

Lewis Baker

PhD, MSc



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Qualifications and Education

2017 to 2020	Doctor of Philosophy (PhD) Department of Computer Science University of Otago, NZ Thesis: <i>Localisation and Tracking of Stationary Users for Extended Reality</i>
2016 to 2017	Master of Science (MSc) Department of Computer Science University of Otago, NZ Thesis: <i>Power Line Detection from Mobile Devices</i>
2015 to 2016	Postgraduate Diploma in Science (PGDipSci) Department of Computer Science University of Otago, NZ Project: <i>Real-time GPU Ray Tracer using OpenCL</i>
2012 to 2015	Bachelor of Science (BSc) Department of Computer Science University of Otago, NZ

Scholarships and Awards

2017	UoO Doctoral Scholarship
2016	UoO Master's Scholarship (Priming Partnerships)
2014	UoO Scholarship in Science

Developer Skills

Languages: C++, C#, C, Python, Java.

Libraries: OpenCV, Eigen, OpenCL, OpenGL, GLFW, Android NDK.

Tools: Unity, Git, Android Studio, Visual Studio, vcpkg, SfM pipelines (COLMAP, VisualSFM, Bundler).

Research Interests

My primary research interests are in AR, VR, computer vision, SLAM tracking, and localization. My PhD topic focusses on how to track cameras for AR applications where the user is in a fixed position (such as sport spectators, lookout points, tourist locations, seated HMD's, etc.). I was also involved in other projects outside my study including maintaining an Augmented Reality Sandtable as a member of the HCI lab at Otago. Other projects include game development with Unity, and multi-view video stitching for player analysis on large sport fields. I am currently a member of the Graphics and Vision lab at Otago, supervised by Dr. Stefanie Zollmann, Dr. Steven Mills, and Assoc. Prof. Dr. Tobias Langlotz, with external collaboration with Dr. Jonathan Ventura (CalPoly, USA).

Publications

Poster: Baker, L., Mills, S., Langlotz, T., & Rathbone, C. (2016). Power line detection using Hough transform and line tracing techniques. In *2016 International Conference on Image and Vision Computing New Zealand (IVCNZ)* (pp. 1-6). IEEE.

Conference: Baker, L., Zollmann, S., Mills, S., & Langlotz, T. (2018). SoftPOSIT for Augmented Reality in complex environments: Limitations and challenges. In *2018 International Conference on Image and Vision Computing New Zealand (IVCNZ)* (pp. 1-6). IEEE.

Poster: Baker, L., Zollmann, S., & Ventura, J. (2019). Spherical Structure-from-Motion for Casual Capture of Stereo Panoramas. In *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)* (pp. 846-847). IEEE.

Journal: Moore, A., Daniel, B., Leonard, G., Regenbrecht, H., Rodda, J., Baker, L., ... & Mills, S. (2020). Comparative usability of an augmented reality sandtable and 3D GIS for education. *International Journal of Geographical Information Science*, 34(2), 229-250.

Conference: Baker, L., Mills, S., Zollmann, S., & Ventura, J. (2020). CasualStereo: Casual Capture of Stereo Panoramas with Spherical Structure-from-Motion. In *2020 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*. IEEE. (Honourable Mention Award)

Conference: Baker, L., Ventura, J., Zollmann, S., Mills, S., & Langlotz, T. (2020). SPLAT: Spherical Localization and Tracking in Large Spaces. In *2020 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*. IEEE.