

## XR Partnerships Day – 28th November - Position Paper. Will Pearson, Academic Engagement

The presentation of spatial data over which you can move; the faithful recreation of the built environment around which users can roam; the bringing together of real and virtual actors and agents into the same space. These are some of the ways in which immersive technologies have been used to date in opening up the possibilities of advanced urban services being modelled, planned and deployed in urban contexts.

The visual perceptive qualities of VR have perhaps been overplayed though, as the primary leading modality from which the technology takes its lead. It's much less clear how affective and cognitive dimensions are playing out, based on Bloom's taxonomy of knowledge. There have been various moral panics in territories where immersive technologies have been both technically advanced and priced for wide adoption – say, gaming communities. These criticisms are by and large distracting and unhelpful; they reduce the technology and its use to lowest common denominator characteristics.

Moving into the tipping point of affordability and choice, and availability of powerful enough domestic technologies that can open this up, we need to reappraise what this can do for the motivation and commitment of our sector, those seeking to make cities more resilient, more liveable, safer and cleaner and supportive of the broadest possible cross-sections of society.

The Future Cities Catapult exists at the very nexus of business, academia and policy; our existence is as a neutral, trusted and independent entity in the innovation landscape. Therefore, we're excited to explore the role that immersive technologies can play in supporting business growth in advanced urban services.

But what of cross reality? How does an audience gain the insight and understanding of the tools available, alongside an appreciation of their application in building better futures?

Firstly, they need to be excited. As Kaufman (2003) first remarked about innovation, the originality that characterises it arises from incremental novelty. Recognising the affective power of novelty to have driven the entertainment (rather than enterprise) take up both VR and then AR, we should pay heed to understand what qualities of content have both gripped the imagination and provided a legacy on which to build.

One example is navigation. From using VR as a means of immersively training patients who have experienced brain trauma to re-learn routes, through to using AR techniques to overlay real world feeds with content that helps wayfind, navigating our environment in a more engaging and error-less way has been regarded as a failsafe content type for these technologies. Overlay sensors and actuators that form Internet of Things (IoT), and you quickly build an indexable and responsive content layer that your client device (the phone or tablet in your hand) can interact with in all sorts of new and potentially liberating ways.

The roll out of 5G connectivity for mobile devices is augured by many to be ushering in the real arrival of widespread VR and AR in mobile, and therefore the most common digital touchpoint in most city dwellers lives. It's based on this exciting juncture that a Partnership day would help the Catapult shape its research priorities. What should we be alert to? What support and investments in this area can we make to facilitate knowledge exchange between universities and businesses? How do we take the widest possible group of people forward with us? By being part of this day, you're helping answer some of these questions, and we're very grateful for your participation.

*Acknowledgements, with thanks for helping us put the day together:*

Igloo Vision  
<https://www.igloovision.com/>

Immerse UK  
<https://www.immerseuk.org/>

MXTReality  
<https://www.mxtreality.com/>

Ravensbourne University London  
<https://www.ravensbourne.ac.uk/>

## Timetable

### Auditorium

#### 9.15

Arrival, coffee

#### 9.30

Introduction to the day, mission: why is the Future Cities Catapult interested in immersive technologies, and how do we understand what the possibilities might be; housekeeping

**Dr Will Pearson, Academic Engagement**

#### 9.40

A Word from Our Friends: Immerse UK: Why Networks are Important

**Carrie Wooten, Immerse UK**

#### 9.50

Session 1 - **Auditorium** - MXTReality + FCC

***MXTReality: Multi User Collaboration Space: An HTC VivePro demonstration of the Highways England Laboratory as basis for discussion of different methodologies. 15 minutes interaction, 5 minutes discussion***

This will be an HTC VivePro setup to demonstrate our modular, multi-user, laboratory environment containing rooms that demonstrate capabilities in:

- Photogrammetry and XR to model spaces and new construction within them;
- Public Consultation within a Virtual environment;
- Collaboration on engineering projects within a shared virtual environment;
- Virtual films within Virtual environments.

#### 10.10

Session 2 - **Auditorium** - MXTReality + FCC

***MXTReality: Simulation: An HTC Vive Pro demonstration of the "ROADS" test environment as simulator and configurator tool for the purposes of Learning and Development and/or Planning***

This will be an HTC VivePro setup to demonstrate how simulators can be configured to meet modelling needs. In this case it is for the training of Traffic Officers in sign placement, cone placement, etc, against specific work instructions and measurements but this will be used to extend the conversation to road layout, junction layout, city configuration. Discussion of eye tracking technology as a tool for assessing the impact of design choices, will feature as prelude to the full demonstration after lunch.

- Configuration of bespoke simulators to generate ideas and feedback in a shared virtual environment
- Implementation of eye-tracking technology to assess the impact of design choices

#### 10.30

Coffee break

### Reconvene – Igloo Vision - 2nd Floor of Urban Innovation Centre

#### 10.50

Gathering at the Igloo Cylinder – showcase of urban related content (20 minutes)

#### 11.10

Session 3 - **Auditorium**

***MXTReality: A demonstration on the impact and use cases of Eye tracking for purpose of evaluating design choices- 10 minutes interaction, 10 minutes discussion***

MXTReality will share biometric assessment/ Eye tracking technology through a VR model.

**11.30**

Session 4 - Auditorium

***MXTReality: Demonstration of Haptic suits by Teslasuit***  
***10 Minute demonstration followed by 10 Minute Discussion***

Teslasuit is the world's first full-body haptic suit that enhances virtual and augmented reality experience through synergy of haptics, motion tracking, and biometry. Haptics is proven to increase immersion and improve learning. Motion tracking connects a human body with a cybernetic environment and is essential to the delivery of haptics. Biometric feedback enables adaptive content and performance measurement. Teslasuit is currently intended for integration into diverse enterprise applications and training solutions. In the future, Teslasuit will find wider use in games and entertainment, fitness and sports, wellness and healthcare.

**Reconvene – Igloo Vision - 2nd Floor of Urban Innovation Centre**

**11.50**

Session 5: Sound enhancing Immersion - Igloo Cylinder

**Gareth Llewelyn, Mixed Immersion:** enhanced spatialisation, textualisation in immersive spaces, the visceral use of sound 20 minutes interaction

**Workspace (Groundfloor)**

**12.10**

PLENARY in the Workspace (Will/Toby)

Will: research themes emerging // Toby: the business journey in immersive tech 20 minutes presentation/discussion.

**12.30**

**LUNCH – Auditorium – 1 hour**

Panogs 360 Degree camera technology to be displayed on large foyer screen. (We are working with Panogs on a solution for viewing, monitoring, and discussing major building schemes in real-time. We'll be using all-weather 360 camera setups that you can access in real-time from multiple locations. The added benefit is that you can enable public access to view the history of the city/build/road network in 360-degree panorama) This will be viewable during lunch, with the intention of prompting discussion.

**Auditorium**

**1.30 - 3.00**

**Ravensbourne and Cardiff Metropolitan University**

Intro to afternoon session 1.30 to 1.40 - Auditorium

Mixed Reality, Wearable Experience, Natural Media and Sensory Augmentation, are just some of the new mediums and forms of media being designed and developed by the Learning Technology Research Team (LTRC) at Ravensbourne. In the afternoon we will provide four demos concerning a variety of types of telepresence and immersion. Both telepresence and immersion transform the concept of the city. The city is no longer about physical space but the combination of virtual and physical.

*"One of the things our grandchildren will find quaintest about us is that we distinguish the digital from the real, the virtual from the real. In the future, that will become literally impossible." William Gibson*

**1.40**

Session 6: **[WEKIT] 'Wearable Experience for Knowledge Intensive Training' - 10 minutes discussion 20 minutes interaction**

[WEKIT] 'Wearable Experience for Knowledge Intensive Training' uses the latest in wearable and motion tracking technology to create 'wearable experience' where we can embody the context of the expert whilst being a novice learner. This (2.8 million Euro) Horizon 2020 project is building a platform for exploring; preserving and retrieving knowledge that resides in collaborative activities conducted in mixed reality settings. During the demo participants can try on the WEKIT garments and harness to record their bio data whilst exploring the WEKIT Hololens recorder and player software.

More information: <http://wekit.eu/>

## 2.10

### Session 7: *Fovography Demo - Tony Langford from Fovolab at Cardiff Metropolitan University*

Fovography is the first functioning imaging technology to be designed around the structure of human visual perception. It naturalistically emulates visual space rather than just simulating light rays, and can overcome many of the problems associated with imaging technologies based on linear perspective projection. It derives from six years of intensive multidisciplinary research, drawing on artistic practice such as painting and drawing, the history of art, the philosophy of perception, the psychology of visual perception, and computer graphics. Fovography is a powerful way of capturing audience attention and conveys a strong sense of depth without the need for special glasses or expensive screens. It can convincingly represent first person perspective and record far more physical space within a fixed picture area than conventional imaging. There are numerous potential applications in advertising, architecture, design, photography, entertainment, communications and medicine and wherever there is a benefit in more accurately replicating human visual experience.

More information: <http://www.fovography.info/>

## 3.00-3.30

### Tea break

## 3.30

### Session 8: *Insta360 pro 2 8k Stereoscopic camera live streaming demo to the Igloo*

Ravensbourne have developed a low-cost, professional-grade 360 VR/AR/MR camera capable of filming in stereoscopic at resolutions up to 16k. Where cameras were initially able to capture 360, now the focus is on 360+3D using the depth information to generate point clouds or full 3D meshes from the camera's output thus allowing for 6-degrees of freedom content capture. This camera is an inside out capture system capable of producing very high quality Virtual Reality (VR) content and uniquely, through the use of optical flow algorithms, Augmented and Mixed Reality content. This is achieved by using the depth information captured from each image to automatically remove the background of the footage. This is the first time a 360 camera has been adapted to achieve this. Through open-sourcing the designs and algorithms, we will be able to disseminate this 360 technology to a global audience of teachers, researchers and production studios. For the demo we will use the Insta360 pro 2 8k Stereoscopic camera to live stream to the Igloo.

More information: <https://www.insta360.com/product/insta360-pro2>

## 4.00

### Session 9: *The first 2 way live 3D teleportation between Ravensbourne University London and Wired Sussex @ The FuseBox* *10 minutes discussion 20 minutes interaction*

Through the collaboration between Ravensbourne and DoubleMe the Holoportal at Ravensbourne was constructed. We are working beyond the traditional frame & sensory boundaries, experimenting with interpersonal connections, human communication, engagement, perception, empathy, space & time, and visual-sonic hacks. The HoloPortal is an 'outside in' capture system that converts 2D videos into dynamic 3D models, in real-time for various 3D content markets including gaming, 3D animation, 3D printing and VR/AR/MR.

"In the corner of a UK research center is a rather unassuming blue room. It's in this room, however, where the future of virtual, augmented & mixed reality content creation lies – & it's called HoloPortal." MSN News

More information: <https://www.ravensbourne.ac.uk/news/2016/12/ravensbourne-and-doubleme-launch-the-uk-s-first-holoportal/>

## 4.30

Review of the day

**From 5pm**

**DRINKS RECEPTION**