FINAL REPORT

IMMERSIVE TECHNOLOGY SUMMER SCHOOL 2019

OXFORD VR AND AR HUB

DESCRIPTION

The Immersive Technologies Summer School 2019, organized by the Oxford AR and VR Hub (recently rebranded as the Oxford XReality Hub) provided students and young researchers with the skills to employ immersive technologies in their own research. This intensive four-days course included a series of hands-on training and project work. It culminated in collaborative group projects, which designed and developed new virtual or augmented reality applications.

SUMMARY

Following the success of the first Summer School on Immersive Technologies in Oxford in 2018, the VR and AR Oxford Hub organised a second Summer School in August 2019. The number of applicants and their different disciplinary backgrounds attested to the increasing demand for this training across disciplines in Oxford and around the UK. As in the previous year, the programme focused on equipping participants with the skills to create immersive experiences. The applications created as part of the group projects focused on public engagement, knowledge transfer and the creation of new research tools.

Attendees engaged in immersive app development: from 3D modelling, to user experience (UX) design, storytelling and app deployment. Topics included motion tracking, UX, computer vision, collision detection, review of commercially available devices and software development toolkits (SDKs).

Twenty-one applicants participated in the 2019 Summer School. They hailed from 10 UK universities and 1 European institution for higher learning. In selecting participants, each applicant submitted a project proposal that leveraged immersive technologies. The six best ideas were selected and developed in the course of the school. The programme culminated with a public presentation of the app developed.

The Immersive Technologies Summer School is the only training course of its kind at the University of Oxford that focuses on imparting AR and VR skills. It is an interdisciplinary and interdepartmental initiative, organised by the VR and AR Oxford Hub in collaboration with MPLS, Radcliffe Science Library and IT Services.

TEACHING AND ORGANISATION

The Summer School was organised and run by an interdepartmental team at the University of Oxford and Oxford Brookes University. Richard Smith and Mattia Montanari directed the programme and assisted in the teaching activities, together with instructors Fridolin Wild, Joshua Secretan and Will Guest from the Performance Augmentation Lab at Oxford Brookes University and John O'Reilly from Unity. Lisandra (Lia) Costiner and Maria Lißner coordinated the marketing and organisation of the course. Professor Nik Petrinic from the Dept. of Engineering provided guidance and support.

MATTIA MONTANARI   **MARIA LIßNER**   **RICHARD SMITH**   **LIA COSTINER**

SPONSORSHIP

Special thanks go to our sponsors: ESPRC, HTC Vive, DELL, and the MRC Weatherall Institute of Molecular Medicine who provided the financial support and hardware used in the course of the summer school.

ATTENDEES

The summer school attracted dozens of applications from national and international institutions. The 21 applicants selected came from the following universities:

- University of Oxford
- University College London
- Durham University
- London School of Economics
- University of the Arts, London
- University of Southampton
- Oxford Brookes University
- University of Buckingham
- Imperial College London
- University of Luxembourg
- University of Reading

The participants represented a variety of career stages – from undergraduates to postgraduate students, and from post-doctoral researchers to senior academics. The vast majority of attendees had no knowledge of VR and AR prior to enrolment in the course.
The cohort was diverse in terms of gender, ethnicity, and subject of study and interests. More than half of the participants were female, and humanities and social sciences subjects were amongst the heaviest represented subjects.
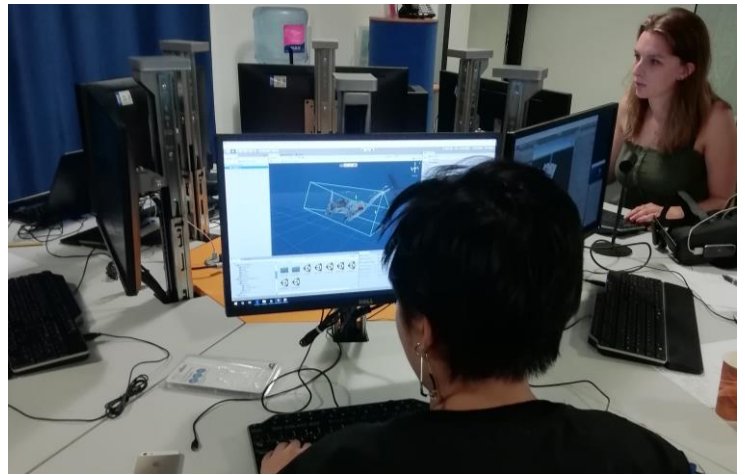
PROJECT 1:

How can one make information come to life for students, allowing them to explore and learn at their own pace? How can one be immersed into a museum experience without having to travel outside of the home?

POP-UP MUSEUM

Pop-up Museum is an AR app that propels you to the centre of the solar system. Interactive models together with visuals and original recordings from the lunar space landing provide a glimpse into how our solar system operates.

Using the Microsoft HoloLens smart glasses, visitors embark on an immersive and interactive journey into the heart of the solar system. The journey is self-guided and interactive allowing for exploration and self-guided learning.
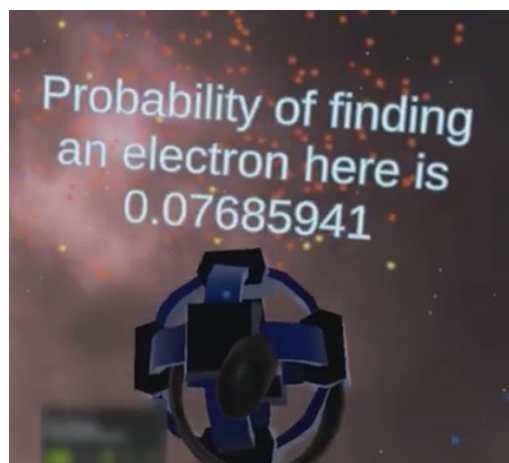
PROJECT 2:

How can one view Palaeolithic drawings located in a cave that is closed to the public? How does viewing cave art in its original environment enable modern researchers to understand the ways in which cave drawings were created and originally experienced?

CAVE ART

Cave Art is a virtual reality application using photogrammetry models of real Palaeolithic cave drawings from Spain. It immerses participants into a cave, allowing them to explore its art as prehistoric dwellers did with a lamp, or as modern researchers with a torch. Ambient sound and the realistic look of the environment recreate the experience of exploring a real cave.

PROJECT 3:

How can atomic theory be explained and visualised? How can an interactive, immersive environment help viewers gain a deeper understanding of physics and the inner structure of an atom?

ATOM INSPECTOR

Atom Inspector is a VR app which invites you to explore the atom. Different modes enable viewers to experience the shapes of electron clouds and dispel the erroneous views of how electrons were thought to travel around the nucleus, in pre-determined orbits rather than in a cloud.
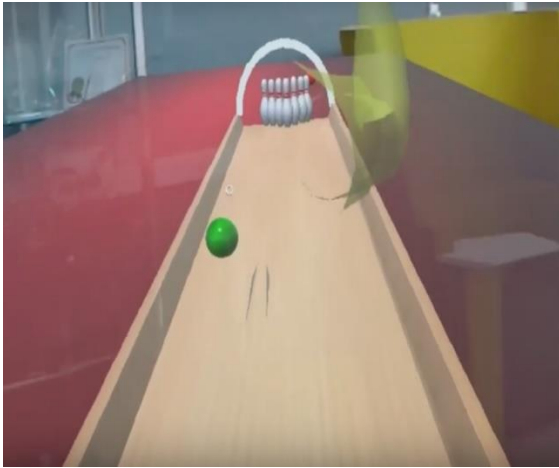
PROJECT 4:

Can one explore a museum from the comfort of their home? How can museums impart information and engage with audiences who cannot visit their physical sites?
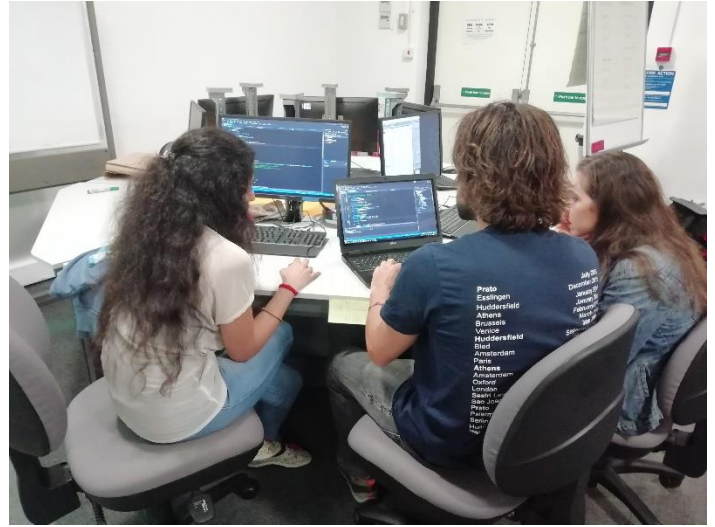
PORTAL MUSEUM

Portal Museum (VR app) opens the doors to a virtual museum of natural history. Walk through the museum's halls, interact and explore various displays and open yourself to new information and experiences.

PROJECT 5:

Can immersive technologies assist individuals with disabilities regain motor control through simple exercises?

AMPUTEE BOWLING

The Amputee Bowling project harnesses the power of augmented reality to help amputee experience bowling again, and in the process retrain muscles. The Microsoft HoloLens is used to create the experience of playing the game while sensors on the arm record movement.

IMPACT

The Immersive Technology equipped twenty-one researchers with a portfolio of new skills which they will take to their home universities and harness in their own research. All participants involved expressed their desire to use this new knowledge in their future work. Seeing the wide range of interest in these courses from researchers from a variety of career stages and disciplines, the Hub is planning to deliver further training in the upcoming academic year.

The summer school also fostered new relationships within the university, between various departments, institutes and IT Services, which collaborated in the organisation, funding and delivery of this programme. It also created new links between the University of Oxford and Brookes University, in particular the Performance Augmentation Laboratory headed by Fridolin Wild. Relationships with industrial partners who supported the development and delivery of this course, were likewise strengthened.

As importantly, this course created new friendships, connections and opportunities for future collaboration across universities.

The Hub leverages immersive tech across all divisions of the University of Oxford.

OXFORD VR HUB