Astrobiology 'Down under': A comprehensive Virtual Field Trip of the c. 3.48 Ga Dresser Formation, Pilbara Craton, Western Australia.

T. Djokic[1,2], M. J. Van Kranendonk[1,2], C. Oliver[1], S. Guan[3], A. Ong[3], [1]Australian Centre for Astrobiology, PANGEA research Centre and School of Biological, Earth and Environmental Sciences, University of New South Wales, Kensington, NSW 2052, Australia [2]Australian Research Council Centre of Excellence for Core to Crust Fluid Systems [3]Big Questions Institute, University of New South Wales, Kensington, NSW 2052, Australia [4]icinema: Centre for interactive cinema research, University of New South Wales, Kensington, NSW 2052, Australia.

The advent of virtual reality technologies and multi-scale 3D modelling in combination with geological mapping has allowed never before explored perspectives of geological outcrops [1].

This research focuses on building a comprehensive virtual field trip (VFT) of the c. 3.48 Ga Dresser Formation North Pole Dome, Pilbara Craton, Western Australia. Extensive and detailed mapping, petrological and geochemical data from the Dresser Formation suggest that the environment was associated with volcanic hot springs on an exposed land surface [1,2].

The VFT demonstrates this palaeoenvironmental model showing how the depositional environment evolved spatially and through time. It includes immersive geological outcrop visuals, photogrammetric imaging (3D models), and integrates detailed scientific observations from the macro- to the micro-scale i.e. outcrop to thin section, respectively (Figure 1). Results aim to: 1. Enhance the depositional model for the Dresser Formation, developing a better understanding of the relationship of some of Earth's earliest convincing evidence of life to hydrothermal fluids and; 2. Produce an interactive and immersive learning/educational tool - by way of a VFT - that can be used in online, face-to-face teaching, and as a research tool.

The principles and practices of the VFT can be applied to other geological sites and, perhaps, Mars. The VFT serves as an educational tool and as a visual aid in communicating science and early life on Earth as well as providing assessment for the use of immersive environments in education and scientific research.

References:
[1] Bemis, S. P. et al. (2014) *Journal of Structural Geology* **69**, 163-178.
[2] Van Kranendonk, M. J. et al. (2008) *Precambrian Research* **167**, 93-124.
[3] Van Kranendonk, M. J. (2006) *Earth-Science Reviews* **74**, 197-240.
[4] Djokic, T. et al. (in prep).

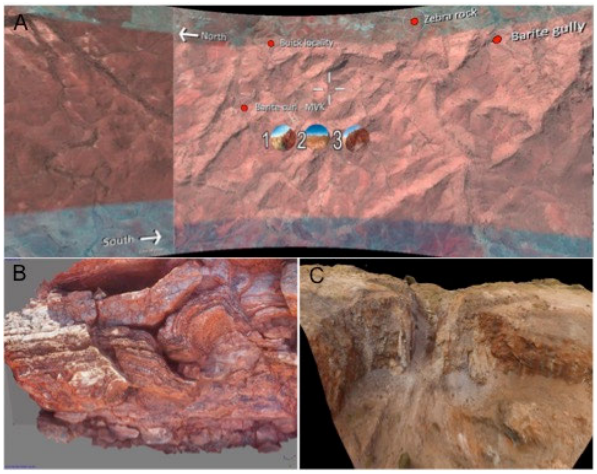

Figure 1 | A. Map of the Dresser Formation within the Virtual Field Trip showing sites containing multiple 360° panoramas that contain detailed multimedia such as 3D models, photographs, micrographs and geochemical information. **B.** 3D model of stromatolites. FoV – 3 m. **C.** 3D model of local outcrop. FoV – 100 m.