



Tuning Into 3D Games

Dr Lorenzo Picinali, a senior lecturer in Audio Experience Design at London's Imperial College, takes us through the exciting developments of his 3D Tune-In project – and how you can get involved

Imagine leaving the audiology clinic with a new digital hearing aid fitted – but not knowing how to use it properly, without ever having tried it before in a controlled environment, and without knowing how it's going to react in different conditions and scenarios.

Now picture being able to use a videogame or virtual reality app on your mobile, laptop or home computer that allows you to simulate different, real-life scenarios (such as a restaurant, cinema or noisy street) and try out, in each one, the different functionalities of your new aid. You could set your hearing aid to 'restaurant' mode, for example, and it amplifies the sounds in front of you and eliminates unwanted surrounding noise.

Or simply switch it to 'street' so you can hear everyday sounds around you when you're out and about – like car horns, the hissing hydraulics of buses, even a

cursing cycle courier! Or maybe turn it to 'cinema', to maximise the speech enhancement capabilities of the device.

Making connections

I started looking at these ideas when I worked in 3D sound simulations, researching loudspeakers and headphones. I realised how many problems were related to the use of digital hearing aids – and I started to connect the dots.

But it wasn't until I visited the University of Nottingham Human Factors Research Group, in 2014, that the idea started to shape itself into a project. Now, it's a fully formed entity – the 3D Tune-In project – funded by the EU and co-ordinated by the Dyson School of Design Engineering, at Imperial College London, where I work.

Hearing aid technologies have advanced dramatically since the commercialisation of the first

digital hearing aid nearly 30 years ago. While old analogue hearing aids simply amplified sounds and frequencies that couldn't be heard by an individual with hearing loss, digital hearing aids include much more functionality.

They can amplify sounds more, or less, depending on where the sound source is located; they can identify speech, enhance it and reduce background noise; they can detect specific scenarios and load the best setting for them; and much, much more.

However, the majority of individuals with digital hearing aids use the devices as if they were a standard analogue hearing aid – as in, mainly, for their amplification and equalisation features.

Put frankly, new innovation was just not being used to its full potential. So why not use video game and virtual reality



Left: Dr Lorenzo Picinali trying one of the apps in its development stage and (right) a conference delegate trying one of the prototype apps, using a simple mobile phone as Head Mounted Display.

technologies to help people with deafness or hearing loss to better understand digital hearing aids? After all, traditional gaming technologies have been used successfully before in non-leisure scenarios to foster learning and skill acquisition and social inclusion. Studies have shown that games have very real benefits in helping people to get used to products.

The 3D Tune-In project brings together relevant stakeholders from the videogame industry, academic institutions, a leading hearing aid manufacturer and hearing communities, to produce digital games in the field of hearing aid technologies and hearing loss.

At the halfway stage of the project, we're now ready to start the development of 3D Tune-In apps, including:

Musiclicity

A web-based app that helps you adjust your hearing for high-quality music listening, without having to increase the volume too much or sacrifice on dynamic range and frequency resolution.

Play&Tune

A mobile app with a simple and engaging interface designed specifically for older people. It guides you through the different functionalities of the hearing aid, such as directionality, compression and tone control.

AudGamPRO

A loudspeaker-based desktop application for replicating the acoustic conditions of real-life scenarios (such as a restaurant or walking down the street), so

that your audiologist can tell if your aid is working well for you.

And there are two innovative mobile apps designed for children:

Dartanan

A mobile app that helps youngsters learn what their hearing aid can do while playing a fun and engaging game.

Darius Adventure

A mobile app for children who don't have a hearing loss, that educates them about what life is like for people who do. The app simulates hearing loss so young users can try out different 'hearing aids' to improve their virtual hearing.

The first prototype 3D Tune-In apps are due to be released towards the end of this year at www.3d-tune-in.eu

Lorenzo and his team would love to hear from more hearing aid users interested in getting involved with 3D Tune-In. So, if you'd like to test the products, and give feedback on how best to modify the various simulations and games so that they're as effective as possible for everyday use, then please email: l.picinali@imperial.ac.uk