Hannah Nabi:	Hello, and welcome to the Research that Reaches Out podcast from Mercer University. I'm your host, Hannah Vann Nabi. Research that Reaches Out is an initiative at Mercer University in Macon, GA that was launched in 2015 as part of Mercer's Quality Enhancement Plan, or QEP. We work with faculty and students to help them integrate service and research to address real-world problems affecting our communities at the local, regional, national, and global levels.
	Today we are welcoming Dr. Laura Moody, an Associate Professor of Industrial Engineering and Industrial Management at Mercer University. She earned her Bachelor's, Master's and Ph.D., all in engineering, from Georgia Tech and has been teaching at Mercer for 32 years. In addition to teaching courses in human factors, ergonomics, project management, systems engineering, and a host of other areas, Dr. Moody has also consulted in human systems integration for the US Navy and, for a time, led the North American Usability Group for Whirlpool Corporation.
	Dr. Moody was the PI on one of seven faculty project selected for the 2019 Summer Student Research Program, a summer undergraduate research cohort experience that's supported by our office, Research that Reaches Out The program provides supports for undergraduate faculty and up to two undergraduate research assistants to conduct full-time service-research for 10 weeks on the Macon campus during the summer term. Dr. Moody trained and mentored two undergraduate research assistants, Thomas and Rachel, as they conducted research into push button strength for senior adults. Dr. Moody, thank you so much for talking with me today.
Laura Moody:	Thank you for having me, Hannah.
Hannah Nabi:	So before we talk about your project and your work with undergraduate research students, let's talk first about terminology. So you are a human factors engineer. What exactly does that mean?
Laura Moody:	Well, human factors engineering is essentially – not to sound too grandiose about it – designing anything that a human interacts with. It's actually a fairly broad field. It draws on a lot of different fields – psychology, mechanics, ethnography – and the idea is that anything from the size of a handle on a tool to the design of a cockpit for an airplane, that's got human factors all over it.
Hannah Nabi:	That's really interesting that you get to pull in all of those different disciplines. How did you get interested?
Laura Moody:	Well, I started out as, well I won't go into the all of the permutations and combinations, but I was an electrical engineering student at Georgia Tech, and I was working as a technician in a rehabilitation engineering lab on campus and

then at the VA hospital. And we were designing devices for people with disabilities, and I discovered in the course of a couple of years of working part-time there that I was a semi-competent electrical engineer in terms of designing circuits and such, but that I really, really was good at working with our clients and the people that were going to come in and test out our equipment and everything. So my boss looked at me and he said, you know, you really need to go back to school and become a human factors engineer. And so I did.

Hannah Nabi: One other term that's going to be important for us to understand as you talk about your research is universal design. Can you explain what that is?

Laura Moody: Sure. Universal design. I'm pretty sure you've heard of designing for accessibility, you know, the Americans with Disabilities Act. The idea being to try to make something so that somebody who's got a physical disability can use it. Well universal design sort of takes that one step further and it says that, if you just start out designing something for a diverse population, whether it's older people or people with various disabilities, then you make whatever you design better for everybody. Best example of that, and it wasn't known as universal design when it happened, but the, uh, the guy that developed the OXO Good Grips, you know the big fat vegetable peelers, kitchen gadgets. Well, that's a guy by the name of Sam Farber and what happened was his wife loved to cook, and she developed arthritis and she was a having a hard time using the vegetable peeler because it was the narrow hard handle and it was painful. And so he designed this, basically for her, so that it was something she could use and from that came an entire range of products designed. It started off so somebody with arthritis could use it but made for much more comfortable, more usable products for everybody else.

Hannah Nabi: Thank you. That was a very helpful explanation. So now tell us a little bit about your research. What is the real world problem that you're addressing? Why is it important? And how does it affect us>

Laura Moody: Basically what we were doing last summer – and what I've been working with an engineering scholar on for the past couple of years – is the beginning of trying to develop some specific design guidance with a diverse population in mind. So what we were looking at was, if you're older and then eventually, if you have certain medical conditions, what effect does the age, physical condition, specific medical conditions – for instance, arthritis or neuropathy – what effect does that have on the strength with which you can push a button? And you know, that's a very, very specific factor, but it's one of several factors that would go into what makes something usable for somebody as they get older, or perhaps have different physical disabilities throughout their lives. So we did, took data on the push strength. And then we also supplemented it with beginning to try to understand what other factors go into making something usable to somebody as they, again, as they get older.

Hannah Nabi:	And pretty much everything we use has buttons, these days, so it seems like that would be something that would impact pretty much every aspect of somebody's life. So one of the things I'm really interested in hearing about from you is how you work with undergraduate students as researchers. So I know you have a long track record of working with undergrads on research. Why do you choose to include them on your projects?
Laura Moody:	Short answer – it's more fun. Well, I guess one of the things – undergraduates have not developed any kind of biases towards what they ought to be able to do or how they ought to do design work, so they're open to new avenues of inquiry. They are eager to learn research techniques, they have some insights and questions. They ask questions I wouldn't have thought of to ask because they haven't done it before. So assumptions I might make, an undergraduate student might not make. And at Mercer it's actually, in the School of Engineering, since our students are in, are getting a Bachelor of Science in Engineering with specific specializations, they spend a lot of time in classes with other engineers from other disciplines. So, you know, I've had students come in and say, you know what, my buddy in mechanical engineering, when they're looking at, you know, the strength of the material, this is how they might do it. This is a technique. they use. My engineering scholar actually, his partner was a mechanical engineer, so the two of them together developed this research study that we used last summer that was based both on the human factor side of it, but also using some mechanical engineering as well. So kind of bringing all of those things together was, made it a lot more fun and gave us some ideas that we didn't have before.
Hannah Nabi:	I imagine that working with undergrads requires a lot of hands-on supervision because they're pretty early in their professional learning. Where do you choose to invest your time when you're training your research students? And how do you balance the priorities of their learning and development with the research outcomes for the project?
Laura Moody:	The time that I spend, I kind of like to do an awful lot or as much as I can beforehand, pulling together some resources for the students. Last summer, the first week or two of the summer, Thomas and Rachel just read papers, pulled out pieces that made sense, whether it was facts, knowledge that would inform what we expected to see from the study, or techniques that were used that we might consider. And so what I would do is, we would get started in the morning together and kind of, here's our goal for the day. Then I would go back to my office and I would do my part of it, and I would leave them. And you know, for the first several days, when I would come back sort of in the afternoon, that'd be the next time I saw them – I peeked in every once in a while – but I would, you know, it was kind of almost like trying to get them to "Yep, go ahead, tell me what you think. That's okay." But it didn't take too long before they would be coming to my office and say "Here, you know, we were reading this and we think we can do this." So we would just start to talk about

ideas that they had, and I think they got as much out of building their own ideas and bouncing them off of me than me trying to tell them what they needed to learn about something. So, you know, in some ways, it took more time than if, you know, I was working with a team of professionals and we knew exactly how to run this study. But in other ways I think we developed a better study because of it.

Hannah Nabi: What were some of the unintended outcomes for your students and their professional or personal growth?

Laura Moody: One of the students actually said this. I think it was Thomas said the main one was – I think it came from that whole build your own ideas – a level of confidence that he could figure some things out. There's a certain amount of trial and error whenever you're doing research. You think you know what it is you're looking for, but that's not showing up. And so you look at what you've got and try to figure out what you're seeing. So I think that one was a big one. And then they learn some, sort of non-engineering soft skills, because they were working with people doing usability work. In terms of, you know, how do we explain what we're doing to somebody who is not an engineer and doesn't know what it is we're trying to get them to do. How do we gently guide the participant in the study. From something as simple as when we say push as hard as you can, that doesn't mean lean your whole body into it. Just push it as hard as you can and, you know, again, they got very, very good at very gently, saying, "Oh, that was lovely. Now can you do it without moving?" So I think they picked up both of those very well.

Hannah Nabi: So you've talked a little bit about the kinds of things, you know, you've mentioned that they interact with people. Tell us what what the data collection looked like. What did they do? What kinds of activities did they observe? How did you recruit?

Laura Moody: Well, we worked with our partner at Carlyle Place, and they were wonderful to work with. And we decided how many people we, logistically, could study. And the Carlyle Place director did a fine job of of getting the people Then when we actually did this study, the students, there's two parts of the study, the one part was to take the measurements of the strength, and they essentially ran that. I sat to the side because it was a fairly routine, you know, do this, do that, take the measurements and that sort of thing. And you know, they developed a good rapport. Just sort of as an aside, if you're working with older people, then polite and eager young people are the best way to get those folks to open up because they just, they love it when young people come to visit. So they did that. And then we sat down together and we did, essentially, I won't go into the details, but we brought in a variety of different products, you know, just normal household items that people would use – clock radios and can openers and, you know, that sort of thing. And we led them through a series of questions and an exploration of what makes something usable. And so that was a much

more open ended interview, and so I tended to lead those. But as that went along, Thomas and Rachel got much more comfortable, I think, and would ask their own questions along the way. So as time went on, I would, we had already decided they were in charge of the strength part and I was in charge of the usability part, but in fact they were participating in the whole study, and it worked very well.

Hannah Nabi: With, you know, with what we call service-research at Mercer under Research that Reaches Out, oftentimes that involves working directly with a community partner, which you did. Is this something that you typically do, working with a community partner when you're doing research and other projects, or was it a fairly new experience?

Laura Moody: I have worked over the years often with various members of the community. We worked with Disability Connections – Tom Glennon introduced me to them – and had several, you know, design term projects in my human factors class with them. And so we would have people come to us with specific design needs so students would get a chance to work with outside entities, you know, community partners, to design and build things or make recommendations, specific recommendations. But I think this is the first time we ever developed a study of this nature with a community partner.

Hannah Nabi: How do you think working with the community partner affects the student learning experience?

Laura Moody: I think what it adds is that, well, I think it adds two parts to it. One is sort of the recognition that what you are doing is more than just an exercise, you know, a classroom exercise. That this is actually meant to affect someone else, either now or downstream. As I said before, it gave them I think a little bit of confidence that they could work with people and do that well, but also the idea, you know, again, more sort of a soft skill, but planning and dealing with unforeseen circumstances. There was one time when we had to get moved to a much smaller room, and I left it up to them to figure out how they were going to set it up so that they could take their measurements. They, you know, had this big activity room to begin with and so they were over here and I was over there. Now we were in a little conference room and where, where are people gonna stand so, you know, all of those kinds of things that you don't normally get just, again, from a classroom exercise.

Hannah Nabi: So as we close, I'd like you to leave us with any final thoughts you have on why this research that you work on, on measuring push button strength in senior adults, why is that work Research that Reaches Out?

Laura Moody: To me, it's Research that Reaches Out kind of in both directions because we are reaching out to the community to get the information that we need. We're asking them to help us understand them better. And then the ultimate goal of

	it is then to reach back to the community with some specific design recommendations that will ultimately result in better products for them to use.
Hannah Nabi:	Well, Dr. Moody, thank you very much for talking with us today. It's been a pleasure.
Laura Moody:	Well, thank you, Hannah. This was fun.
Hannah Nabi:	And thank you to our listeners for tuning in to this episode of the Research that Reaches Out Podcast at Mercer University. You can check us out on our website at QEP.mercer.edu and subscribe to our show at SoundCloud.com