# Health and Human Science Matters Season 2, Episode 6: Patti Davies

Patti Davies: So it's been interesting because occupational therapy is a very functional intervention and the type of research I do is more basic. Matter of fact, at the first research day we had, I had a poster and I won the award for basic research.

Avery Martin: Welcome to Health and Human Science Matters, a podcast by Colorado State University's College of Health and Human Sciences. I'm your co-host and digital media strategist, Avery Martin.

Matt Hickey: And I'm Matt Hickey, Associate Dean for Research and Graduate Studies. In our college, we make at our mission to optimize human health and wellbeing through discovery and innovation. Don't just take our word for it.

Each episode we sit down with people who fulfill that mission, our college faculty and staff, and today we're lucky enough to have a friend and colleague Patti Davies from Occupational Therapy. Patti, welcome.

Patti Davies: Thank you.

Matt Hickey: We're delighted we could spend some time with you and take the opportunity to get to know you a little bit better. As we were talking about in our, sort of, pre on the air, we want to get to know Patti the person and Patti the scholar, a little bit of both. And so, we'll... This little winding road of questions to both ends. But we want to start with big picture things. So, in terms of your scholarship, big problems that you're working on and the impact that you hope the work might have.

Patti Davies: Okay.

Matt Hickey: That's where we'd like to begin.

Patti Davies: Great. Well, I think I'm going to start with the large picture and that really is looking at why people with disabilities aren't able to function in everyday activities. I am mostly interested in children. So children with neurodevelopmental disorders like autism and sensory processing disorders, ADHD, and really trying to understand why they have difficulties dressing, going to school, playing, talking. And so that's the big picture of where I have begun.

Matt Hickey: Great. Now I might dovetail on conversations we had just a moment ago. You just submitted an R01.

Patti Davies: Right.

Matt Hickey: And so talk to us a little bit about what that entails. This is hot off the presses kind of stuff.

Patti Davies: Well, so yes, I lived and died by three weeks of writing and more than that, but yes, trying to get to the finish line with that. That particular project is to NIH and it is for the area of, they call it now, music and medicine.

Matt Hickey: Yes.

Patti Davies: They had a call about three years ago that we submitted to, which was music and the brain. I am not a music specialist. I enjoyed playing piano and flute and those kinds of things, but I am not a musician. But our lab is now located over in the music therapy suite. We moved there a couple years ago. Space came open over there and we were needing to move out of the location we were in. And we've been collaborating with both Dr. Michael Tout, who is now in Toronto, and Dr. Blythe LaGasse over in music therapy. They also are very interested in understanding how music experiences and beat and rhythm help people in particular with motor activities. So they may play music, or just even a beat, and they find people with Parkinson's disease have a better gate when they have the music. And our particular music therapy department over here is really interested in the neuroscience of that, where my background is.

Matt Hickey: So you bring the brains.

Patti Davies: So I bring the brains. Very good. As one may say.

So my area of research is really looking at brain activity, brain processing. And so, I've been working with their department for over nine years and this was just a really nice collaboration. And now that we're there, our R01 that we submitted is really looking at entrainment and that's where you have a beat and you tap along with that beat. And we're trying to find the neural mechanisms that help that synchronization happen in the brain.

Matt Hickey: That's cool.

Avery Martin: Fascinating.

Matt Hickey: Yeah, it's an area I don't excel in. I'm not a musician either, for what it's worth. I appreciate the skill in others. That's for sure.

Avery Martin: Yes.

Patti Davies: So, one thing I can share is, so our lab used to be in Gifford building across campus and it was a very academic building. So you go in and it's quiet, there may be a few classrooms. I walk into the University Center for the Arts, I hear pianos, I hear singing, and it just really has changed my outlook in going to do my research when you can have the music. But I can say, at the beginning of the semester, sometimes it's not always sounding quite so fine tuned as it is.

Matt Hickey: They're polishing their skills.

Avery Martin: You hear the progression.

Patti Davies: But it has given me a new outlook with my research is being in a new location like that.

Matt Hickey: That's a neat observation.

Avery Martin: That's awesome.

Matt Hickey: I can remember when Mike was on campus right over in what's now, the Tilt building, I think is where music therapy used to be many-

Avery Martin: Oh.

Matt Hickey: Shows you how old I am, right?

Patti Davies: Right.

Matt Hickey: Back in the good old days. So yeah, that's fun.

So, Patti, talk to us about your journey. How did you get here? And this can involve family memories and we're certainly going to press you on sort of educational touchstones and mentors, but talk to us a little bit about how you got to be Doctor Patti.

Patti Davies: Well, that was a long road, let me tell you.

But yeah, so I grew up in eastern Colorado, on a ranch, near a small town called Deer Trail. Some people don't even hear about it. It's along I-70.

Matt Hickey: And when you say near a small town, that just tells you how rural we're talking about here.

Patti Davies: Yes, yes. So my closest neighbors growing up were, if you fly like a crow, at least a mile. But, by road, it was really a couple three miles. We were about five miles out of town. So my dad tells the stories. They homesteaded there, he and his parents, and he would ride a horse to school sometimes. So, I'd never had to do that. So we were pretty far out and I'm the youngest of four. But one thing I really appreciate about my upbringing was, being raised on a ranch, I learned about responsibility and hard work.

Matt Hickey: Indeed.

Patti Davies: And we had fun too, but I really credit my parents and my upbringing that's allowed me to take the journey I have through Academia because it is hard work.

Matt Hickey: Can you talk about early memories that kind of shaped your educational trajectory?

Patti Davies: I always have enjoyed children, so I babysat a lot. And some of our neighbors, they would come pick me up before I could drive and, again, it was two miles to their house or whatever. But I did quite a bit of babysitting and I just enjoyed working with children. And so I thought that I might want to be clinical psychologists that worked with children with disabilities in our rural community. And when I was there, we really didn't have any supports for children that had disabilities and that kind of thing. So there wasn't a lot of healthcare or special education and that kind of thing. And so I saw that as a need. And so I came to Colorado State University for my undergraduate, started in psychology. Psychology really, it has evolved, but when I came to CSU, it really was thinking about mental aspects and they worked with children with disabilities, but not a lot from a medical standpoint meaning that it was a lot of mental health and those kinds of things.

And so I didn't know about occupational therapy, but when I was in my sophomore year, I was thinking to be a clinical psychologist at that point. It's like eight years and I thought, "I want to work with children before eight years." And so I found occupational therapy and what I really liked about occupational therapy at that time was it was a combination of mental health and medical aspects of a person. And one of the courses that I took was neuroanatomy and gross anatomy. And I really liked that aspect was learning more about the body and the brain and psychology didn't really. That was not a requirement for psychology. So it was a nice way and I could be an occupational therapist in four years instead of eight years. So at that point that was desirable for me. So I ended up graduating and I was an occupational therapist for eight years, nine years with a bachelor's degree, before I even really thought about research and that kind of thing.

Avery Martin: Cool.

Matt Hickey: Wow. So you're out working as an OT professional, and it sounded like from your discussion just a few moments ago that the seeds of graduate school probably emerged more as a professional than when you were an undergraduate. Wonder if you can talk a little bit about, and it may not have been a moment in a very discreet sense, but that nascent idea if I want to go back and get an advanced degree.

Patti Davies: So yes, working with the children, where I was working most of the time in that eight years was at a residential facility for children with disabilities. It was called the Institute of Logopedics and Logo is like word meaning, so all of the children there had language difficulties. Now it's called Heartsprings in Wichita, Kansas and it was a really great, great experience being in occupational therapy in that setting. And we had a school and we had cottages where some of the children lived and it was a family style. So they didn't live in dorms, it was more they had caregivers in the home that lived with them, so it was a nice kind of setting. So we had school, and we could work with the kids in their cottages, playground, there was like a lunchroom. So there were a lot of opportunities to work with the kids, the children, in situations where they have to do their everyday activities.

And we also had a chief medical physician on staff and some nurses so it was a large operation. And we had psychologists and speech pathologists, so it was the whole health profession. And it wasn't the only time this had happened, but I had both the physician and the psychologist say, "Well, how do you know what you do as an OT really makes a difference in the child's life?" And at that point, we really had no research, no evidence. Now, evidence-based practice is a buzzword; but then, we had really no evidence, just theories. And so, I took that to heart and how do we know? And realized that our profession at that point was pretty young and we didn't have evidence. And I thought, "Well, I want to do that."

Matt Hickey: Cool.

Patti Davies: Yeah.

Matt Hickey: Yeah. So the hunt for where to do that then, no doubt, ensued, right? So.

Patti Davies: Yes. So I actually conducted a research project, so a clinical research project, while I was at the Institute of Logopedics and I had moved up from a staff occupational therapist to a supervisor position overseeing OT and occupational therapy, physical therapy, parent infant program, a whole bunch of different health profession programs. And we were having some financial difficulties, the facility or the agency, and so they said, "Well, we need to reduce your staff." And I said, "Well, there's no evidence... To reduce the staff, we would have to see more than one person at a time. We'd have to do some group therapy and there's no evidence that says that's as effective as working with someone individual." And I challenged the CEO and said, "We can do it, but I don't know if it'll be as good." And he said, "Well, give me a proposal. How would you look at this?"

Matt Hickey: Hot dog.

Patti Davies: So we lost no staff, he gave me resources, and we did a year study. We even got to hire an external person to do assessments and stuff, and we did group therapy, and we did individual therapy and compared them.

Matt Hickey: Son of a gun.

Patti Davies: And so that was a lot of fun. And we got to the data, I was working with the research division and there were two people in the research division I was working with, and we got to data analysis and they didn't agree on how to do it. And of course, having a bachelor's degree, I didn't know. And I said, "I am going to do something about this. I never want to be in the position where I can't make a decision." And so statistics became an important... Being able to do my own research was important.

Matt Hickey: Cool.

So, you ultimately took that into a doctoral program somewhere. So again, tell us about where and with whom.

Patti Davies: Yeah.

So I was interested in developmental psychology and neuroscience and it just really depended, I think, on a program that I could find that might allow both of those kinds of knowledge and I ended up going to the University of Wyoming. They had a developmental psychology program and a neuroscience program. And so I was accepted into the psychology department, but also many of those faculty were in the interdisciplinary neuroscience program. So I got to do both there.

The department head was a statistician and the course were phenomenal and so I credit him. I learned so much and he taught me about variance and how to account for variance in my research and so that was important. And then, more neuroanatomy and knowledge that I could gain about the brain, which I was really interested in.

Matt Hickey: That's great.

So this is presumably where this sense of, "I think I want to be an academic" started to take shape in some way, shape or form, right? Now, postdoc, early career moves.

Patti Davies: So again, this has been a few years ago and there were not very many occupational therapists who got PhDs. And so, getting a position in an occupational therapy department within a university, you didn't have to have postdocs. Now, our profession has changed and we have advanced so many times, we have to. But I was fortunate I was able to go right from my PhD into a faculty position and I was fortunate that within two years, a couple years, I was applying for mentored grants like a K01, we call it, with NIH and that gives me time to do my research.

So I got to do a postdoc, really, as a faculty member with a K01. And so, that worked out really well and what that was all about was, in the neuroscience program at CSU, I learned electrophysiology, and made electrodes, and worked with electrodes in animals, but I didn't have the opportunity to do any imaging with humans. And so that's what the K01 was, was to give me some experience with neuro imaging.

Matt Hickey: That's cool. And where was that, remind? I'm trying to picture your CV. I've seen it more than once.

Patti Davies: SUNY at Buffalo.

Matt Hickey: Yes, that's what I was recollecting.

Patti Davies: Moving from Colorado, Wichita, Wyoming. So kind of the sun, rocky mountain... Well, Wichita is really kind of plains Midwest, but it's close to the mountains. Moving from here to Buffalo was not something I was necessarily looking forward to. Growing up with the sun and knowing that Buffalo gets a lot of snow and I heard on NPR that there's not even enough sunshine in Buffalo to grow tomatoes without grow lights. And I thought like, "Oh, my. This is going to be..."

Avery Martin: Not what you're used to.

Patti Davies: A challenge.

But it was a good university, it was a good program. And I thought, "I can do anything for five or six years." So I was there for six years.

Matt Hickey: And then we managed to bait the hook and recruit you back to your alma mater.

Patti Davies: Yes.

Matt Hickey: And how did we pull that off? How were we lucky enough to get Patti to come join us?

Patti Davies: Well, so I always felt, of course a little biased, but CSU has always had a very good occupational therapy program and it's been in the top 10 of the country for a long time. And so I thought, "Well, it's a very good program, but people don't retire from here very quickly and it's competitive to get a position here." So I thought, "Well, I can always hope." Well, I got the K01 five year grant and because I had a grant that paid a lot of my salary, it gave me leverage. And so, a position came open and I applied for it. So I felt lucky that something opened up and I was able to come back to CSU.

Matt Hickey: Well, the feelings are mutual, for sure.

Now, if I may, when did you start?

Patti Davies: 2000.

Matt Hickey: So, if it's any consolation, I got you beat by a couple of years.

Patti Davies: I know.

Matt Hickey: Yeah. But we're of that same basic cohort, right?

Patti Davies: Yeah.

Matt Hickey: A year or two ago, as they say. Good. So, talk to us a little bit about life in the Davies Lab, your group, and feel free to name names. Who are you working with at the moment? One of the things that, everybody laughs when I ask it, is the day in the life, as if there's a sort of a typical day. But talk to us a little bit about what a representative day might look like.

Patti Davies: So my close colleague, Dr. Bill Gavin, he's been working in the lab for about 18 years. So not full-time, but he has a lot of background with statistics, and electronics, and building. He had a lot of experience with computers. So there were some skills he brought to the lab that helped me because then I didn't have to necessarily learn the computer programming to write the code to get the analysis we needed. So he's been very instrumental in those kinds of things. And then, of course I mentioned Dr. Blythe LaGasse, who's in music therapy.

Four years ago, CSU hired Dr. Jacqueline Stevens who is an occupational therapist and she kind of followed me because she's an OT, but was interested in neuroscience and neuro imaging. And so she would watch, come to AOTA, and write "Dr. Davies, can I meet with you?" So she kind of followed me for about 10 years and kept trying to connect with me. Well, she graduated with a degree in neuroscience, did a postdoc at John Hopkins, and then a position came open at CSU. And so we hired her and I mentored her in writing an institutional mentoring grant and then she, with my mentoring, got it into a K01. So she ended up being able to do something similar to what I have. So she is part of the lab, but is developing her own lab as well. So she's been part of it.

We have about four PhD students that are working in occupational therapy, started a PhD program 10 years ago. And one of the first two was Mayhan Lin from Taiwan who worked in our lab. And so we've had, for about eight years, one to four PhD students. And then we have master students, and then neuroscience undergraduate students galore.

Matt Hickey: That's great. Yeah. So you see a lot of bright young faces, right?

Patti Davies: Yes.

Matt Hickey: That's neat.

So we put on our imagination caps and flash forward five years into the future, you're just wrapping up data collection on your R01 that we successfully get funded.

Avery Martin: Yes.

Matt Hickey: Talk to us about the Brainwaves Lab and your activities a few years down the road. What do you envision? What do you aspire to?

Patti Davies: So one of the things that I found out that it really takes a lot longer to get to that place you want to be. So I had mentioned, ultimately, I'm very interested in understanding more about the brain and brain processing in children with disabilities and how that relates to their everyday function. When I started collecting EEG data, we didn't even know what brain processing was in typical development. So much of my career so far has been learning about that aspect and collecting those data. I've been fortunate. We collected data on children with sensory processing disorders and also children with autism, so we've been able to work in that arena as well. And one of the things, so our lab has had a lot of firsts. We were the first lab in the world that did collect neuro imaging data in children with sensory processing disorders and show that, indeed, their brain processes sensory information significantly different than a neuro typical child, so that was so exciting.

And then there was a new kind of executive function or higher order thinking task, air related negativity or performance modern monitoring. And it's when our brain signals that we made a mistake so we can adapt our behavior. Well, if you think about that, that's really important to thinking about children with disabilities and do they have those kinds of processing? Well, our lab was the first one to collect that data in children and we published that in 2004 and that was really fun to be the first. So we've learned a lot. And children brains are much different than adults and so we have contributed a lot to statistical analysis and how do you look at brain activity in children? You can't use the same techniques you do with adults. Their brain activity is much more variable, so you can't assume that every trial is the same.

So those are some things we've done so far. What I wanted to really try to do is relate brain activity to behavior. So brain behavior relationship because that's going to tell us about what in the behavior and what in the brain is different in children with disabilities and how can our interventions help with that. Simple correlations don't do it. We tried that. And so, in the last five years we've been, and this is one of the pieces in that R01, is looking at modeling. So how can you put multiple variables within one model and show how it all relates together? We've gotten three publications with performance monitoring task and so we're proposing looking at these modeling within entrainment. And the models are becoming very consistent no matter what the task is, so it's looking like the brain in children and the way it develops is similar. So we're learning patterns and so we are beginning to show how brain and behavior relates to one another and how then eventually can interventions influence that. So, that's kind of what the next piece is.

Matt Hickey: That's so neat.

Avery Martin: Wow.

Matt Hickey: It seems to me it must be incredibly rewarding for you to come back to your undergraduate alma mater as a senior scholar and make these seminal contributions and be so incredibly productive in an area that you had an interest in before you first set foot on this campus. How cool is that?

Avery Martin: Yeah.

Matt Hickey: Good for you.

Avery Martin: Yes.

Matt Hickey: Congratulations.

Patti Davies: So it's been interesting because occupational therapy is a very functional intervention and the type of research I do is more basic. Matter of fact, at the first research day we had, I had a poster and I won the award for basic research.

And so, it's been a journey and I'm always trying to explain what I do relates to occupational therapy. And I'm not sure I always succeed in that, but I'm okay with it.

Matt Hickey: Indeed.

Patti Davies: So you say it's fun and it is. Sometimes, there's some struggles there.

Matt Hickey: And I think this is an important observation. I've said a million times, "I love my job." Do I love every minute of every day? Life is full of the warp and woof of great days, and challenging days, and all the things that come with the messy business of doing life together as we say, right?

Avery Martin: Yes.

Patti Davies: Yeah.

Avery Martin: Yes.

Patti Davies: This morning, I'm teaching the PhD students seminar and it's kind of a philosophy of science and trying to deal with reality and it came up that being in Academia is like an extreme sport. You're always on the edge and it's difficult. It's hard. So PhD students thinking they'll go on to Academia, I didn't want to leave it with that. And I said "Yes, but there are so many benefits of it."

Matt Hickey: There are indeed. But we do find ourselves working with a lot of driven people by, it's the nature of the beast, right?

Patti Davies: Yes.

Matt Hickey: And that's a lot of fun, but it can be challenging too, for sure.

Patti Davies: Yeah.

Matt Hickey: So I have a couple of layered questions as we wrap up. The first is to ask you to share reflections on the things you like the best about working in the College of Health and Human Sciences.

Patti Davies: And why I'm smiling is because our college has gone through a couple of name changes.

Matt Hickey: It has. Yes.

Patti Davies: And I really like our priorities and emphasis on human health and wellness and how all of our very varied departments and schools contribute to that. And I think that's really important. And I think by the name of our college, we've been able to really portray that to the rest of the university and the importance of that. So I like that. I like what all of our units collectively can do in that arena.

Matt Hickey: Well said.

Patti Davies: I enjoy the diversity in our college and because we have so many different units and professions involved, that's been very rewarding.

Matt Hickey: It's dynamic environment.

Patti Davies: Yes, it is.

Matt Hickey: I love it. And so we operate as a college within this institutional structure, part of which is this important piece, and it's not just branding. We tend to use that kind of language, but I think it's really part of our ethos as an institution, this land grand ethos.

So I wonder if you'd share reflections on that as well.

Patti Davies: So I think, going back to my agriculture roots of being on a ranch and also being part of 4-H, my uncle, Raleigh Brooks, who has passed away, was in charge of the 4-H part of extension here at CSU for many years. And so I've always known about that part and really have appreciated it. I worked with Dr. Laura Ballos in food science and human nutrition on a project looking at the development of obesity and young children, looking at motor skills and those kinds of things with her and her team, and reaching out to rural areas through extension and helping to collect data and work with data on that project.

So I think the opportunities, even though my primary research hasn't had that, I've been able to participate in some of those outreaching kinds of projects. And I think I'm very proud to be part of a land grant institution.

Matt Hickey: Particularly proud given your roots, as you articulated. That's great.

Patti, I just want to thank you for spending a few minutes with us. We really appreciate it and it never gets old. I love hearing the story. Somebody who I've known for 20 plus years and you learn new things and that's a delight. So thanks again for sharing. We appreciate it.

Patti Davies: Thank you for the opportunity. I enjoyed it.

Matt Hickey: It's our pleasure.

Another great interview is in the books. Thank you for listening to this episode of Health and Human Science Matters.

Avery Martin: Be sure to check out the rest of season two as well as season one. If you want to learn more about the college, go to www.chhs.colostate.edu.