

# VIRTUAL REALITY IN NATURAL SCIENCES

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**Abstract** *Virtual and augmented reality is a hot topic in education and research. To reach educators in natural sciences, Teatime Research Ltd and Department of Geosciences and Geography from the University of Helsinki organized a workshop during the LUMAT Symposium 2017. The participants were shown the possibilities of the technologies and software available, one of these being the locally developed Teatime Vrifier, a universal viewer for three dimensional data. To integrate these new technologies into educational workflows and daily use, it requires actual testing and exposure on all levels.*

Virtual and augmented reality (VR/AR) has been considered as a promising and novel technological tool for education and research for several years now. The use cases with disruptive technologies in the field of optical sensory data collecting, such as three dimensional or computed tomography (CT) imaging, often evolve from the initial step of data visualization and then move toward quantified analytics; in layman's terms, going from pretty pictures to actual scientific research. This is the normal pathway to arouse interest around the subject through education and public outreach, tempting the natural pattern recognition and aesthetic capabilities of humankind, inducing commitment.

Teatime Research Ltd and The Department of Geosciences and Geography (University of Helsinki) organized a workshop during the LUMAT Symposium 2017 addressing these topics to give educators and researchers substance to integrate VR and AR to their toolsets and thinking. There has been a high exposure in the media about VR and AR, but it still remains not that familiar for the public and surprisingly few have actually tested different types of equipment and content. Teatime as a content provider, is probably most familiar to the general audience from their immersive journalism Aleppo-Helsinki VR experience, <http://teatimeresearch.com/aleppo-helsinki>, where the technology was used to visualize the effects of war in a familiar environment. Teatime Research was also featured in the Nature journal (Maxmen, 2016).



**Picture 1.** Aleppo-Helsinki journalistic VR experience (Teatime Research).

More generally, Teatime is in close collaboration with education, scientific and technology communities. These manifest in working with many instances in the University of Helsinki, Quantum Game Jam project with quantum physicists from the University of Turku and Aalto University and being a core member of the Finnish Virtual Reality Association, FIVR. This is also one of the key operating areas for Teatime, providing tools for scientists and educators.

Teatime Vrifier, <http://teatimeresearch.com/vrifier>, a 3D data visualization, manipulation and analysis tool, was introduced to the community in the workshop. Participants were able to view and manipulate e.g. CT scanned gekko skull and remote sensed geographical landforms. The Vrifier is designed for use with a wide variety of 3D models or spatial datasets, whether generated by the user or acquired from online databases. It is designed to be directly and easily usable by museums and educators, providing a separate “Kiosk”-mode, where you can design your own experiences around the models with added text or image information, to be used almost like a PowerPoint for VR.



**Picture 2.** Vrifier, a 3D data visualization and analysis tool. User is viewing an elk skull (Teatime Research).

During the workshop, the participants were also able to test the newest devices such as high-end VR HTC Vive, “holographic” AR Microsoft HoloLens and mobile Google Daydream headsets to get a grasp about different type and level of solutions and possibilities. They were also introduced to several educational contents like Google Earth VR, Galaxy Explorer and Labster: World of Science on respective platforms.

For most of the workshop participants, this was the first encounter with VR and AR. It was very well received and they started immediately to incorporate it in their planning of future use. Teatime is now part of a proposal from the University of Helsinki, where educational content will be generated in digital form, also virtual reality, and some of the teachers from the workshop are planning to take VR in their curriculum.

Virtual and augmented reality is already a medium for the educators to use. It is now up to the individual scientists and teachers to find the right tools and contents to best suite their needs and share the knowledge based on their own experiences.

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