- Hey guys, today we are talking with Chris Hughes. He's a computer science lecturer at Salford University. And he was also a panelist on the Inclusive Immersive Experiences panel session at TechShare Pro. We're talking about the brilliant immersive web player that they've developed and that they would like you guys to check out. I'm here with Chris Hughes of Salford University who's very kindly offered to or agreed, twisted his arm to talk to us. Chris, do you want to give us your title and kind of what you do in your day job there?

- Okay yes, I lecture in computer science. So I teach computer science, but I'm interested in research and how that fits into broadcast and accessibility and all those kind of areas.

- Brilliant, now the reason why I got Chris on is because he was one of the expert speakers, panelists at a session at TechShare Pro last November. And it was on immersive inclusive experiences and it was a really good session. Chris was talking about a project that they've been involved in there, the IMAC project which is nothing to do with removing hair from your legs. Is that IMAC, sorry, forget that. But it did sound really, really interesting. So people may well not have heard about IMAC. Do you want to give us the low-down?

- Okay, so the IMAC project, it's a European-funded project that brings together collaborators from broadcast, industry, and academia with the sole purpose to look at how you can effectively integrate accessibility within immersive media. So by immersive media I mean 360 degree video. So the broad kind of overall aim of the project is to look at when a user or someone is immersed in 360 video, whether it's using a head-mounted display or whether it's just using their mobile phone on their laptop, how do you bring in the accessibility layer and the services just subtitling all the descriptions, sign language, and what other assistive technologies and layers you need to put in there to make them work.

- Brilliant, I mean it's quite a touch challenge, isn't it? I'm sure people are aware of VR, even have tried it themselves. They may well be aware of 360 video. And as a blind person myself the closest I have got is I have a pair of Bose AR frames which has speakers in and a compass as well. You can have the audio panning around you as you move your head. So that's the closest me, as a blind person, has ever personally got to an immersive experience that kind of feels like you're in a different place. So what are the challenges and how are you guys approaching it?

- So the project is focused on a kind of user-centric approach. So the whole project is about actually trying to work out what works for the end user. And the project also focuses on the entire pipeline. So in order to do this, it's not just good enough to kind of create a new player. We've had to look at how you build that, all the editing and production tools that fit around that. And then the entire pipeline as to how you then deliver that to the end user. Also this user-centric kind of approach it also kind of gives us the scope that it was all about us pulling together a few ideas and then putting it in front of users to work out what works for different people. And throughout the project we've had several kinds of development cycles where we built things, done pilots with users to get their feedback, and then gone back to the drawing board and started again to try and improve upon that.

- And in your session piece at TechShare Pro you mentioned some specific examples about what people liked and didn't like and what you're trying to achieve with making it more personalizable, more customizable for each individual.

- Absolutely, one of the interesting things I find when looking at 360 degree video and VR is the fact that you've suddenly got the freedom of choice. And quite often for me it's almost more interesting to look at what's happening elsewhere in the scene rather than where the main action's happening. And to me it's important that that kind of experience and opportunities are presented to any of the users regardless of . So we find, for example, if you are using subtitling it's often not possible for people to work out where the action's happening or who the person is actually speaking. So for example, one of the things we've had to look at in the project is exploring some kind of guiding mechanism to see if there's way to give an indication that if you can't hear the sound you can only see the video. Whereabout in the scene that's coming from. And in the project we started with about eight different approaches that we thought might be interesting ways to give an indication of where the speaker is and how the subtitles relate to that person. And in the end we whittled it down to a process of again pilots and user testing to find two approaches that people really liked. And the first one was just to add an arrow to the side of a subtitle that suggests actually it doesn't matter that you're looking at what's happening behind the scene, but the subtitle you're reading relates to something that's happening to your left or to your right. And if you want to see the person you actually need to turn to look. And we also implemented a kind of radar approach so if you're more experienced and you're familiar with the scene, and you've got more awareness of the kind of 3D scene around you, it gives you a little almost radar with a dot that indicates where you are looking relative to where the action's happening.

- Happening above you or below you as well.

- Absolutely, that's what I love about this kind of world. I say quite often would much more interested in. Sometimes we have video examples of things like an opera where it's actually more interesting to turn around and look at the conductor sometimes. See what's happened there, than it is on stage. If you have good hearing we can use binaural sound and you can hear the sound around you. You can hear the sounds behind you. But without those cues you then have to look at other mechanisms for doing that.

- Brilliant, if anyone's interested in a good example of binaural sound then just Google the virtual barbershop and put your earphones in. That's a brilliant piece of audio there. So you've got being able to follow the action when you are relying on subtitles. What about people who have got no vision, like myself?

- It tends to, in a spatial environment, be slightly easier when you've got sound. Because as I say you can use 3D sound. So you can hear what direction the person is speaking. If there's a person stood behind you, you get the cues again from the binaural sounds that the person's behind you. And you can also turn your head. And as you turn around you can hear different features of the scene that gives you some kind of spatial awareness of where you are in that scene.

- Yeah, and if you had an audio description track then you probably wouldn't want to have the audio describer kind of positioned somewhere in the 360 panorama as like an extra character in the scene. You'd probably want that always to be centered.

- Absolutely, absolutely and again in the project we've tried several positions to put the audio describer. And again through the play you can customize a little bit about whereabouts the audio description comes from.

- And talking about audio description, I mean I personally as a blind person relies on it. Often find that the levels of the mix, you know the audio description is too loud, it speaks over people. There are issues with good audio description. Your colleague Ben Shirley also at Salford University, they're working on a related but separate project about audio that is enabling people to choose the mix that they want in immersive audio or in immersive media.

- Yeah absolutely, it's a fantastic piece of work. Fantastic project, actually. The basic idea being you can have multiple audio assets in your scene. So you might have the background, you might have key action events, things like doors shutting. You could have dialog and you could have the audio description all together. One of the problems we've seen with other projects is it's very easy to then give different volume controls for these different layers. The interface becomes very complicated because you have to choose different volume layers for about four things. What they've been doing in their work is looking at how you can kind of resolve that down to a single volume control where different coefficients are given to different layers within the scene. So you can effectively turn the dial one way and it fades out the less important things and fades up the more important things like dialog or the audio description. Or if you turn it the other way you get more of the background noise and it kind of manages all the different levels together.

- Absolutely, and they gave a really good example of a tennis match, didn't they? Where they did lots of research about what people liked with regards to the levels of volume between the commentary and the match noises. You know, the tennis racquet hitting the ball, the grunts, the crowd noise and all that sort of thing. And the BBC, or whoever's covering it, tends to get a mix that's sort of somewhere in the middle. But the research actually showed that people, nobody actually wanted it at that level.

- It sounds like most users turned it one way or the other to an extreme. But the BBC obviously having to deliver a generalized audio version were aiming in the middle. And it as interesting when he was talking he was actually saying that it was directly in the middle. They were clearly finding that middle point whether that was a conscious decision or not. But they noticed that what was being brought up was right in the middle.

- Yeah, kind of a customer preference dead spot which nobody wanted. So this would certainly address that. And you're doing kind of the visual equivalent of that as well where you're not just getting a vanilla experience where you're served up what you're served up and everyone gets the same thing. And all you can do is really just turn your head and experience things. Anything else you want to say about, and we should say that IMAC stands for immersive accessibility. And where is the project going? What's the sort of timeframe and is there going to be a deliverable at the end?

- So we're actually now heading towards the end of the project. We're in the last round of pilot testing which is a much larger open pilot. So throughout the project most of the pilots have been kind of closed small groups, one-to-one, and asking questions and allowing people to experience it, and getting feedback that way. The final part of the project is where we actually are releasing the video player. It's being released on two of our broadcasters' websites. And there's an open version as well. And that will allow anyone to connect to the website, have a look at the player, try it out, see what works. And it also then asks them to provide some feedback through our survey form afterwards.

- Great, so if people want to do this, is it worth at this stage giving them the link to where they can go, and what kind of hardware would they need?

- Absolutely, although I might have to forward you the link afterwards because we're just finalizing those details at the moment.

- It will go in the show notes, guys.

- That would be amazing because anyone that then wants to see the player can see the player. As we reach the end of the project as well it's important to note that on the kind of player it's completely open source. Everything we've built is published, and all of our findings are published on our website as well. So anyone can take the player at their own service or put it on their own website and use it in any way they want to. We're now at the stage as well as looking at what happens next. So once we get the open pilot results back we'll able to make more of a decision on what the next steps are and how to improve it further and make sure that what we found gets taken forward and actually used.

- Great, but I'm assuming people will need a mobile phone with a compass and accelerometer and it would work in their browser?

- Oh absolutely, one of the real advantages of our player is it's completely JavaScript. So it works over the web which means you could load the player on your laptop if you wanted to. And you could use your mouse to look around the scene. Or if you've got a mobile phone with an accelerometer, if you open the player on your browser on your phone you can use your phone to look around. Or if you've got a head-mounted display which more and more people seem to be having these days, you can then connect to it through there as well. It works on pretty much any platform quite successfully.

- Brilliant, because they all have a browser and it would work the Cardboard I guess, as well?

- Yes indeed, it works absolutely fine with Cardboard. The idea was to make it as widely usable as possible.

- Yeah, hence the web. And you'd have to have your ears in for the full experience.

- Yes, absolutely.

- Brilliant, Chris, thank you so much indeed. I'm excited, I'm gonna give it a go even though the visual stuff you know for me personally won't be all there. But yeah, I'm very keen. My Bose AR frames have really made me excited about VR, immersive media albeit just from an audio point of view for me. But all the other listeners I'm sure will have a really good experience playing with it. And the link will be in the show notes.

- Excellent, well thank you very much.

- Thanks Chris, keep up the good work.