

Intro (00:00:01): Welcome to this limited series, exploring stories of innovation, patent protection and product commercialization in the state of Florida. This is James Di Virgilio, in the summer of 2022. I moderated a series about Florida innovation in partnership with the Cade museum, Florida house on Capitol hill and the Florida inventors hall of fame. I spoke with inspiring leaders, trailblazing the commercialization of transformative products across a variety of industries. Join us as we delve deeper into the process of bringing innovation into the public square.

James Di Virgilio (00:00:37): Thanks again for joining us today. And our guest today is Dr. Sylvia Wilson, Thomas. Uh, she has an extensive and wonderful bio. I'm gonna give you a little bit on her now, before she gets to tell us about herself. She is currently the vice president for research and president and CEO of the USF research foundation. She's a professor in electrical engineering, a senior member of the national academy of inventors and a fellow of the American Institute for medical and biological engineering. She's dedicated to STEM education serving as an advisor for the society of women, engineers, and national society of black engineers. A member of the board of directors for black girls code and a Florida Senate appointee to the Florida education fund board of directors. She's mentored well over 150 students and Dr. Sylvia Wilson Thomas leads, the advanced membrane and materials, bio and integration research lab at USF where she conducts research on diversity, equity and inclusion of underrepresented minorities and women. She's been recognized in local and national news and publications. Welcome to the program, Sylvia. We're super happy to have you.

Dr. Sylvia Wilson Thomas (00:01:46): Excellent. Thank you so much, James. Um, great to be here and I am very thankful for the Florida house, the Cade museum and Florida Inventors hall of fame for this concept and for bringing this initiative forward. So we can begin to talk more inclusive about innovation and as a nation, looking at it locally, regionally, specifically for the University of South Florida and how we move forward.

James Di Virgilio (00:02:19): Yeah, let's start, let's start right there. Obviously. So much of your life revolves around innovation. Why is innovation important to you?

Dr. Sylvia Wilson Thomas (00:02:27): Because it helps change lives. Innovation, if we, you know, think about it, it can have, and take on so many forms for so many different people in so many different walks of life. And so, for me, innovation is how I can help someone's quality of life become better. And for others, it, innovation may mean something else, but the things that we do in terms of our creativity, how it expands across products, how it expands across just the very simple things in life we have to, to harness that. And so for me, it it's all about how we can help society become better, how we can improve quality of life and then make a difference for future generations.

James Di Virgilio (00:03:28): Now directly at the USF research foundation. Uh, tell us a little bit about exactly how that's happening. I know you're, you're kind of working on what you just said there on a daily basis. What does that look like? What, what is the foundation able to do?

Dr. Sylvia Wilson Thomas (00:03:42): Wow, uh, huge question. Right? In, in terms of the University of South Florida and our research and innovation efforts, it is huge across some of those grand challenges that we're seeing as a nation. Whether, you know, we're looking at sustainability issues, we're looking at big data and data analytics and how it's applied to FinTech or healthcare. Um, you know, looking at our coastal, um, areas and the impact there looking at of course healthcare. So all of those particular grand challenges that we're dealing with as a people we're addressing at the University

of South Florida, through our research and through our innovation. And we encourage and promote that process by encouraging our student, our faculty, our independent researchers to be innovative. So, we want to nurture that creativity. And at the University of South Florida, we take that help support that creativity and move it through the process where we file patents and disclosures and look at licensing.

Dr. Sylvia Wilson Thomas (00:04:59): And then we move that into, um, the, the product phase and try and monetize and commercialize it. And then we also go even a step further and we encourage our students, our faculty to, you know, begin startup companies. And so through our research park and our innovation ecosystem, we can support all of that small business, you know, SBIRs the S TTRs. So they get the small business loans. Um, they establish their companies and then they can grow. Um, we can help nurture that, um, through that ecosystem and they can grow into, you know, the research park and then even grow beyond that, where they have their own building. And so it, it becomes again, a, a process and a system that, that we're encouraging and building and strengthening here at the university of south Florida. And so, and that does a lot for, for us in terms of, you know, how we're impacting community, our national reputation, um, what we're doing in terms of institutional excellence and strengthening the, the research infrastructure here at the University of South Florida, which is very critical in the state of Florida and the nation and internationally as well.

James Di Virgilio (00:06:25): Sure. So it's a start to finish, uh, support system, as you mentioned, early stage, middle stage, late stage, whatever the case may be. There's health provided, uh, to innovators.

Dr. Sylvia Wilson Thomas (00:06:37): Absolutely.

James Di Virgilio (00:06:38): Yeah. What does, what does an innovator look like? Sylvia? What, what do the innovators you're working with look like? Are there, are there commonalities? Are they all over the place? Like, what makes an innovator?

Dr. Sylvia Wilson Thomas (00:06:47): Close your eyes and whatever you can imagine, that's an innovator. So they're, and, and we want, you know, those who are, you know, K through 12 and, you know, the community partners, we work with the industry partners, we work with inclusive of our faculty staff and, and students to understand anyone can be an innovator. Um, anyone can, you know, look at their lives and apply what they know about their lives, the needs that they see in their lives. And they can be innovators. Um, you know, a lot of, you know, from the institutional or the academic standpoint, you know, in the lab. And I, people hear me say this all the time. We get that "aha" moment. Right. And we're in the lab and we're making these, these discoveries, you know, but one of the things I, I want to mention here is, you know, what's fueling our, our approach to make those discoveries and to be creative.

Dr. Sylvia Wilson Thomas (00:07:58): Um, you know, for me, some of my work is looking at, um, glucose sensing. Um, the reason for that is because, you know, members of my family specifically, my aunt has, you know, is diabetic and, you know, has other healthcare issues. And so in looking at that, I wanted to be a part of the solution. So, you know, we filed patents on glucose sensors, um, that were implantable because it was gonna make a difference in someone that I cared about. So a lot of our researchers are driven by that passion to actually impact people that they know. So when we talk about an innovator, again, close your eyes and it can, they can look like any and everything and, and be very creative in the things that we address.

James Di Virgilio (00:08:56): Is innovation, a culture that needs to be built. Does it exist on its own? How do, how do we foster that? What you just mentioned, how do we foster or nurture or encourage that spirit, or, or can we even impact that?

Dr. Sylvia Wilson Thomas (00:09:11): Well, I, I will say this James, that as a nation, as a country, we understand that we have to foster innovation. So that goes to the bipartisan innovation act, right? Uh, where industry, university, national labs, um, they're coming together. So we can talk about being competitive as a nation for innovation. And so, yes, we do have to nurture it, but there are still some challenges, right? Because there we talk about barriers. Jamie talked about barriers earlier. Well, there are some barriers that we do have to address, right? When it, when it comes to communities that are not exposed to, you know, what is innovation, how do we define innovation? So you have some communities that have not been exposed or are not been brought into the fold in terms of harnessing their, their creativity, harnessing what is going on in their communities that will also build innovation capacity across the United States.

Dr. Sylvia Wilson Thomas (00:10:28): And again, impacting those internationally. So yes, we have to continue to harness innovation. We have to continue to educate and support, nurture, encourage mentor, um, those who are in the innovation space and those who are outside of the innovation space and bring them into the fold to, again, lead to enhanced competitiveness for the United States, um, for addressing some of our societal challenges, you know, for instance, um, you know, there's a shortage of semiconductor chips. And so, you know, some of my experience has been in that, that realm as a manufacturing engineer in an R and D researcher for bell labs. And so when we talk about the shortage of semiconductor chips, that impacts multiple technologies and multiple, you know, industries. And so as a nation, we have to continue to drive that technology and be innovative of how we can address that particular challenge in some of those shortages. And so again, innovation can be defined in several different ways and we have to continue to be innovative, creative, and impactful and implement those innovations.

James Di Virgilio (00:11:57): All right, let's dive into something you had mentioned a few minutes ago. Imagine here, and you may be able to set a specific stage for us, a community that has not been exposed to innovation, or as you mentioned, maybe they don't really know or understand what they're capable of. What does it look like to go into a community like that and then fuel them, or give them the resources, or basically change the culture of you can problem solve these things you see in your community. You can do that. What does that look like?

Dr. Sylvia Wilson Thomas (00:12:30): It takes diff-- several, you know, from my point of view, it will take, um, several different avenues to do that. And the reason why I say that is because, you know, when we're embracing communities, it's really important that we understand what the needs are in the community. It's really important that we understand and have a conversation with the community in regards to what the, wants, needs, um, you know, resources, um, and, and what is actually available in that particular area. And so gaining understanding is one particular avenue. Another avenue is in fact, bringing in some of those resources, we have an entire world that's virtual, right? So you may have in some of those communities, they may not in fact be, have crossed that digital divide, right? So we also have to think about that, but you can have a, a virtual platform. Um, we can partner with national federal agencies to initiate programs that actually go into those areas and, and do things that are fun and integrative, and, you know, allow those communities to see what that space looks like.

Dr. Sylvia Wilson Thomas (00:14:08): In addition to that, you know, we can build programs that offer shared, right, royalties to those communities. So not only are we embracing them and engaging them in, in this innovation space, but we're also helping to infuse, you know, dollars into those communities to help sustain the innovation, to help sustain the creativity that may come out of a community organization that's working in that community. So there are several phases and several avenues that we would have to, to go through. And in order to, you know, have those conversations about innovation within those communities. And I, I think communities are eager and they're excited to be part of the conversation and they want to help and to offer solutions, um, to academia, to industry, to national labs, to governmental agencies, in terms of some of these grand challenges that we're dealing with as a nation.

James Di Virgilio (00:15:25): Now you yourself have multiple patents. Can you tell us a story or two, um, first, about something that was really difficult that you had to overcome as an innovator, and then, and then secondly, uh, maybe what you would consider to be one of your, one of your greatest successes when it comes to you yourself creating or innovating something.

Dr. Sylvia Wilson Thomas (00:15:47): What did I have to get over, huh? That's a big one. So the, the intimidation, right? The, the intimidation that what you are creating is, is not worthy of a patent. Um, the intimidation that, you know, the things that you are, are studying, and you're, you're putting into that, that effort or not going to stand the mustard. Um, but I tell my students and I encourage all of my classes, all of my colleagues in research, I was once told when in doubt, disclose. So don't even think about all of those other things, disclose and file the patent disclosure and the experts, right. Will review all of the patents, let you know where your, your thought process stands in terms of that, that patent process. But I think it's really critical that we don't deny the world, the brilliance that comes out of, you know, um, people's creativity and, and what they're doing, um, to make a difference.

Dr. Sylvia Wilson Thomas (00:17:13): And so, I mentioned earlier, um, you know, one of the patents that we have, we actually have several patents, um, toward the glucose sensor. And so I, I talked about my motivation, uh, for doing that and, you know, trying to understand, um, how we can make that technology better and how we can address some concerns that we're in that industry, in terms of the lifespan of glucose sensors, that technology has matured tremendously, um, for, for the industry. And there, you know, a couple of other innovations that we have that are visionary innovations. And, you know, one of them is, you know, if we talk about a hydroelectric system where you have this huge wheel, that's turned by water, right? Well, our vision was, and we have a patent on, on this process is to shrink that turbine into a mini notch turbine, where we have, um, that pattern where the application is to actually power implantable devices.

Dr. Sylvia Wilson Thomas (00:18:38): So we would implant that turbine into your body. It could be turned by any fluid flow or airflow in your body. And we would convert that mechanical energy into electrical energy to power say a pacemaker. Well, why is that important? Because when babies are implanted with pacemakers over the course of their life, they have to go through multiple operations, um, because of the battery lights. So how can we address that? How can we, you know, help in terms of their quality of life? Well, our mini notch turbine will help power those particular devices for several years beyond a battery life. And so it's those types of, of issues that I like to say. I continue to, to support in the office of research and innovation at the University of South Florida. And I continue to support through my research and into those types of activities, through innovation, where we're gonna change

the world where we're, we're gonna make life better for those, um, another innovation, um, that we have is, um, a water filtration, um, where we're working with, um, cactus mucilage and we're creating membranes using cactus mucilage, using nature, right?

Dr. Sylvia Wilson Thomas (00:20:18): And we, um, have a patent on a nanofiber membrane where you can use it to filter water. You can also use it for its, its medicinal properties in terms of wound heal, healing, um, tissue scaffolding. So not only when we talk about innovation and, and we talk about products, but those products could have multiple use and then you can have innovation, right? That is, um, licensed across trademarks and, and copyrights and, and licensing and, you know, data licensing. And so we also encourage those who are in the arts, right. To be creative about their innovation and how that can impact the world. And so it, it's, it's fun. Let's put it this way. It's a lot of fun because if, if you think about all of the things that, that we go through in life, and if you sit and you, you think about, oh, well, what is it that I can do to make that better for someone? You'd be surprised of all the things you can, you can actually come up with.

James Di Virgilio (00:21:30): Yeah. And that is one of the most beautiful things about innovation in general, as you mentioned, is that the large majority of people that get into it do not do it because they're thinking I wanna make a ton of money. They do it because they're passionate about solving a problem or improving a process or creating something that has not been created to solve a problem. Right. Uh, and that, and that is, I think, as you mentioned, really a beautiful thing about innovation in general, it doesn't prove the world faster than anything else can do it. Uh, and because you're right there solving the problem, you may see it first. Now, if you have any questions for Dr. Wilson Thomas, you can go ahead and put those in the chat. We'll take those in a few minutes. Uh, but in the meantime, I wanna ask you another couple of questions here. And Sylvia commercialization is often the hardest part of innovation. People have ideas. They may get some friends and family money. They may get a grant, but there tends to be this, this overwhelming sense of dread. I will never have enough money to be able to take my idea to market. So why do it, how do you help people overcome that kind of feeling of it just is too expensive. It's too hard. How do I raise money? I don't know what I'm doing. How do you help them overcome that challenge?

Dr. Sylvia Wilson Thomas (00:22:41): So we partner, um, you know, with those who are in the innovation space, um, our USF connect and incubator allows, again, startup companies to, uh, you know, go through their prototypes, to look at how they can market their products. Um, look at what it looks like to have IP for those products, right? So in those partnerships, we also engage those who are in the field of commercialization. So, you know, we talk with consultants, um, our national academy of inventors offers, workshops and seminars to talk about what, you know, our partnership would look like with an existing entity, right? Someone who's in that area, in that industry and a possible startup and how we can leverage that partnership for commercialization, um, you know, know, and also with our consultants and looking at the IP to see in which particular, um, area or sector, um, of the, of a market, right, that particular IP can have potential in terms of is commercialization. So there are several phases in which you have to go through. Um, and again, it is very difficult and it, it takes several years in terms of that maturity, in terms of, particularly if you have to go through say the FDA and, and, you know, get right, um, that, that clearance. And so we offer, again, uh, through our partners with our partners, the opportunity to be educated on that commercialization and, and how we can provide different resources to make that happen for say our startups for our faculty, um, students, and also our portfolio.

James Di Virgilio (00:24:55) Yeah. It's often said, and maybe too often said, or two cliché, but it's really true when it comes to innovation, right. Is that the journey of a thousand miles begins with just one step? Yeah. And I think as you mentioned, you take the step by have an idea I'm interested in something, you take step one. Then if you get to step two or step three, uh, then they meet you and then you say, well, here's what step four, five, and six look like, and then they meet someone else. And here's what seven, eight and nine looks like. And at the end of the day, you have a network of people that have taken these steps ahead of you that are able to work with you, as you mentioned, to take something. And that is, what's really neat about innovation is that it's, I've interviewed hundreds of innovators, uh, and not a single one of them as ever said, I did this by myself.

James Di Virgilio (00:25:39): Right, there was always a Legion of people and organizations that assisted them, and it did a community. It's a true community right. Of people. And of course, I know huge champion that across the board. I know you've talked a lot about it today. And I think that's something that obviously is, is one of the best things about joining the innovation community is it's really, it's a family of people working together to make the world better. And with that, I wanna ask a question here. Um, what do you enjoy most about working with the innovators specifically in the state of Florida? The state of Florida has a lot of different, you know, reputations across the country. It's been changing a lot in the past couple of years, but what about the state of Florida makes it a really great place for innovation?

Dr. Sylvia Wilson Thomas (00:26:21): The, and, and that's a huge question too, right? Because in the state of Florida, again, from the, um, state level to the local level, um, in turn, and also at the individual university level, we're promoting innovation throughout the state of Florida. Um, we are being recognized on the national level as a place to in fact, come to be innovative, um, just here in Tampa, right? We have an innovation district that is just booming in terms of new companies and them bringing their, their new innovation, um, to the Tampa bay region. And the University of South Florida is supporting that. And so that's happening across the, the state of Florida. And so we're supporting nurturing, um, mentoring that, that innovation. So at the national level, we can be recognized and be competitive with other states. Um, and, and being able to do that, the state of Florida through our board of governors is, is also supporting that innovation and how we move it forward.

James Di Virgilio (00:27:50): Specifically regarding, uh, patent of yours. The work you've mentioned multiple times today, with regards to the glucose research. The question here is, does that mean potentially that you'll be able to check your blood sugar on a device, maybe a cell phone, or an iWatch without clicking your fingers several times a day, or are you working on something maybe that's outside the scope of actually pulling the glucose level from the blood.

Dr. Sylvia Wilson Thomas (00:28:14): So if you look at some of the current technology to date, you can do that, right? So they have the glucose sensors that do continuous monitoring, and they can pass that to your cell phone, or you can collect that, that data. One of the specific issues that we were focused on was an implantable device. First of all, right? So again, you wouldn't have to con-- continue to prick or have the needle stuck in, in your arm. And then you would in fact, be able to continuously monitor your, your glu-- glucose level and, and the changes that you were seeing. And so we also were focused on power, the power capacity. And so, you know, that's getting into some of the, the technology of, of the device, but we were also focused on that as well.

James Di Virgilio (00:29:13): Makes sense. And as an electrical engineer, of course, there's many things that your brain might think of that me as more of a, a finance person may not think of, but I've, I've appreciated you explaining them and, and straightforward terms, uh, you know, when you start saying, oh, we, and then we make it smaller. That's, that's exactly that's yeah. That's quality and that's helpful. And when it comes to championing stem education, which I know is one of the, the forefronts of, of how you spend your time. Um, what's, what's the most rewarding thing about that because I'm imagining, maybe incorrectly, that sometimes you're, you're speaking to people that have never considered themselves a person who would be interested in science or technology, and then maybe by the end, as light bulb goes off, that it's something they can do. Yeah. Um, yeah. Just tell us a little bit about that.

Dr. Sylvia Wilson Thomas (00:30:00): So one of my passions, as you say, James is en-- encouraging, you know, younger generations to, to look at stem from a standpoint that through a stem education, it can, you know, the mindset that you, you actually develop in stem allows you to pursue any avenue, whether you wanna go to law school, whether do you want to go and get a PhD, if you wanna go to medical school, that stem education, in my perspective, gives you that discipline to pursue those particular areas. So a lot of my, my passion is encouraging, you know, young individuals to actually pursue those areas. And why is that important to me? Because if, and I go back again to creativity, if, if you go and you just expose them to the possibility of what they can do with the stem education, you know, their eyes light up. And it, it becomes really exciting because they realize the possibilities and they understand that, wow, I could really do this, or this is something that I, you know, I can use this to make a difference, um, in my life, in my family's life.

Dr. Sylvia Wilson Thomas (00:31:44): And so my passion, of course, you know, I, I've done a lot of work with young girls, right. Working with the girl Scouts, the girls collaborative, um, black girls code. And so, you know, one of the reasons for me really harnessing in on that is because of course I'm an African American female is obvious, right? And so one of the things that really spurred me to do stem was, you know, my father, the late Dr. Eddie Wilson and my mother, Verna Wilson, who still lives in, Itta Bena, Mississippi. And it was a very quaint small town in Mississippi. And so you talk about innovation, right? We were not necessarily exposed to what they call innovation today. Um, and so they encouraged me to pursue a career in engineering, you know, a few years ago, we won't say how many years ago Uhhuh, um, when it was not necessary well, when it was coming on the stage as being popular.

Dr. Sylvia Wilson Thomas (00:32:54): Right. And so I have, I have been so fulfilled by that career pursuit that I want others to experience that and be fulfilled by it and, you know, not be intimidated by it and, and understand that, you know, you can embrace it and, and, and you can use it to propel you into other careers. And so I continue on that mission and I continue to, you know, work with, um, you know, different entities like AMRoC, um, here in, in Tampa and encouraging their young inventors to just continue to be innovative in the things that they're doing. And so I think it's really important for all of us to do that, to, you know, reach back and touch someone, a, a group of, of young people that are just really eager to understand the world that we live in. They're eager to, um, make a difference. Um, of course they're a little bit different than we are, right? Because, uh, there, there are a lot of things that they have at their disposal that we didn't have. And so how do we use all of the technology that has been developed? Um, all of the virtual spaces that have been developed to allow them to contribute to innovation so that, that's gonna be really important. I'm gonna continue to strive to do that.

James Di Virgilio (00:34:35): Um, that's a wonderful mission and really, to, to be human is to create. And I think to your point,

Dr. Sylvia Wilson Thomas (00:34:40): I love that

James Di Virgilio (00:34:41): uh, sometimes we have to inspire that. I think, I think that's, that can be unfortunate because it really is, again, to be a human creating is something that comes natural to us is something we want to do. And you wanna foster that. You want people to know that they are capable of changing the world around them. Uh, they're capable of, of thinking of brilliant ideas. And oftentimes when you think of the idea, it seems too simple, and that's kind of how, you know, it's brilliant because others have not thought of it. And that's often what happens, but, uh, Sylvia, thank you so much for joining us today. It's been absolutely wonderful to have you. Of course, you can find Sylvia's contact information with a simple Google search. She's all over the internet. You can find many ways to contact her. Should you wanna reach out and get in touch? Uh, thanks again for the time today. It's been a fascinating discussion Sylvia. Thanks for, thanks for being with us.

Dr. Sylvia Wilson Thomas (00:35:27): Well, thank you, James. And I just want to say one last thing that it's all about purpose, right? So finding that purpose in your life and, and moving forward to, to seek that purpose.

James Di Virgilio (00:35:43): Well said. Liz, I'll turn it over to you.

Outro (00:35:49): Radio Cade is produced by the Cade museum for creativity and invention located in Gainesville, Florida. This episode is part of a virtual series conducted in partnership with the Florida house on Capitol hill and Florida inventors hall of fame. The Radio Cade theme song was produced and performed by Tracy Collins and features violinist Jacobson.