

# Changing What's Possible - S.2, Ep.4 - Transcript

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## SPEAKERS

Brandon Biggs, Dr. Marie McNeely

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### D Dr. Marie McNeely 00:01

Hello and welcome to Changing What's Possible: The Disability Innovation Podcast brought to you by Cerebral Palsy Alliance Research Foundation or CPARF. I'm your host, Dr. Marie McNeely. And this season we are excited to bring you extraordinary stories about how disability technology and innovation come together. And today we have with us Brandon Biggs. Listeners, Brandon is Chief Executive Officer of XR Navigation, one of the startup companies in our 2023 Remarkable US accelerator program. In addition, Brandon is a software engineer at the Smith Kettlewell Eye Research Institute, Chief Financial Officer at Sonja Biggs Educational Services, and also a PhD student at the Human Centered Computing Program at the Georgia Institute of Technology. And listeners, if you haven't had a chance to hear part one of our interview in Episode Three, definitely check that out to get more details about Brandon and XR Navigation. And today we are going to be going into more detail about XR Navigation's products.

### D Dr. Marie McNeely 01:02

So can we talk a little bit more about the technology, Brandon, what kinds of technology does XR Navigation use to create these custom navigation solutions?

### B Brandon Biggs 01:12

So we have two parts to Audiom, one is the visual experience. And for this, we've taken an existing library called Map Libra. It's an open source mapping tool that a lot of companies and governments use - very popular. We've taken that and modified it to be Web Content Accessibility Guidelines, triple A compliant. So we're in the midst of working with LevelAccess, which is one of the biggest agencies to certify our visual map to be Web Content Accessibility Guidelines (WCAG triple A compliant). Our audio map is running on the same data as the visual map, but it presents the information through audio and text. And so this is where you're basically a little avatar that moves through the space. And as you move over objects, you hear the sound of that object. So it's like a concrete footstep as you're moving over a street and over

will say something like Fillmore Street, and you can move around the map as if you're a first person avatar moving through the space. And so you can kind of simulate walking from point A to point B and you can zoom in and out and have bigger steps or smaller steps based off whatever you want to do there. And then you can also get information about what's around as well. And so this auditory interface we're working to get that WCAG triple A compliant as well. And so we need to make sure everything can be read through Braille display, and can be operated with voice commands and all that kind of stuff. So we've been doing a lot of testing with different types of users and on different types of interfaces and with different types of input devices. So our goal is to make the world's most inclusive map viewer. And that's Audiom.

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**Brandon Biggs 02:45**

For the interactive 3D model map, we're using this tool called Cameo that was developed by Smith Kettlewell, that basically, you have a camera from like an iPad or an iPhone, and you place that above an object that you're interested in labeling, and you use a little stylus that has these QR codes on top of it, and you hold the stylus, and you can label or read labels that have been digitally added in that space. And so they don't really physically exist, they're Augmented Reality virtual labels. And we've done also some studies, we actually won the best paper award at CSUN, which is the biggest Assistive Technology Conference in the US back in 2020 for our paper talking about Cameo, and this is also a tool that is something that blind people can use to make everyday appliances or different types of technology, or appliances, or whatever, any kind of physical interface accessible. And so we're using it for the map to make the 3D model map accessible. And then, of course, we've got Good Maps who's using computer vision to view the world in front of the user and compare that to a map that's inside that user's phone and they're able to determine where the user is in the environment, using that computer vision and other sensor technologies that's better in the phone.

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**Dr. Marie McNeely 04:03**

Phenomenal, I appreciate you going into the overview of these three different pieces. And let's maybe dive into a little bit of detail about Audiom, first. So you mentioned the technology it uses. I guess, when you get an order a customer asked for some sort of custom map. How does that platform work? How do you make the custom map?

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**Brandon Biggs 04:21**

There are three steps to get Audiom into an app or a website. So we can be in both a mobile app or a web page. So the first step is the customer will give us their existing data set. And we work primarily with vector data. And that means that if you've got a data set that's pictures, then we need to convert that into numbers. So the computer can understand and perform functions with that data. And most places do have this. Most places will have some kind of geographic data. So we get the data from the customer. We then process that data and we will do this for the customer and we add a name attribute to every single feature in the dataset. So sometimes we're given like different tags. So it'll say like amenity is restroom. And then the type of the restroom is men's or something like that. So we need to then say men's restroom in the name. And we need to look at that data, figure out what the naming schema is and convert that into a usable name that makes the object recognizable, then we add a type attribute to it.

And this might be different from the existing type attribute. And it basically allows us to do filtering on the different objects, and also allows us to add specific sounds to an object. So if it's a grocery store that will have a different 3D sound associated with it, then something like a train station, that's the second step. And the third step is we will give a few lines of code to that customer, and they can embed that into their app or website. So when we give that code, we work with them on what exactly they want, because we can do it through like an iframe or embed with our software development kit. So we've got a couple different ways that we can implement the map into their existing website. That's basically the three steps.

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Dr. Marie McNeely 06:05

Very cool, this Audiom platform just sounds absolutely amazing. So if you had to summarize, I guess, Brandon, what makes Audiom unique compared to other solutions that might be out there?

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Brandon Biggs 06:14

It's the only WCAG triple A compliant map viewer on the market. So it's a technically acceptable solution. So section 508 of the Rehabilitation Act states that if a technically acceptable solution exists, then it needs to be used, and you can't use an alternative or claim it best meets exception. So Audiom is affordable. So it's not an undue burden, because it's an affordable solution. And it's not an alternative. And it's better than an alternative, because it's a technically acceptable solution. And that's because we've got this data showing that Audiom allows you to access that geographic information if you're a non visual user, and you don't have the information if you're using alternative like a table. So that's what makes it a technically acceptable solution. So basically, Audiom is the only technically acceptable mapping solution on the market. And that's why people should use it.

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Dr. Marie McNeely 07:06

That is a phenomenal Brandon, and you touched on some of the other pieces that you're working on. I'd love to go into some detail about this turn by turn wayfinding application that you've been working on in partnership with Good Maps, I think this is absolutely fascinating. Can you tell us a little bit more about it?

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Brandon Biggs 07:22

So we have been working with Good Maps to integrate Audiom into their existing applications. So I've done almost no work with them on building their turn by turn navigation system, I've definitely presented with them. And we've we're actually going to be presenting together at the AFP Leadership Conference at Innovate April, but we consider our applications kind of partners in this navigation journey. So you've got the pre trip planning experience where you need to figure out where do I want to go, and how do I get from my house to there? So that's the pre-trip planning piece. And that's what audio can provide. What Good Maps does is allows you to navigate using turn by turn directions. So you build a mental model using Audiom, and then you navigate using turn by turn directions with Good Maps. And they've got their Good Maps

explore experience application that you can use, and we're looking to integrate Audiom into that. And then also, you've got their indoor experience. So once you reach the building that you're trying to get to, then again, you have that pre-trip experience where you've built a mental model of the building, and then you use their computer vision algorithm to navigate around the building when you're in that building. And if you get lost, or you want to view the map, you could also do something like that when you're on your phone and figure out, okay, I guess I need to go downstairs in here. And if the app for some reason gets confused, then you can double check it. And so that's where kind of the integration of Audiom and Good Maps is. And we're probably maybe going to be getting a grant to do a full integration with this. And it looks like that might be possible. But we've been put to the very final round on that. We'll see if we actually get it.

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Dr. Marie McNeely 09:06

That's really exciting. And I think this indoor experience is really particularly interesting, because I think they're maybe for people with visual impairments or people without visual impairments, a variety of different ways or strategies you can use to get to a place but sort of figuring out how to navigate within buildings is a huge challenge that I think a lot of people don't necessarily think about, and something that might be beneficial also for people who do have vision. So can you tell us I guess what that indoor experience works? How do they make those maps?

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Brandon Biggs 09:33

So Good Maps has this technique they do. So if you're a building owner, you basically can talk with them, and they'll say how big your building is, they'll give you a quote on how much cost to do that. They'll come in, physically scan the building using this technology called LIDAR, and they'll take that scan. It's super, super accurate so they get this really detailed virtual model of the building that is from this LIDAR scan, they'll go back to their offices. And they'll create a 2D map of that three dimensional LIDAR scan. And that's what Good Maps and Audiom run off of. So that data set is something that blind and sighted people can use. And Good Maps does have an existing map viewer already on their app. And it's pretty much visual only. So sighted people can use their tool to view both a map and then use the turn-by-turn navigation. So the computer vision piece will recognize where the user is at as they're walking. So we'll say put your camera up, and then you have your camera parallel to your body. And as you're walking along, it'll recognize where you're at. And the camera will say, we found your direction, where you're at. And it'll tell you to continue on for a few feet and then turn, right, and then it will continue giving turn-by-turn directions. And so if you want to use Audiom, if you get lost or your turn-by-turn directions are wrong, you can stop and swipe on the app until you find the Audiom application button, and we'll activate the map, and it'll start you from where the app thinks you are. And you can navigate around the building virtually while you're on route.

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Dr. Marie McNeely 11:05

Well, Brandon, this is absolutely amazing. And can you tell us maybe how does this Audiom plus Good Maps solution differ from other things that might be available for people with limited vision?

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**Brandon Biggs 11:14**

The Audiom in Good Maps hasn't actually been released yet, the current way that you would navigate around and build a mental model of a space, you'd use something called the look around feature. And you've got a few apps on the market right now that will do that. I believe Blind Square does something like this. And also, there are a few other tools. But when you navigate around these other types of tools, basically you're jumping from point to point, and it'll say you're moving 800 feet to the next point and then moving another 20 feet to the next point. And you've basically missed all the information in between how wide is the hallway? What type of surface is that hallway made out of? How long? Like if I wanted to walk in I know my steps are, you know, a meter long, how long is it going to take me to get between point A and point B? What things am I passing on while I'm navigating there? How far is this door between this other door? So there's a lot of little kind of spatial information that you're missing when you're jumping between point to point in the existing map viewer. Audiom gives you that really virtual experience. And it's not just point to point. So that's basically the difference between Audiom and then what Good Maps currently has.

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**Dr. Marie McNeely 12:24**

Excellent. Well, thank you for sharing these details with us. And I know you've made tremendous progress thus far, Brandon, and there's only exciting things ahead. But can you tell us what are some of these key milestones that you've achieved as an entrepreneur and what that journey has been like for you?

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**Brandon Biggs 12:40**

It's kind of looking at both the research and the entrepreneurship piece. And so as a researcher, some of the big milestones that we've passed, are we've done validation, like does Audiom actually work? And so that's translating it to business-speak the MVP, a little bit, but because our customers are actually not blind people, we have to go beyond that and say, does it work for our customers who are businesses or governments? We first did the does it work for blind people piece, and then we've been extending Audiom and now we've done the does it work for businesses and governments? We've just started doing that. And so far, we've built that MVP out (minimum viable product), and are integrating it into existing websites and apps. That is also another big huge milestone, and we've got paying customers. So that's a huge milestone for the business side. And then for the research side, we are doing comparisons between existing tables. And then Audiom, we're going to be doing other studies, like turn-by-turn directions and interpretive directions with Audiom. And that's going to be another big milestone, if somebody can have that data to see how Audiom compares. We'll continue doing this type of research. And then hopefully, within a year or so we'll see if XR Navigation needs to raise funds for like a seed round or something like that. And we'll see what ends up going on past this point. But our next big milestone is to really get our current customers 100% satisfied and start to expand out our customer base.

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**Dr. Marie McNeely 14:09**

Wonderful. And what has the journey been like for you hasn't been exciting? Has it been full of hurdles? Has it been what you expected or perhaps not what you expected?

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**Brandon Biggs 14:17**

Well, as a kind of new software manager person, I'm fairly new comparatively, at managing software projects. That's been probably the hardest piece is making sure that software projects are delivered on time and under budget. And that's been probably the hardest piece for me. Although it's starting to be much better as I get more experience. The other pieces - customer discovery, that's a lot of fun, in my opinion, just talking to people about the issues that they have. And then also doing studies and research and watching blind people use the system. So that's been a lot of fun and the technical hurdles around like how do we convey this type of data to a blind person or how do we clean up this data that's also been a little bit frustrating. But the team that I have is very interested in solving some of these really hard problems. And so it's not a bad thing that we're facing all these issues. If they were easy, people would have probably solved them already, even within the blindness community. So we're taking a lot of the existing conventions that blind people have done. And now we're in the process of extending those on to geographic information from Open Street Map. And that was not made for blind people and blind people have never really had input into that type of data collection process. And so now blind people have access to it. It's not necessarily made for blind people, and are missing important information like doorways, and sidewalks and all that stuff that why didn't they collect that information? Just why?

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**Dr. Marie McNeely 15:41**

I think hindsight can be a valuable learning tool. I think, in some cases - (Brandon interjects) They collected roads, but who cares about the roads, you need the doors!

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**Dr. Marie McNeely 15:49**

Oh, it's been great to hear about your experiences. And I think you bring some really important perspectives in developing these solutions. So looking towards the future, Brandon, what do you hope to achieve with XR Navigation?

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**Brandon Biggs 16:02**

Like I mentioned earlier, I hope that XR Navigation can partner with companies to get Audiom into every single map that's on the web and in any app that has a map. So we can replace existing mapping solutions. But we can also work with existing mapping solutions that are visual only. We are an audio component, we are the only audio text based component out there at the moment. So we can either supplement or completely replace existing map viewers. And companies like Google, Apple ESRI, Map Box, any of these places, we can work with those existing maps. So either the companies themselves or the customers using those maps can contact us. And we can get that non visual experience integrated with the visual experience so that everybody can have access to that geographic information that was worth putting into a

map in the first place. So that's my vision for Audiom in the next, hopefully, five to seven years that we get most of the maps on the web accessible. And that would be amazing. That'd be my vision.

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Dr. Marie McNeely 17:02

I love it, Brandon, that is phenomenal. And I guess thinking about the users, who do you think can benefit from the work that you're doing in your company, and who really should be using your products and services?

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Brandon Biggs 17:12

Obviously, blind people are going to benefit by getting access to geographic information for the first time. The companies who integrate Audiom into their websites are going to get blind customers, because they're able to easily access that information that was important enough to put into a map and put on the website. The companies and governments and universities and different places, they should be the ones who purchased Audiom for the blind users that they have. And each of these different stakeholders have their own interest in Audiom. So once the university or the customer will integrate Audiom into their app or website, then the blind user is going to benefit just like a sighted user benefits when an app or website gets a visual map.

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Dr. Marie McNeely 17:57

Absolutely. And I think you've really painted a clear picture of the value proposition, like you said by incorporating Audiom, these companies are going to be attracting new customers and bringing people in who might have gone somewhere else because the map wasn't accessible.

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Brandon Biggs 18:09

Not just that, but if they have a map in their app, it's going to reduce the amount of time that their employees are already spending on helping a blind person navigate between point A and point B, I always call ahead when I'm going to a new location and spend time on the phone with the person at the front desk, you know, to say, I'm going to be taking this route to get to your building, tell me how your building is in relationship to this bus stop. It's really hard to communicate verbally geographic information, which is what basically is happening on the phone. And it takes a long time to do that. And so we're wasting a lot of the person's time who we're talking to on the phone about this.

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Dr. Marie McNeely 18:48

Absolutely. I think the efficiencies and just making everything more accessible can benefit a lot of people and thinking about the impacts that XR Navigation is going to have or maybe it's already having, do you have some examples or some impacts that you hope to see?

**B****Brandon Biggs 19:02**

I guess the biggest impact will be blind people having access to geographic information. So that would mean being able to have a conversation about what does gerrymandering mean? When in political conversation and discourse. When we've got a democracy here, blind people have no idea what you're talking about when you say a gerrymandered state, and so they don't know if they should be part of that conversation or not. So it's going to increase the amount of social justice in the world if blind people are able to participate in these conversations about where legislation is being performed, or the different layout of the congressional districts. That's just one piece. They'd also be able to independently perform scientific research on climate change information. And that is not something that can be done now. So if you're a blind scientist, you have to ask an assistant to basically read the map to you and you're like asking questions as a scientist and trying to get this information secondhand. So blind people will be able to independently explore and find information they didn't even know existed like a sighted person would be able to. And then for navigation, blind people will gain confidence in being able to access the geographic information that their turn by turn navigation system is already accessing. And if their turn by turn navigation system gets lost, they'll be able to confidently say, I know that I need to keep going this direction, I don't need to stop and turn around and get lost when I'm navigating this route. There's just so many benefits for blind people when they'll get access to this geographic information. And for sighted people, we've already seen this benefit, and the digital map market is around \$22 billion. That's a lot that's huge, huge market that's like bigger than the insulin market or about the same size. So we've got this huge, ginormous market that sighted people already paid for. And maps are very ubiquitous throughout all of life. So blind people just will have access to that for the first time. And that's going to be the impact. It's going to really increase global inclusion, having these maps included in apps and websites.

**D****Dr. Marie McNeely 21:03**

Absolutely. I think you really explained it. Well. They're just greater participation and greater opportunities within community, within the society, within even career choices, which I hadn't even really thought about. So I'm really glad you brought those up. And we covered a lot of ground, Brandon. But if our listeners want to learn more about you and XR Navigation, what is the best way for them to do so?

**B****Brandon Biggs 21:24**

Learn about XR Navigation, go to [xrnavigation.io](http://xrnavigation.io) or visit [audiom.net](http://audiom.net) to learn about Audiom.

**D****Dr. Marie McNeely 21:35**

Fantastic. Well, listeners, definitely check out those websites. And Brandon, we really appreciate you joining us to share your insights and experiences with our listeners today.

**B****Brandon Biggs 21:45**



Thank you for having me.

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Dr. Marie McNeely 21:46

That was great. It was wonderful to chat with you and listeners. It's been great to have you with us as well. We would be so grateful if you could take a moment to leave us a review on your favorite podcast platform and to let us know what you think of the show. And we look forward to connecting with you again in our next episode of Changing What's Possible.