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>> SPEAKER: Good afternoon everyone. I have the privilege of introducing Doctor and Mrs. Cooper. Doctor Rory Cooper is a U.S. national - - innovation from President Joseph Biden. Doctor Cooper earned a BS and Masters in electrical engineering California Polytech State University. Earning a PhD in electrical and computer engineering from the University of California. Doctor Cooper is a founding director and be a senior research scientist of the human engineering research laboratories, AVA rehabilitation R&D center. A distinguished professor at the University of Pittsburgh and an adjunct professor at Carnegie University. Doctor Cooper is a member of the National Academy of engineering and lifetime fellow of the National Academy of inventors. Doctor Cooper is an adjunct professor at Carnegie Mellon University and of the uniformed services diversity of health sciences. awarded honorary - - University. Cooper has co-authored over 400 peer-reviewed journal publications and he has 30 patent awards and/or pending awards. Doctor Cooper's highest awards Include - - civilian service medal. Distinguished Eagle Scout, Boy Scouts of America. National Bureau of - - award, and the U.S. Department of veteran affairs diversity and inclusion excellence award. 2009 Doctor Cooper was featured on - - August 2010 he was with one of his robots which was centerfold on popular science in 2015. Time magazine produced a video on Cooper for his online magazine. In 2019 Cooper was revealed as the 20th inventor in the United States patent and trademark office. November 10, 2023 Doctor Cooper was featured on the NBC today show and further, Doctor Cooper's students have been recipients of over 75 international words. Introducing Mrs. Cooper, Mrs. Rosemarie Cooper. Mrs. Rosemarie Cooper is NPT, associate director for state engagement at the human engineering research laboratories. Receiving a bachelors with a concentration in international business from California State University in Sacramento in 1994. She received NPT degree in physical therapy from the University of Pittsburgh. She was recently the director of the UPMC Center for assistive technology and worked as a clinical instructor. Wheelchair seating clinician at the center, Rosemarie Cooper has been the author on several articles on wheelchairs and seating. Member of Beta Gamma Sigma. Business academic honor Society and a member of a PINT Introducing Doctor and Mrs. Cooper.

>> RORY COOPER: Thank you. It's a pleasure to be with you today. To be back in Harrisburg. This is our third time I think so far this year. Thank you to the organizing committee for putting this together. I have a brief presentation, not so brief presentation and some Q&A afterwards. To discuss a little bit about what we do. I'm going to cover technology we are coming up with in Pittsburgh and around the world. In some ways related to AI since I know that's one of the themes today. A little bit more about me that you didn't hear my lengthy bio. I'm an avid hand cyclist, Army veteran and I competed in the Paralympic games as well and still active in the Paralympic movement. About five or six years ago I had a severe accident and had to go to rehab again. So, I found out what it's like to do that for your separation between my original rehab and go through rehab again twice. Fortunately, both times it worked out pretty well. The picture on the far right I like to show also because that was my first marathon in a wheelchair. You can see the wheelchair is using that marathon, similar to the one I'm using today. The other important message is that in that picture is my peer mentor when I was going through rehabilitation, Tim Davis who is a Tet Offensive Marine veteran, lost both legs in Vietnam. Tim and I are both friends today 45 years later. Let's see. There we go. I'm going to show you a little overview. We are located in - - Square in Pittsburgh if you ever get the chance to visit. We have a very diverse team that includes people with invisible disabilities, hidden disabilities, mobility, hearing, cognitive impairments as well. Engineers, therapists, and scientists working together. These examples are OmniBot where we are trying to develop mobility technology to allow people to participate in stem education and engineering careers. We have a pretty extensive machine shop and electronic shop. Computer software development where we can do mobile mechanics work. Virtual reality. A smart kitchen we worked on. People with disabilities on our team, IT, scientists, engineers working for people with disabilities, it's people with disabilities and scientists working together. This is our new chair that goes underwater. If you need power chair users and want to go to water parks or theme parks this is an excellent opportunity. It's in San Antonio Texas. I will go over this in more detail. Going over the bridge will seating coach. This is, I will go over this later two. Inspired rugby wheelchair, some of our work in robotics, robotic arm, our MEBot, advanced robotic wheelchair. We partner a lot of work, this is a board game that we will talk about, we are trying to get people to learn more. Therapy students, people with disabilities to learn more about the various facing transportation. To start with the premise that technology promotes social mobility, health and participation, there is a number of national Academy reports and summarize that as well. I would also like to build on the premise of the national Council on disability that the disability community knows best. Being involved in planning from day one is critical to success for an accessible product no matter how long it lies in the future. Let me talk about the design process. There we go. There seems to be delayed. One of the things we do is meta-analysis. Basically, summarizing scientific what we call gray literature, the nonscientific literature to identify global priorities. It's not terribly surprising that people with disabilities identify five global priorities. One of them is accessible housing and living in the community. Which a lot of you facilitate access to education and employment. Traveling and leisure activities which I think is great that there is a priority now. She gets one and two and control before even thinking about travel leisure opportunities. Long-term health and participation is another important priority. Nearly when I think is interesting is the actual engagement in research and education activities as well as standard developments. That shows the progress we've made over my lifetime with a disability. And if you look on the right there are some technical domains that people are interested in. You might think about transportation and autonomous

vehicles. And autonomous system such as improving wheelchair driving. Power sources. We can think about cars for example, high reliance on internal combustion engines and the last 20 years. Hybrid vehicles and things like that. Looking at alternative sources for assistive technology. Opportunities and devices. Transfer assist devices. Smart home technologies and connected health technologies. Focusing on different domains, mobility devices and robotics technology and smart home devices, smart connective devices. Human machine interfaces. And robotics automated systems that are virtually designed. The whole idea of participatory action and design engineering and research is to engage people. The end user from the very beginning throughout the entire process, this is losing surveys and focus groups. Using storyboarding like graphic novel techniques as a way to get people engaged. Using expert user opinions. And eventually user acceptance. This picture is one of my former students. There we go. Sorry, I skipped a couple. There we go. The robotic arm, user benefit would be what we should focus on and prioritize. And then summarize that data. But also focusing on user extension. This is a video I took in Korea during the Paralympic games. You can see this is Nordic skiing or cross-country skiing some people call it. What I really want to point out here is how well that technology fits the person's body. I'd be willing to bet most of them are faster than the people, most of the people in this room and cross-country skiing. Then same is true for wheelchair raising or downhill skiing. The way you can see with 3D modeling and 3D scanning. And coach engagement, you get optimized close body fit and ergonomics. Similarly, wheelchair racing, each chair is custom fit to the body. Believe it or not individuals are not clip all had tetraplegia, impaired leg and arm function. Doing the 5000-meter race in Paris and the Paralympics. Their finish time was somewhere around 13 minutes which would be faster than any individual running in the Olympic Games. Due to composition, fit, close fit of the wheelchair to their body as well as the ergonomics of the wheelchair. 3D printing has become a useful tool. I actually think the VA is using Occupational Therapy and poly trauma clinics and spinal injury clinics with engineers working closely with clinicians and end-users. Small numbers of devices for individuals to accommodate their needs. I think that's a really exciting opportunity for OBRA to think about. Any other resource programs. This is just a little example. When you work with consumers twofold, what happens, think about pressure ulcers but their wheelchair seems to map fine. We find that they are sitting on hard surfaces like toilets, from one seat to the other. This is just a - - they use it for other things like you can see armrests, pads, leg rest pads, things like this. Which if you have been seeing people use wheelchairs, often times you'll see towels or dish pads, things like that used. Potholders is pads. This kind of makes a more elegant solution to the problem. This is one of my favorite projects. Trying to get increased quality and access to wheelchair by lowering cost. You are probably familiar with origami, the cousin to Kirigami. The Swanson frogs and things that you can make. Paper napkins. We have been inspired by the automotive and aircraft industry. Looking at Kirigami as improving higher quality of low-cost wheelchairs. These user two examples of old rugby wheelchair, rugby is a very popular sport, our goal is to lower the price to \$1000-\$2000 making it affordable for schools to introduce people to the sport. The other picture is an ultralight wheelchair like I use myself. It is intended to improve cost and accessibility of wheelchairs. Let me show you a video about this. Mrs. Jackson, one of our engineers. They wounded special forces soldier in rugby. This is actually a tennis chair version. They create a CAD model. From that model, we have a I take a three-dimensional shape and fly in it. Kind of the reverse of what you'd see. Make it into a 3D shape. Optimal from the flat shape, we figure out how to cut it on the laser, how to get the most parts with the least amount of materials.

The beauty is you can use single flat sheets of aluminum or steel and make any number of different variety of wheelchairs. And you don't need any specialized jigs. This lowers the cost. AI is used to optimize the cutting pattern. You can see how AI is tracing where the laser should cut this metal. The idea is so you don't cause it to work due to heating. This is how fast the laser operates at cutting the model. You can get an entire wheelchair ready for assembly in 15 minutes. The bit of welding the auxiliary parts like the castor amounts and actual amounts. Other software is using AI to tell you how to take this two-dimensional shape and bring it back to a three-dimensional shape. And so, this is the software called the CNC controlled press brake. Here is Jessica, one of our engineers who is using the press brake to bend it together. The cool thing is this machine is smart enough that it tells you what tool to use and it also tells you to put the device, piece of metal in there until you hit the stop and it bends it. Now we are actually, this is time lapsed. Jessica is not quite that fast. Putting the rugby chair you saw and the original picture together. What's also cool is we cut all the holes with the laser and basically, it's almost like an IKEA kid. So, if you line up the holes correctly and use the rivet gun that chair fits together and it lines up perfectly. We've even thought about you can literally sell these as a kid. Right? You get your little rivet gun. And all of the things in the box. And your instructions on how to put it together. This could be, kids could get these for Christmas from family and mom or dad or grandma and grandpa could help them assemble their sports wheelchair. So, we are excited. We showed it to the U.S. rugby Paralympic team. We took it to the National Veterans Chair Games, national - - and everyone is excited about the technology. A little bit about measurement and coaching. Smart wheel is a tool that uses AI machine learning to help coach people on how to prevent wrist carpal tunnel injuries. Elbow tendinitis. Rotator cuff injuries. When we started the work 30 something years ago about 80 percent of manual wheelchair users experience carpal tunnel syndrome, rotator cuff injury within five years. The knowledge gained and dissemination of technology worldwide has reduced this to about 20 percent. Likely due to other activities such as transfers and not so much wheelchair propulsion. We do work on activity monitoring. We've done that in the United States. We've done cool work - - a little bit longer. That's about a one wheelchair basketball or rugby game. With mobility. Let's see. Virtual seating, sorry. We talk about transfers using Microsoft Kinect in order to study transfers in the real world. This is a friend of mine David Gray used to say what you learn in the clinical setting is what people can do. What you learn in the real world is what you do do. Have this can-do, do do theory. We are using trans - - TransKinect and extend therapy into the real world. Using AI tools as well to optimize your body motions and large sets of data of other body motions to provide instruction. Along the same lines, one of the common problems that fit for wheelchair users as they gain weight and unable to weigh themselves, they get weighed very infrequently. Once a year most. We worked on these intelligent good skills. Put a skill under the four feet of the bed because everybody goes to bed at night. At least you hope they do. And whose AI and machine learning to figure out if there is one person in bed, two people, a dog. And what's cool is you can look at sweep quality and people get rolled over, they get out of bed at night, if they get out of bed at night as well. There is real opportunities to learn about how to do positive coaching and also help with proper weight and maintenance. I'm going to show you a video. Let me skip. Another is pressure injuries amongst people with neurological injury and conditions, older adults. It can lead to hospitalization. In rare cases, death. Let me see this next video shows more. Virtual coach was developed in order to meet the clinical neatly identified. If people have however wheelchair functions, their condition not improving. So, we did a series of experiments to see if it

would reduce function but not necessarily as instructed. The idea with virtual seating coach was to advance in technology to first onboard computing. Later with smart phone technology. To provide coaching in real time contextually aware all the time available to the user. And provide data to the cloud. Algorithms could be improved. Based on what was learned. As well as share that data with clinicians in order to improve clinical practice and eventually clinical practice guidelines. The technology interacts with the user to help the user get the maximum benefit from the technology they are using. The power chair user, now use manual where we implement the seat. This is actually one of our colleagues Doctor Truong. You can see in real time changes in pressure mapping. Along with that we are measuring pressure of the seat. Center pressure to the seat gives an idea of how effective a pressure relief maneuver is. Using AI and machine learning we can look at centers of pressure and correlate that with pressure mapping to give people real-time instruction as well as real-time feedback on when, how long, how effective and how to do effective pressure relief maneuver. Mrs. Josh and Rosie going over structures of the app. The idea being that people get instruction in the clinic but it's difficult to follow the instructions, difficult to digest it. Maybe consumer-oriented up on how to improve that. Interestingly and clinicians are told about various maneuvers but there's no guidance or data showing what's an effective pressure relief, for how long and how often. Along the same lines there are some people that are just not going to be able to physically or cognitively follow the guidelines to prevent neurological pressure, pressure-based injuries. So, we've been working with University of Texas applied research Institute now through state SEI grant in Pennsylvania. On an active cushion that actually performs the maneuvers that you are performing now. Sort of micro wiggling in your seat. In order to encourage capillary blood flow so you don't get pain or discomfort. People with disabilities don't get pressure injuries. Looking at the bottom row and see a normal Christian and tuberosity us. The bones in the rear end. They have hotspots and there are places where you can get injuries. The atypical cushion will offload. What happens is it puts pressure on - - [Low audio] and any way that you want to do it, whatever your seating position is across the entire surface which is the final right-hand side where you can see pressures in the low safe range. Robotic assistance. In order to allow people to perform functions on their own and be less dependent on others for daily activities. This is Alex. Alec is using a smart wheelchair created by alumni. Companies in Tennessee, not in Pennsylvania. Something the governor wants to work on to keep brilliant people in the state and start their companies here. This is a robotic arm we developed in Pennsylvania manufactured in Canada to give you a second example. We developed wonderful IPN Pennsylvania and built really smart people. To make sure that some of them stay here. Alec is using a robotic arm to get a drink on the left side. You can see the robot sees it and uses AI to say okay, the robot is taking over control. It actually facilitates. It's more like when you drive a car, press the gas and you'd like to accelerate the vehicle, you tell the computer to slow down. Sort of blind that concept a robotic technology where the robot is looking at what you're intending to do. This is a custom one remade for Alec or cerebral palsy. Limited function and intention with gross motor movements. Able to do these fine motor movements with control. This is a very common act. People wanted to be able to take a drink on their own, opened the refrigerator and pull out something, put it in the microwave or make a bowl of cereal. Or make some popcorn together. You can see the excitement. That is something that we get these activities by using AI machine learning to get something more natural for - - movement. In Alex defense, this is, most of these robotic arms technology created in Pennsylvania, manufactured and sold in Canada but the largest population of users is Germany

because they are covered by the German health insurance. And they are not yet covered in Pennsylvania. And I think it would be wonderful to see from our Commonwealth citizens can gain greater independence. Some assistive technologies, especially after the pandemic you really saw the challenge of caregivers. It's been a challenge to find caregivers. You have reliable caregivers. Unfortunately, compensation is often not as good as other professions. A very physically demanding job. One thing we looked at is can you do a transfer in and out of a wheelchair with robots without the need for another assistant? So here we have Jess who is a Pennsylvanian with a disability. And who is now being transferred by one of our engineers. And Josh, you can see no lifting, no slings, we could lift a person who weighs up to 600 pounds. You can imagine even in bariatric institutional hospital settings. When we first demonstrate this, we went to the VA in Pittsburgh, a long-term care facility and one of our focus group participants, a veteran said she wanted one of these devices so she could take her husband home. A little bit of a bind, we have a prototype. We were able to work with her in the VA to make a prototype for her husband. She was able to take her husband out of the nursing home after he had been there for a few years. We were able to do that for a few other families. So, this is a person, you can see they - - complex seating, hopefully we will have a video of the next year. If the caregiver doesn't show up it would be possible to get in and out by themselves. It's a really fun project with Amazon committees are used in Amazon fulfillment centers across the United States, Amazon regrets a fair number of people with disabilities and performance centers. Especially in the holidays are preparing for the holidays. They asked for us to create a robotic system. To perform all of the functions needed to wrap the label of and send it on its way. They had this robot that can go left to right, up and down, swivel. It's pretty exciting that it created a job opportunity for people with disabilities with a large employer. This is an exciting new technology called the OmniBot, trying to address this problem that a lot of first jobs are in confined spaces. You need to be able to go up and down, slide left and right. But also, if you want to get people into stem jobs, I am biased towards engineering jobs or into manufacturing jobs. Same thing. You need to get around machines like this, move up and down, left and right, swivel. Even things like 3D printing, - - machine you can see, you can go down. Grab the material. Go up. Reach the lid. We have a little over one yard of height adjustment. Very small dynamically stabilized. We are in process of finding user evaluations on controls and operation. Same thing in Pennsylvania. Especially Pittsburgh. The Allegheny Mountains, hills, challenging architecture. Robotic wheelchairs that self levels, if you are on a terrain, it keeps you up great. Keeps you stable. This is our computer-aided models. We fabricate these things in Pittsburgh, our engineers, you can see them looking out a blowup of that model. But here you can see if a person drops off a curb, instead of falling over they will automatically adjust and keeps them stabilized. This is a common problem my people report to emergency room-power wheelchairs. They get I will drop off the edge on the curb, driveway. You can actually raise up the seat to have an eye level conversation. Same base technology. This is several years of working with users. This could be a rear wheel or four-wheel-drive. You can see for environments, indoor environments optimize bill position. Here is where you use AI to detect. You can climb curbs. You can climb up an eight-inch curb. This is an actual user contributing to our research. And it maintains the stability at all times. Putting all of these different functions and the base allows curb climbing, optimization. And we are in the process of working with a Californian, Boston Massachusetts company trying to convince him to come to Pittsburgh. So, this is just you can see some of the models. Also, the chair is able to rise up and tilt which facilitates transfers. This is one of our engineers who has a spinal cord

injury. Showing you a little bit about. If you notice it's a little subtle but the chair was up and tilted. That was for the transfer into the bed. To transfer out you lower the chair because you always want to transfer down if possible. Gravity helps you so we call it a gravity assisted transfer.

>> SPEAKER: Model and build the new chair that makes a challenging trip to the waterpark. Fun.

>> SPEAKER: I like that I have the freedom to run around.

>> SPEAKER: It's rewarding to see how he lit up and the enjoyment that he got out of going to the sprinklers in the water.

>> SPEAKER: We let him go and that's what he wants.

>> SPEAKER: - - Independence will be influenced to.

>> SPEAKER: That the kind of experience you want kids to have. So, when they grow up, they don't have those biases. You can say, I see people with disabilities do it just like I have.

>> RORY COOPER: - - Central and western Pennsylvania and the Boy Scouts to bring these to Pennsylvania. We are looking for a manufacturer so if anybody knows someone that's interested in making these for a global market. Airline travel as well. Twofold, looking at working with the Pittsburgh airport. Now to make airport chair that also is an aisle chair so we can make it safer for both airport workers and people traveling. We are also working on a new docking system because we're trying to work with the FAA and aircraft and airline manufacturers. So, people can stay in their chairs when they fly. So, this is safer for people who use these complex wheelchairs. Just want to talk a little bit about educational activities. Inspiring the next generation of inventors and engineers and scientists. There is a very small number of people with disabilities with patents less than two percent in our survey studies and follow the patent being a person with the disabilities, something we need to work on. Providing more adopt recreation and sport activities to allow people to build confidence. We need to expand opportunities for powered wheelchair users to purchase parts of activities. We have a very small number, fortunately one of our colleagues wheelchair user recent engineering graduate is working on building on that area. Kind of a fun thing. I was challenged by the department of transportation Secretary - - a few years ago to say you guys do great work. But instead of publishing literature, how do you take your research and put it into a form that can actually have a real impact on people's lives? We could set this up. We created a board game. These are trainings from - - students about transportation, accessible transportation barriers. This is a physical version of the board game. You can see it's got easy buttons like dive schoolers, different scenarios. Right now, moderated game. There are pitfalls. We are working on electronic version that uses an AI generated avatar moderator. This is an early version of the board game. Electronic board game. It comes with different scenarios based on the scenarios you earn money, kind of a family feud style type of thing. You can choose mobility device. We call it HERL-Town. This is an example scenario. Clicking through that pretty fast but the dollar amount associated by the most common answer people with disabilities. Perks and pitfalls, things like good things and bad things happen when people travel. Using a wheelchair but the idea is to learn how to use buses. On-demand transportation. Private vehicles and things that can occur without. This is an example you can see power wheelchair user. They were at a work trip in a new city. All coworkers are tricking a taxi to go to dinner. Unsure of the taxi service is

accessible. And how would you respond offer to arrange the taxi and ensure that it's accessible. Just ask the travel plan coordinator to get an accessible vehicle or a taxi for you. You must write separately and arrange her own transportation or decide not to go. All based on surveys and interviews of over 1000 people. Wheelchair users or travel companions. Skip that a little bit. We are also working. We have a program that Doctor - - introduced to the state. Started among 2000 during the pandemic, about how to organize communities and work with the - - program in western Pennsylvania. In order to have leg users and caregivers communicate with one another, share resources, back each other up and also caregiver training end-user training on how to manage a caregiver and caregivers to provide more effective support. I would like to say thank you very much. Rosie and I are happy to answer any questions. Rosie, why don't you tell what you're doing with - - and scouting USA now?

>> ROSEMARIE COOPER: With - - and Boy Scouts we did a trial with our pneumatic power chair to give students an opportunity to try the chair and a camp setting. Like - - has the camp victory. Which is for individuals with some intellectual and physical disabilities. We - - campers to try. We also had very good feedback from the volunteers and staff that were also trained on the new chair. And really provided an opportunity to just enter the pool. So, they went out and normally they have problems getting the participants into the pool. The participants were so happy that they could go into the pool on their own and get out on their own. Really providing an opportunity to move around without the need for assistance. We did the same for the Boy Scouts camp. We had adults with spina bifida and they gave us the same feedback. Just if your power chair user not to be excluded from the activities. But also, staff which really for the staff they felt they were safer and it was less taxing on them. So, they are pretty anxious to get their chair. The other thing I wanted to say with the transportation board game for me as a clinical therapist. I work for 20 years in the clinical setting. And, you know, you get -- you need to update yourself on the latest research findings and really the board - - [Low audio] with the board game to give a practical teaching. To let young therapists are people not familiar know what people with mobility impairments go through just to navigate through their community. And we went to - - walk for the recreational therapist. We had students that got so much into the game that they really felt after the game they now have a better understanding of what a person goes through. Especially when exposed to pitfalls and perks. They were so afraid of these pitfalls. They were getting pretty anxious and the teacher told them you know this is what every person in a chair goes through every day. Every day they leave their house and they don't know what pitfalls await them or what scenarios await them and they have to have alternative plans. Having research results being shared through that message was actually pretty exciting for us to see how the students reacted and we are anticipating may be city planners or even like for your group. It could be a great training tool to start working with people with mobility impairments and are really know that because you haven't experienced yourself to go through that exercise. You know that - - and then one more thing I would like to share with all of our research aspects. The therapists always have clinical insight for Lake the human machine interface for our research. Within - - to involve users and have engineers with stability and therapists working side-by-side with the developing of the technology is pretty rewarding. Also, for 20 years working in a clinical setting I used a ton of the evidence to identify appropriate - - we did pretty good because we provided quality equipment, eight meaningful equipment and as you see with Alec, I was able to get some of our clients from the clinic to be actively involved in improving and having an input in the technology development. And one more thing, we have within our research, we created a special

condition of the research advocate. Because when I worked in the clinical setting for 20 years and you can tell by my background, I was trained in restaurant management. I work in business. I worked for banking so I had customer service experience. I became a therapist working with the technology center and with end users that just had an impairment. And they just needed some enhancement. And they needed technology to enhance their performance. Treating our - - providing customer service in treating them unequal footage that we are to provide the necessary technology to allow them to live their lives to the fullest. That customer service part I know incorporated in our research through the role of the research participant advocate. So, for any participant outcomes through our research, we know that we have our ethical teams. To make sure that we abide by the IRB and have engineers. But who takes care of the participant in the advocacy understanding? Knowing what they need, making them comfortable. Treating them. They are the main beneficiaries of our research. So, we have the role of the advocates. So, we will make a first contact and it's really just focusing on the well-being of our participants and following up so that they know we really appreciate their participation. Their input and that they feel respected and served as customers. So that is what I had to say. Any questions?

>> SPEAKER: Working? Traveling with a power wheelchair and power scooter on airlines, each time I have traveled with some they've not undamaged. The last two times they were damaged so bad the airline had to replace them. My question to you is do you find that this is a common occurrence? With damaged wheelchairs or do I have dumb luck? Maybe there is something I should be proactive about protecting my chair because I've only had a disability the past five years or so. So, I'm kind of worried about traveling with mobility devices and it's frustrating because similar to running a power scooter - - therefore a week or two or I have to use a manual wheelchair on site which is hard for me after using manual wheelchair, relying on friends to push me.

>> SPEAKER: - - [Low audio] And happen to live each year, so it's a huge problem. Unfortunately, there is not a good solution right now. Except airline and airport staff education, that the Commonwealth can lean on. That's one of the reasons we are working on allowing people to remain in a power wheelchair in the airlines. One thing I can give you is, if you take, the common things that get broken, before you get on the flight that can help a little bit. If you have the means, get a travel wheelchair. Really light, a lot of them hold up now. And you can take the battery out very easily. A click and battery. That's a little bit more protection. There are some travel, lightweight travel as well that will give you more protection. Right now, for the more complex power wheelchairs, there really isn't a good solution. There was a survey done by paralyze - - that was pretty frightening. Third individuals that use complex power wheelchairs, Medicare would call group 3 group for power wheelchairs drive by car up to five days when taking an airline.

>> ROSEMARIE COOPER: I have a little perk for you. Right now, we currently do a survey called journey mapping. We are interviewing people who use power chairs and did air travel with it. And also interviewing users of power chair users that have not traveled in the three years. And we also interviewed journey mapping with caregivers' companion to really get journey mapping interviews, interview concrete experience and attend stages of traveling starting from the final destination going through each section finding out what are the most crucial parts of air travel that give the - -. With that journey mapping we then want to get all of these scenarios and create another boardgame just specific on-air travel to allow people, people that have successful travels - - in a game form. So that in the future if we have newly injured people or end-users that would like to

consider air travel but just don't know how to prepare or what to do, hopefully can with a rehab team, counselors or peers, or family, may be go through that and prepare themselves.

>> RORY COOPER: Do we need more people? Yes. If you contact us - - would be happy to enroll you in a study. As a tip, to get airline travel tips there's an organization called all wheels up. I would get guidelines on how to travel.

>> SPEAKER: I have a question from one of our online attendees. They said the technology looks great but they had some concerns about data privacy with linking AI models and data potentially being used against individuals with disabilities. Can you speak to those concerns?

>> RORY COOPER: Using AI, robots are not necessarily personal information. - - [Low audio] Collecting sensor data, one thing to do is identify data so we don't know who it is. We just know what the task is. And we can gauge the for multiple people learning. But AI data privacy certainly has concerns. There's other ways to identify data. There is a code so a human would have to break the code. Knowing who that person is, - - so that's another way to do that. That's what we use, we identify data and broker. I think it's really a problem when you look at large language models, generative AI. That's, there are means to do that. But it's really kind of when we have government lawyers. I'm sorry I don't have a better answer. In our case, we are looking at using AI to advance developmental design in machines or build better robots. In that case we don't really need to know who or where the person is. That is the way we can ensure their safety.

>> SPEAKER: Thank you. Another online participant said they learned so much from your presentation and were curious about what are the technologies you highlighted, was currently available at this time? And they asked if clinicians are able to access the transportation gate?

>> RORY COOPER: Five transportation game is not widely available. We are still doing research although I'm sure they can contact Rosie. We can work something out. We are working with two Pennsylvanian companies to bring it to market. That will be available. Widely available as a training tool hopefully in the next 12 to 16, 12 to 18 months. The technology I showed, I focused more on the technologies under development. The, unfortunately the MEBot, the bed, the chair, none of those are currently available in market. We are due - - as well and we are looking for licensing partners and manufacturing partners. Maybe that is something that they can help us with.

>> SPEAKER: Thank you. One last question. Do you need more people for their journey on research and how do people get in touch with you if you're looking for more participants?

>> RORY COOPER: We are looking for more participants. And the easiest way is to go on our website, HERL - - we are on LinkedIn, Instagram, you can connect with us on our website. I have a list of newsletters. All of the states we are actively including in there is a QR code and a link for every - - they can use that to contact us. Thank you very much. It's a pleasure being with the own. Keep up the good work.

>> SPEAKER: Thank you Doctor and Mrs. Cooper. Another round of applause. The work you are doing is incredible and life-changing. And offers an opportunity for those with mobility challenges to have a little bit more enjoyable elements to their life. Incredible work. We are a few minutes early yet again. I will invite you all to take the next 15 to 17-ish minutes. Take your final break,

cruise the vendor tables one last time and please be back promptly at 2:45 PM for our final workshop and closing remarks. Thank you to everyone that has stayed with us.