that tension resolving itself?

Dr. Juan Gilber...: Well, if anybody says they know, I'm going to say they really don't. This is too TBD to be determined. Do you have these technologies, specifically AI, that will be integrated into society in different areas? How will it integrate with people? How will that occur? It's just undecided. So it's hard to say how far it will go and what society will look like as a result of that. All we can say is for certain is it's going to change things, Our society's going to change as a result of this. To what extent I don't think anyone knows until it's actually implemented. Because what you'll see, a person has a vision for implementing AI in a certain context and then they do it and then it fails and they have to walk away from it. And that happens.

Scott Hanselman: One of the analogies that I use, and I'm interested in your analysis of this, is many, many years ago they cloned a sheep and it was on the news, and we all remember those of us of a certain age we're like, "Oh my goodness, they've cloned a sheep." And then there was a lot of discussion and there was a lot of government meetings, and then everyone decided, "We're not going to clone people. We might clone cells. We could use this for medical reasons, but we as a culture, we as a society are not making copies of humans." And we moved on with our lives. However, in a world of AI where things are open source, it's not as easy for us as a society to decide we're not going to use AI for thing, for whatever a thing is. It's limited really to what country or what continent or what organization wants to regulate it. Does that change your opinion that we can't all decide, "Oh, we're not doing generated movies. Nope, we're not doing deep fakes."

Dr. Juan Gilber...: You're absolutely right. And again, I say you don't know that it's going to work until it's been deployed. Let me give you an example of something. Look at facial recognition. It got very good and they said, "Well, we're going to use it in law enforcement. We could find the bad guys." All right, sounded like a good idea. It's going to work. But what did it do? It ended up using bias, creating disparities and who it actually identified and things like that, mistaken identities. You started to see that it wasn't as accurate identifying as people from certain demographics versus others. They didn't know that going in. And so I think we're going to have moments like that, meaning, "Ooh, AI would be so cool if we do this thing." And people are going to jump in and then they're going to learn that, "Ooh, this doesn't work." That's why I'm saying the verdict is out. It is

one thing to have the ability to do AI. It's another thing to actually deploy it and have it be successful.

Scott Hanselman: Yeah, it's really interesting also to think that the internet has flattened the earth in the sense of, so many of us think of the earth as having and the internet itself as having its own culture. And we mostly agree about stuff. And I was traveling in Korea last week and they have facial recognition and their TSA, their airport system was just buttery smooth. And I thought it was amazing. And I came back and I told my wife, it's so amazing. They're so high-tech, I didn't even have to talk to a person.

And the first thing I see in the newspaper is a letter from 14 senators saying facial recognition at airports is a bad idea and we shouldn't expand it. And I thought that was such an interesting thing because here I'm thinking "How convenient was this?" But then other people are saying, "Well, what did we lose?" And Korea and Europe and so many of these other countries that are using this technology think it's awesome, but it feels like we're at a moment where we want to pump the brakes, at least in the US on facial recognition, two different cultures having a dramatically different reaction to effectively the same technology.

Dr. Juan Gilber...: Absolutely. And we're going to see more of that. And that's why I'm saying you can't predict what the future's going to be like with AI. All we can do is hypothesize, but until it's actually deployed and evaluated, you just don't know.

Scott Hanselman: So you all are doing some research in one space with AI that I think is very interesting around hiring decisions, which has the opportunity to be somewhat controversial. We had a job recently that had hundreds of applicants and one could say, "Hey, we should probably get a computer involved because who can read 800 resumes?" But then to your point, bias inadvertently missing out on a great person because they didn't have the right keyword. How are you approaching AI within the context of hiring decisions?

Dr. Juan Gilber...: I created what's called Applications Quest, we call it AQ for short. I created this technology in response to the Supreme Court decisions on affirmative action in admissions and hiring decisions, the use of race and gender, national origin, etc. So the idea of using AI to read an application is not what I do. What I do is I take the application and process it after humans have read it, for example. So the AI I created does not read an essay or anything like that. What it does, it takes application data and it addresses what I call the capacity issue. So the Supreme Court and those folks, they all got this wrong. They thought this thing was about race, gender, national origin, et cetera. It's not, I can prove it because the first decision was in June of 2003 and we just had another one last year on this very issue, and it's not going to go away.

The reason is because they're addressing the wrong problem. The problem is a capacity issue. When you have more qualified applicants than available slots or

offers, by definition, you got to turn away someone who's qualified. Well, you turn away someone who's qualified and they know they're qualified and they're upset they didn't get it. They want to know why. Well, the easiest scapegoat is race, gender, national... So that's why we're here. You take those things away, they're just going to move on to the next thing. They're already talking about legacies. Then they're going to be talking about athletes, and it's just going to keep going until you address the capacity issue. So the AI I created addresses the capacity issue, and as a side effect, you get what I call holistic diversity, diversity across many different attributes, not just race, gender, etc. So that was the approach I've taken and that's the problem.

Scott Hanselman: The idea of holistic diversity is a really nice one. I love that that's an academic term that's much more sophisticated than what I've told my co-workers and friends, which is that tech should look like the mall. And you go to the mall and you see just this wave of America coming at you as you walk around in the mall and it's very natural roll the dice representative group of people. Now, when you say capacity, is the capacity of the academic system to accept people or the number of jobs available or the number of teachers available? What is the capacity that we are lacking?

Dr. Juan Gilber...: No, it's not we lack any. It's just limited. So University of Florida has a freshman class. We have a limit, a bound on how many people we can admit. There's a scholarship available, we only have 10 of those. Your organization is hiring, we only have two spots. There's the capacity. So if you only have two spots and you only have capacity, say to interview five people and you had a hundred applicants like you said, then you look at it and say, "Well, at 150 of them meet my minimum qualifications. Now I got to turn away 45, which 45?" So this AI can select which five or recommend the five in a way that is they're qualified and holistically diverse.

Scott Hanselman: ACM Bytecast is available on Apple Podcasts, Google, Podcasts, Podbean, Spotify, Stitcher, and TuneIn. If you're enjoying this episode, please do subscribe and leave us a review on your favorite platform. Very cool. Very cool. How do you decide as a lab, which projects to work on? Do you have a brainstorm or a eureka moment or maybe one of your TAs or one of your PhD students has an idea and then you all get together and vote on it?

Dr. Juan Gilber...: It's all the above to be honest. What happens is a lot of our ideas come from society. What's the issue? What do we care about? What are we motivated about? What do we want to address? So a lot of the ideas come from events. So I'll give you an example, a new project in the lab primarily. I walked in the lab one day and a group of my students were sitting around a table with sad faces. I said, "What's the matter?" They said, "Well, we're tired of seeing people get shot during routine traffic stops." I said, "Whoa, really? Okay, well me too. Let's do something about it." We went to the lab and we created a technology called Virtual Traffic Stop. So it just came about as a result of events.

Scott Hanselman: And this is an app that you can install. It's in the Apple App Store or Google Play. And are you learning, are you being trained how to be safe during a traffic stop or do you run it while you are in a traffic stop?

Dr. Juan Gilber...: So the way Virtual Traffic Stop works, here's a scenario. You get the app and you have to register and you put the car you're driving and all that stuff. So let's say you've done that, your information's in and the law enforcement officers pull you over and they have to have it too. So the idea is that when you get pulled over, you can open Virtual Traffic Stop and initiate the virtual traffic stop. So what is a virtual traffic stop? It is a video conference between you and the officer prior to them approaching the vehicle if they have to approach it at all. And you can have a third party of your choosing. So if you're a kid, your parent could come in. And the idea is this is a de-escalation tool whereby law enforcement and the drivers can have an ice-breaking moment where you can know who they are, what you're stopped for, what they're doing, what's in the car, all this information. So if they approached a vehicle, it's deescalated. They don't have the same unknowns and tensions.

Scott Hanselman: Wow, that is a really crazy idea. I love that. The idea also as a son, I have two sons, 16 and 18, and my 18-year-old had his first traffic stop going five miles over and describing the feeling of his heart pounding in his chest while the guy is sitting there in the car and he doesn't know what's happening and is he going to get out? Is he not going to get out? Being able to have a third person, an advocate, whoever, whether it be for a young person or someone who may have trouble communicating like a hard of hearing or a speech impaired driver.

Dr. Juan Gilber...: Exactly. And we designed it for that. If you are hard of hearing, speech impaired, you can actually specify that and instead of speaking, you can chat with the officer and, by the way, the whole thing is recorded. And once I process the video, it's made available through the app to you, at the same time, law enforcement gets it. So I created this technology in response to incidents. University of Florida police Department has the app. They're the only law enforcement division that have it right now. But people out there, you can get the app and look at it. The website has videos and if your law enforcement wants it, we can sign up, do pilots and check it out. It works.

Scott Hanselman: That's so interesting. Let me ask you this. When people are listening to podcasts or reading the news about stuff like this, in such a polarized time, they might say, "Oh, Applications Quest, that's too woke or Virtual Traffic Stop, that's not needed." Is that a failure of empathy perhaps on the part of the reader or the listener who's not seeing that, "Well, I don't need that, therefore it's not needed?"

Dr. Juan Gilber...: That's one way you could look at it, I think is just you got to reach people where they are. So like Virtual Traffic Stop. People ask questions, and I say, "This is giving cops safety." What most people don't know, cops during traffic stops, cops that are injured or killed. It's not so much that the drivers are shooting



them or injuring them. They get hit by cars. Virtual Traffic Stop, worst case minimizes the amount of time they're outside the car. And if you look at all the incidents that happen that went sour, they have one thing in common, all officers say the same thing, "I did not know." And there's something they didn't know that caused them to react the way they did. Well, with Virtual Traffic Stop, you can know. So it's keeping law enforcement safe as well.

Scott Hanselman: Yeah, that is a very thoughtful and very balanced way to do things. I appreciate that perspective.

Dr. Juan Gilber...: Let me pose the question this way. This is what I asked officers. There's a car you pulled over, the person legally has a firearm in the car. Wouldn't you like to know it rather than discover it?

Scott Hanselman: Yeah. They could literally tell you on FaceTime or effectively on a video call separated from each other and you're like, "Heads up." And they could even hold up their permit and you could scan it and you can do all of that from the safety of your car. And it's recorded on both sides.

Dr. Juan Gilber...: Exactly. Exactly. So from law enforcement, there's a lot of bonuses to this. There's safety, there's identifying this information, and I'm in Florida, I keep saying, "I'm taking bets. There's going to be a Florida man incident." Somebody's going to get pulled over, they're going to have a third party come in and the third party going to say, "Bob, you've been drinking again."

Scott Hanselman: Yeah. Getting that heads up of what am I getting into before I step out onto the shoulder? To your point, is super, super important. And that idea that came because some of your students said, "This is something that we're interested in exploring."

Dr. Juan Gilber...: Exactly. And a lot of our things are driven by news or incidents that affect them or their communities and things we care about. And so it's my perspective, do something about it.

Scott Hanselman: Speaking of doing something about it, some academics write papers, and I'm making a broad generalization here, but you seem to be one that you are compelled to create things and put them out there and make them available. Again, with no disrespect to our paper writing academic colleagues and friends, everything that you're doing has a very tactile, we made it, we shipped it, we created the code, and it is available. Did that happen on purpose?

Dr. Juan Gilber...: Absolutely. Yeah. That's by design. Again, the lab model change the world. We want to have impact and the things that we have expertise in is we understand the human condition, we understand people, we understand technology, then they learn policy and they understand culture. So if you look at those things and you say, "Well, here's a problem. What will be an intervention that could help? Even if it doesn't exist, what would that look like?" I mean, we created Virtual



Traffic Stop that didn't exist. We invented that. It is real, and we can do those things. In the future, in many years from now, I predict the Virtual Traffic Stop is going to be integrated into every car. It's just going to be in there.

Scott Hanselman: I tilted my head, but at the same time, I also have a GPS and dynamic maps and, and, and now I also have a pocket supercomputer. My children and I were looking at that meme that says, here's what you had in your pocket in the nineties, and it was like flashlights and cameras and video cameras and VHS tapes, and now you have your phone, and now we're on rolling computers effectively. So we are connected. We have cameras, we have full support with our pocket supercomputers. There's no reason that couldn't happen in a car.

Dr. Juan Gilber...: Yep. And it keeps people safe and both sides, and it documents the interaction. Yes, you're right. We invent and we translate and deploy, and we evaluate with relevant stakeholders in the relevant context that matters.

Scott Hanselman: So Applications Quest is happening right now. There's also things happening in the space of brain computer interfaces. We're also seeing some billionaires and some other people out there who have ideas around how to do brain computer interfaces. What's your thinking about how we're going to interface with our machines in the future?

Dr. Juan Gilber...: Yeah. The brain Computer interface or BCI, in 2015 here at the University of Florida, we held the world's first brain drone race. We race drones with our thoughts, so you can go to [braindrone.com](http://braindrone.com) and look at the video. Some people saw it and said, "Oh, that's fake. They didn't do that." But we did it for real. The reason we did it was, you're going to love this, the reason we did it because it was really cool to do. That was one reason, but the other reason we did it was to show that the BCI is legit. It can be used. And so what's the future? Again, this is one of those things, it's hard to say. We have some thoughts on where we think BCI could go, but we wanted to at least make it understood that it's a viable technology, that people can use it. Now I wanted to turn people loose on it to go out and play with it and experiment with it.

Scott Hanselman: Yeah. It's been something that people have been trying to crack for a very, very long time, particularly the non-invasive part. Some people say, "You got to go." Human beings are big meat bags under pressure, and I'm a type one diabetic and I have an open source artificial pancreas, and I have at least three holes in me from being poked by systems to get insulin in or to get data out. And some people say to do the brain computer interface, you got to poke the meat bag, get a needle into the brain. But if we can do it from the outside, whether it be, you could imagine an earpiece or something with just a single lead or a couple of leads, it could completely change how we interact with our systems. That plus AI, things start getting really, really interesting.

Dr. Juan Gilber...: One of my former students actually did her dissertation on creating a sexy BCI designing things that people would want to wear.

Scott Hanselman: Oh, I see.

Dr. Juan Gilber...: So we looked at all aspects of it. Yeah, there is [inaudible 00:28:46].

Scott Hanselman: Something fashionable that you would not be like, "This is a dork." Because there's a number of people out there who've been wearing helmets on campus, and that may not be something that's going to break into-

Dr. Juan Gilber...: Exactly. Exactly. So think about it for women with hair. So how do you incorporate a BCI? We did work on that.

Scott Hanselman: Very cool. It sounds like there's some amazing stuff happening at the Computing for Social Good Lab down there at the University of Florida.

Dr. Juan Gilber...: Yes, we think so.

Scott Hanselman: Fantastic. Well, thank you so much Dr. Juan Gilbert for chatting with us today.

Dr. Juan Gilber...: Thank you for having me.

Scott Hanselman: You can learn all about the great work that they're doing at [computingforsocialgood.com](https://computingforsocialgood.com). Explore the research, explore the people, and learn more about the work that they're doing at the lab. This has been another episode of Hanselminutes in association with the ACM ByteCast. We'll see you again next week. ACM ByteCast is a production of the Association for Computing Machinery's Practitioner Board. To learn more about ACM and its activities, visit [acm.org](https://acm.org). For more information about this and other episodes, please do visit our website at [learning.acm.org/bytecast](https://learning.acm.org/bytecast). That's B-Y-T-E-C-A-S-T, [learning.acm.org/bytecast](https://learning.acm.org/bytecast).