Wandering around the molecular landscape: embracing virtual reality as a research-showcasing outreach and teaching tool.

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Virtual reality on campus

Virtual reality in science is an exciting, effective and rapid expanding field in today's research. Auckland molecular research at the School of Biological Sciences aims to build capability in the use of virtual reality technology for molecular visualization, i.e. to create an experience which enables the user to actually climb inside a molecule and walk around it.

The required hardware was funded by the MacDiarmid Institute, and a workshop is run by PhD student Kyle Webster to build interest in using the technology to showcase research on campus.

The project

The team has run a small pilot study using existing software to provide a proof of concept that is indeed possible to climb inside a virtual molecule. To keep up with the rapid growing technology, a dedicated software developer and a motion graphic designer are part of the Auckland team to connect local and international expertise so that the Auckland molecules are professionally rendered to maximise the impact as a research, teaching and outreach tool.

The application

The team will create awareness on campus of the technology, so that researchers can turn their molecules into virtual reality experiences and stroll around them. In the first instance, the team will use proteins in the Lab from Prof Gerrard and her collaborators as case studies, moving onto the more complex case of Dr O'Sullivan's complex DNA structures in whole chromosomes. We envisage that many other projects will be nucleated by the programmer and researchers / PhD students will be excited to turn their 3D data into a virtual reality experience.

The collaboration

Prof Gerrard was introduced to the Vive VR technology at the Googleplex – an international SciFoo Conference – and was able to keep updates of other institutions that are rapid adopters of this technology. For example, Prof Tom Davies, Director of the ARC Centre of Excellence in Convergent Bio-Nano Science and Technology (https://www.cbns.org.au/) and Prof Paul Bonnington from CAVE-2 Centre (http://www.monash.edu/mivp) are some of the more advanced players in the field who have agreed to share their expertise as part of this programmer.

More locally, the team have connected with the VR Garage and the Media Design School, where Steve Dorner, Associate Dean (Programme Leader of Bachelor of Art and Design &) is interested in assisting with scaling the technology for large undergraduate audiences (perhaps through augmented reality). This would provide an opportunity to showcase Auckland molecular research at the centre of the virtual reality experience, and tailor it to attract students and researchers to the University of Auckland.

The role of the Centre for eResearch (CeR)

CeR has an excellent facilities and expertise in visulisation and analytic area. The Centre has been working with researchers across the University including Auckland Bioengineering Institute (ABI), Faculty of Medical and Health Sciences, Population Health, Mathematics, Marine Science, New Zealand Institute for Pacific Research names but a few, to build visual spatial maps, generate animated model, 3D modelling tool etc.

The Benefits to the University

The project is linked to the University strategic priorities and provide the following benefits:

1. Attracting talented undergraduates and postgraduates from throughout NZ and internationally.
2. Enhancing the University's ability to attract externally funded research and in particular, offshore funding.
3. Enhancing the student experience, including the experience of international students
4. Enhancing learning and teaching
5. Enhancing the University's international relationships and standing.