

Intro 00:00:01

Inventors and their inventions. Welcome to Radio Cade -- a podcast from the Cade Museum for Creativity and Invention in Gainesville, Florida. The museum is named after James Robert Cade, who invented Gatorade in 1965. My name is Richard Miles. We'll introduce you to inventors and the things that motivate them, we'll learn about their personal stories, how their inventions work and how their ideas get from the laboratory to the marketplace.

Richard Miles 00:00:37

Using artificial intelligence to help us lead longer and healthier lives. What does that mean and how does it work? Welcome to Radio Cade, I'm your host Richard Miles. Today, my guest is Susann Keohane, the IBM Watson Health Innovation Leader for Healthy Aging and Longevity, and a 2021 inductee into the Florida Inventor's Hall of Fame. Welcome to the show Susann, and congratulations.

Susann Keohane 00:00:59

Thank you.

Susann Keohane 00:01:00

So, I had the privilege of actually talking to you a few hours before you're going to be on stage receiving this big award. So, tell us, how does it feel? Do you have a big, a big speech plan? You ready to be a celebrity?

Susann Keohane 00:01:09

No, no, I'm not going to pull one of those Academy Awards where they talk to you long. I am just going to smile and say, thank you.

Richard Miles 00:01:14

So, you're not going to thank your parents?

Susann Keohane 00:01:16

I thank everyone. I'm so appreciative, and I was actually thinking about that on my way here. I mean, there's so many people throughout my life that got me on that stage and I'm very appreciative to all of them, but I don't think I'm going to stand up and give a long speech. So, I'll say thank you to everyone. I'm really excited. It's so fun. I kind of needed this kind of celebration.

Richard Miles 00:01:38

I think a lot of people do, you know, we're recording this as we're sort of hopefully coming out of COVID, but already two years now. And so, it's been, I think people want to get together and celebrate things. Yeah.

Susann Keohane 00:01:48

Yes. Yeah. And I'm really honored by this. Especially other inductees, stellar folks.

Richard Miles 00:01:55

Yes, me too. It's impressive reading their achievements.

Susann Keohane 00:01:57

I know, you kind of think, I'm not worthy, but.

Richard Miles 00:01:59

So, talking about achievements, Susann, reading a bit about what you have done, which includes getting 137 U.S. patents. I think I get the big picture, which is using artificial intelligence to make life better for aging populations. And then specifically, if I understand what I've read correctly, it's sort of using the internet of things, which I think most people are familiar with in which our toasters are smarter than we are, paired with motion sensors. So now my toaster, I guess, knows where I am and what I'm doing, but explain to us how does that technology help elderly people? And I'm wondering if you can put it in practical terms for people. For instance, I have aging parents, like my dad's 86 years old. He has COPD. He's had heart issues in the past. So, for someone like him, who's fairly typical of a lot of people that age, what exactly is what you're working on? How is it helping them?

Susann Keohane 00:02:45

So, I did several research projects a few years ago. And the idea was, could we understand humans in the wild, human behavior, and look for that pattern and behaviors, and they're called activities of daily living. Someone getting out of bed. Are they showering? Are they preparing food for themselves? Are they leaving their house or are people visiting them? All of these activities that are what you would expect from someone that is aging in place and aging in place well. So, the idea was in the past, you've always seen the necklace where it's like a panic button, if you've fallen. And they're very important devices, but we stepped back and said with all the technology emerging, can we start to detect these

human activities, these human behaviors, just from the things around the home. And what's so fascinating is even your electricity usage, your microwave pools a certain frequency and electricity.

Susann Keohane 00:03:49

Like, just all of these things, these signals really do tell the story of everyday life. So, in practical application, if you have, let's say, a bed sensor, one that can slide under the mattress, you won't even know it's there. The technology is incredible. It can take heart rate, heart rate variability, how deep of RPMs and how long you go into them for. Are you restless? Are you in bed? Are you out of bed? Are you in and out of bed? Are you in and out of bed in the middle of the night? All of these little signals could potentially say, is this normal, or are things changing, and maybe someone should check in on this person. So, the idea we were doing these large sensor deployments. Lots of data. So, these are a sampling at a really fast rate. So, lots of different data points on a 24-hour clock.

Susann Keohane 00:04:37

And that's where you had any of the machine learning to kind of process all of that data and then start to pick those patterns out and then try to associate the patterns to normal or abnormal behavior. And the idea is to start to do predictive care. When is the right time to intervene? When is it the right time to alert someone, to check in on someone? So, the projects we ran, we did at a care facility that had different levels of care. So, people that live completely independent have no services, they might move up to a new, new level of services where maybe someone comes in and cleans for them or helps them prepare food until they get to 24-hour nursing care. So, there's a lot of facilities. And when is it the right time to transition to that higher cost of care? Cause each one of these transitions can be quite expensive.

Susann Keohane 00:05:26

And if you don't transition at the right time, something catastrophic can happen. If you transition too early, it's expensive and you lose a little independence, right? If someone's coming in and into your environment all the time, not everyone wants that. And so, there's a, uh, lots of stats out there that say older adults want to age in place. They want to stay in their homes for as long as possible and not all of them, but majority of them. And if you think about it, if someone's been in their house for 50 years, they know their neighbors, they know their community, they know when they're moving about, they have all of these reference points. So, to kind of move out of that environment, as you get older, it's not for everyone. And so how can we help those people thrive in place, live their healthiest life longer and that whole remote sensing and can the environment kind of be aware of them and monitor them was the goal.

Richard Miles 00:06:22

Susann, that's fascinating. I mean, I eat this stuff up. So, the real breakthrough here is not necessarily the sensors themselves, right? Because that's not the high tech, it's the ability to tie multiple sources together and the analytics that go behind them and to detect a pattern it's unusual compared to some bases.

Susann Keohane 00:06:37

Yeah, and putting the right sensor in the right place is a breakthrough. How many sensors do you need to have accuracy, every little bit, even curating all of the raw data. And then if you have the IOT data in the home, could you start to look at the, the energy data I was mentioning earlier, can you start to pull in maybe health records? How do you pull that all in together? Each bit of the, each step of the way has its own challenges and problems, and it's a research question. So, it's really interesting. And you know, what's fascinating is there's lots of folks working on this. You see these smart homes in different universities. I was just at University of Florida yesterday. They're working on amazing sensors, new sensors that go on essentially, almost like a band-aid. And they're looking at ultrasound in order to deliver new kinds of therapy.

Susann Keohane 00:07:28

It has that stimulation and healing properties to it. It's amazing. There's so many avenues to invent in this space. And what I love about it is when you really step back, ultimately, and this is my patent portfolio is all about how can I make society a better place and how can I make a society, a place that I want to age in. I'm kind of selfishly inventing things for me in the future. And what's lovely about patents is they're documented. So, someone can read your patent and go, I think I can do it better. And they can come up with a different implementation, a new way to attack it. And that's a new invention.

Richard Miles 00:08:08

You anticipated my next question, which was, I imagine now with the development recently in smartphones, and then these devices at home in which you can measure everything from the way you sleep to the way you walk, basically, almost anything can be quantified that you do. I imagine you're at the beginning of this revolution of just abundant data. The problem now is really just sort what you need and what you don't need and what's noise and what is actually useful.

Susann Keohane 00:08:32

Yeah. So that's definitely one area that is being worked through. And as you were saying, you have all this information, but what does Gate mean? So, there's research that says a change, a gate, could potentially be early indication of cognitive impairment. So, if you think of a holistic body and I, and I think of Japan really leads to change in this about holistically looking at how your brain functions control your muscle function. So, something like Gate could actually mean something more and tying that all together and then having sensors that can detect that and kind of pull through to the end goal of

improving outcomes or early detection. And how could you deliver better therapy to potentially get ahead of that? I think that's really interesting, but I thought you also brought up a good point when you bring all this data together, there's a lot of noise, a lot of signals that have no value.

Susann Keohane 00:09:25

And I think the challenge also too, is if you talk to a care provider, it's almost like someone that works in the ICU. If you step in the ICU as a non-native to that environment, it's alerts everywhere, right? There's beeps and sounds. And, but someone that works there, they start tuning that out. So, you don't want to create alerts that are annoying. You want to like create the alert, that's the right time, the right level, and to help the person. There's so many challenges to this problem and we're starting to solve them, but there's always going to be room for improvement.

Susann Keohane 00:09:57

Right. I thought of an example of, I like on your research that you do, you always have sort of, not one but multiple sensors. I imagined sort of double-check so you don't just have one primary. And I thought of the example of the smartphone and how you mentioned the gate. And I noticed, I think it's apple, they'll tell you you're favoring your left foot or your right foot or whatever. Then the thought occurred to me that we have a little granddaughter she's two and a half she'll steal the iPhone and she runs around with it. And I go, well, anyone looking at this data right now thinks that I've had a stroke or I'm drunk, or there's something wrong with this guy because gate's way off. But in that case, you're assuming that the smartphone is with the target.

Susann Keohane 00:10:30

Yeah. So, what other data points could alert that it's not you, maybe your heart rate. I'm not sure what it is, but you're right. You kind of need the different signals to check. I have a funny story. Like one of the independent living homes, we were censoring, these people lived alone. No pets were allowed. We were deploying sensors and people come into their environment. So can we accurately track the person, see that another person comes in and not crossover on who's, who that's kind of one challenge, but there was a really weird pattern happening in one of the homes. And I was just so confused. I thought the sensors were kind of off, you know, a lot of garbage and it was by the sliding glass door. And I was like, it's just so odd. It's like up and down. And then by the sliding glass door, it wasn't just one sensor, it was checking. And when we were doing interviews, it turned out the person's had their daughter's dog come visit. So, he did like doggy daycare. So, he often had the dog come during the day. So, we were tracking the dog and the sensors were working, but we just didn't, we had no context cause we weren't using any cameras. People find cameras very intrusive, but there's new technology like LIDAR, which won't take an image. It's a different way to kind of see the movement.

Richard Miles 00:11:51

Right. It's not too intrusive. Sure.

Susann Keohane 00:11:53

Yeah. So, you would probably see that animal and then you would know, like I said, there's always going to be new sensors on the market. They're going to get even more sophisticated and you're right. You're hitting on some of the challenges of, of this space.

Richard Miles 00:12:05

Just quick and better. Susann let's zoom out a bit and talk about the effects of aging populations in entire countries or regions. And it's a well established fact that for instance, in Western Europe, you've had declining birth rates coming up on a half a century now. You're having the graying of populations in particular in Western Europe, Japan, and soon to be the United States and the rest of the world is not that far behind. What sort of issues are countries facing now with aging populations? And then how do you think implementing say what you're doing? How is that going to dress and help mitigate some of these problems of fewer workers, fewer home care workers, and then people getting older.

Susann Keohane 00:12:44

Yeah. You look at a country like Japan and one in every four people are over 65, twenty-five percent of their population. It's incredible. Right? So, countries like that are really leading the charge on what does it look like to have this many older adults in their population? Granted, the older adults today are not the older adults of tomorrow. And so, I do think people are healthier than they probably previously were at...

Richard Miles 00:13:09

60 is the new 40, right? At least I hope so.

Susann Keohane 00:13:12

Yes. Yes, me too. I was just looking at the demographic shifts. And what, I always think is so interesting countries that have younger populations somewhere like India or Brazil, they're aging too. They're a young population today, but I think the stat was between 2010 and projected to 2050 their people over 65 are going to increase by 250%. It's a global issue. So, it does beg the question, like how do we support an aging population? It's going to burden healthcare more. Our policies on insurance, transportation, like losing the ability to drive, is a major life transition. And we have such great technology. Autonomous vehicles are coming up, rideshare, but do people think of rideshare and older adults together? No. And do we advertise it to them? So, I really stepped back, and I love the big data. I'm an electrical engineering background. I'm getting a PhD in health research for aging and it's all qualitative.

Susann Keohane 00:14:18

And I think the question is what is the right technology? How do we get over the barriers and facilitators to adoption for older adults? And how do we get over this age of society? How do we start to say this technology is for you? I looked and did a systematic review of the research over the last year of COVID, the pandemic, older adults, and technology. And what's fascinating is I think we just leveled up a lot of people that were using technology, this older demographic, because of the necessity of having to, and what was fascinating in what I was reading and all these different studies, it was very purpose driven. They wanted to see their grandkids. They wanted to talk to their family and loved ones. They were going to figure it out. They are not going to let a year go by and not see their loved ones in practice.

Susann Keohane 00:15:10

So, they figured out Zoom, they figured out all of these different technologies. They're not going to unlearn what they learned. And then what's interesting is, it's like a steppingstone, right? So, then they discover Alexa. Yeah. Our YouTube, I can watch videos, do yoga through YouTube. I mean all the things that we might just think of every day, like it's kind of this whole new world. So how do we, as companies start realizing this is a demographic that we need to serve better and they're not homogeneous. Like everyone has a different opinion of technology at any age. Right. So how do we really tap into those folks that do want to learn that might need that real-time training someone might've showed them? And then they're like, gosh, what do I do now? I mean, we all do that, right? Like how did I do that before?

Susann Keohane 00:16:01

So how do we start to build more intuitive designed solutions for this population? And that's what I'm getting really excited about. I think the technology can solve any problem. I think you put brilliant brains on it, and we'll come up with great technology, but how do you get people to use it? How do you get them to adopt it? How do you get them comfortable with it? How do you make sure they understand it? Because there's the privacy and security aspects. Do you know what you're giving up the give for the get, and we're talking about older adults, but this is relevant to all of us. Right? And so, it goes back to you growing up in this world, I had to switch some technologies recently, and I was really frustrated, and I was like, I just want to use, well, always use. And I always have to tell myself I love emerging technologies, but I just kind of chuckle.

Susann Keohane 00:16:48

I'm like, I'm at the forefront of this. And I still don't want to change my ways. So, you could just imagine someone that's used to email, they just want their email the way it was in text messaging. If you don't have great dexterity, how does it work? Like if you can't see, I have glasses now, I need my readers. So, I think there's a lot more to be done. But overall, I really want us to make older adults feel like technology

is for them. Right. Right. And it's theirs to be used to, and it should be marketed, advertised and designed for everyone.

Richard Miles 00:17:21

And you make an excellent point, both on the willingness of people to learn, but then started the challenges. My mother-in-law who unfortunately passed away last September, never touched a computer. I think she was maybe 88 years old. And my wife said, let's get her an iPad. And I said, what? That's a crazy idea. She won't know how to use it. She'll be frustrated. And sure enough, she basically learned how to do very basic things. But there's once where she actually learned how to use it to order an Uber. But we had forgotten that we got her an iPad that didn't have cellular capability. It was just wireless. So, she orders an Uber. She goes to the hairdresser's and then I get a phone call from her. We're in Washington, DC. She's in Gainesville saying I can't get back. But miracles, miracles. I was able to call her an Uber from Washington DC, guide the Uber driver in, look for an older woman in front of a hair salon, and pick her up. So, the willingness was there, but it was too much for her.

Susann Keohane 00:18:09

Purpose driven. She was going to get my hair cut and done.

Richard Miles 00:18:12

But to try to explain to her like, well actually you have to try to get onto the wireless network at the salon. And here's the like, no way, I wasn't even gonna do that. So, I'd rather guide the Uber driver in and explain the walk to see her.

Susann Keohane 00:18:22

So, this goes back to public infrastructure, universal WIFI for everyone. I mean, even with the pandemic, when children were learning at home, they had to put mobile WIFI buses in certain communities. It should be universal. So, we got to level up our infrastructure for all of the inequality. And again, I'm focused on older adults, but this applies to a lot of people. And if you had that universal WIFI everywhere, she wouldn't have had that problem. Right. And it's hard to get on networks.

Richard Miles 00:18:52

No, it is, yeah. Even if you know what you're doing. Right.

Susann Keohane 00:18:53



I had the same problem. Like it took me like two tries. Yeah.

Richard Miles 00:18:57

So, Susann, I mentioned your background a little bit earlier and to wrap up, I wanted to know a little bit about you sort of pre-professional you, I know you're a graduate of University of Florida. Good thing. Go Gators.

Susann Keohane 00:19:07

I love Gators! Go Gators!

Richard Miles 00:19:09

But tell us a little bit about your life story. I know you're a Florida native, so why don't we start there? What were your parents doing in Florida? Why were you born in Florida?

Susann Keohane 00:19:15

Yeah, I'm the last of five children and the only one born in Florida. So, they moved down to Florida the year I was born and my dad actually worked for RCA and my mom was pretty busy running the household. It's five children. And then they kind of started their own business in Fort Myers together. I really enjoyed growing up in Southwest Florida. I was just telling my husband, I was like, you can take the girl out of Florida, but she can't take the Florida out of the girl. I just love being here. And it's so beautiful. When I come back, I just like, gosh, Florida is such a beautiful place. It's so lovely. So, I grew up in Southwest Florida and I tell this story a lot. My first field trip in third grade was to Thomas Edison's winter laboratory in Fort Myers, Florida.

Richard Miles 00:20:00

It's a great place.

Susann Keohane 00:20:01

It's a wonderful place. They are fantastic. I actually just, this past December worked with them and did a virtual session with some children who were working on innovation. And so, I got to talk with them and about their work and their innovation and they're going to compete in a contest. So that organization does wonderful works. So, I was part of that, third grade, I went to Thomas Edison's laboratory. I was like, oh God, you know, botany and all the cool stuff they were doing, they were working on the most efficient way to make rubber for Henry Ford's automobiles. So, there's a lot of rubber trees on that site.

And what I loved about it is I never thought of myself when I was there. I didn't see myself. I loved it. I thought it was fascinating. It wasn't until I started at IBM, when someone told me you can be an inventor. And I was like, I can be an inventor? Me? And then I was like, I know all about inventions. I grew up in Fort Myers. I've been at Thomas Edison's winter laboratory. And I always say this, like sometimes you've just got to tell people what's possible. And a simple conversation with one of my team leads, like let's do an invention. You can be an inventor. I was like, I can. Then I was unstoppable.

Susann Keohane 00:21:18

He kept going. I kept going. I love it. I called it my creative writing. I was just talking at UF, and someone was asking me like, how did you become so prolific? And I was like, I love problem solving. I love kind of creating and dreaming up new ways for the world to work. It was just fun. And I think when you can find something that you enjoy, and you have license to do it. So, I work at a great company that really fosters innovation. I think we're 29 years in a row of having the most patents than any other company. It's part of our culture. And I really thrived in that.

Richard Miles 00:21:53

Susann one last question. I usually ask guests to imagine they were, all of a sudden, had the opportunity to talk to their 20-year-old selves. And you've had a very distinguished career, but I imagine not every day was easy. Is there any advice that you would give to your younger self in particular about overcoming setbacks or maybe handling unexpected detours?

Susann Keohane 00:22:12

Yeah. So, when I tried to become an inventor, I reinvented a million different things. I just didn't understand how to know if something was novel or not novel. I could see the problems and it was resolving problems in the same way that other people had done it. So, it took me 30 tries before I actually had a submission into our patent process that they said we are going to file this. And if I was to go back to my former self, I say, good job, good way to keep at it because in that process, very frustrating, and I was just trying to figure it out, but I learned so much and now I think I can discern things really quickly. And sometimes part of that struggle is how you learn. Right. I'm a very hands-on learner, unfortunately. So, I think I have to kind of work through things in order to really understand it.

Richard Miles 00:23:04

So, you had to do that hard work of the 28th and the 29th time. And finally...

Susann Keohane 00:23:07

Yeah. Yeah. And so, I guess like Thomas Edison, it is his birthday today, by the way.

Richard Miles 00:23:13

Oh, wow, I didn't know that. I should.

Susann Keohane 00:23:16

And it's, what is it? National Inventor's Day on his birthday. He said, I...

Richard Miles 00:23:20

Didn't fail. I just found...

Susann Keohane 00:23:22

10,000 ways it didn't work. I didn't fail. I found 10,000 ways a day. I have lived that. I didn't feel like a lot of ways that didn't work are just rediscovered, how other people had done it before. So just that persistence. And I think that's what kind of made Thomas Edison, Thomas Edison. And I think that's what make inventors just have to be persistent and just stick with it. If it's a problem, especially a societal problem, please stick with it. Right? Like let's solve these problems. We need great brains to do that.

Richard Miles 00:23:55

Susann, that was a great words of wisdom. Congratulations again, on being inducted in the Hall of Fame. So, it was quite an honor. And thank you very much for coming on the show. Hope to have you back.

Susann Keohane 00:24:03

Thank you so much.

Outro 00:24:05

Radio Cade is produced by the Cade Museum for Creativity and Invention located in Gainesville, Florida. This podcast episode's host was James de Virgilio and Ellie Thom coordinates inventor interviews. Podcasts are recorded at Hardwood Soundstage and edited and mixed by Bob McPeek. The Radio Cade theme song was produced and performed by Tracy Collins and features violinist Jacob Lawson.