

Prof. Jordan Poppenk, Ph.D.
Canada Research Chair in Cognitive Neuroimaging
Department of Psychology, Centre for Neuroscience Studies, School of Computing
jpoppenk@queensu.ca

#1: Our laboratory has recently developed procedures for reducing the negative impact of traumatic memories. However, our procedures are currently only usable in a lab setting. We seek to gameify these procedures such on a mobile device platform that could be "prescribed" and downloaded to treat PTSD. The proposed project is for software will accept multimedia files to be presented in the context of an engaging video game that adapts in difficulty to the user's capabilities. At its core, the project should mimic our lab procedures, but there is ample freedom to integrate these with your own creative vision for a new game. Our lab has a Unity-based infrastructure with many valuable scripts and assets to facilitate your implementation.

#2: How do we develop memory of the spatial environment? Our laboratory seeks to sample electrical brain potentials as well as physiological signals of users while they navigate new areas for the first time. For this purpose, we have created an iOS platform for tracking users' routes and measuring how their memory for those routes changes over time. However, to be scientifically useful, this software requires development for recording and transmission of biological signals from our hardware. Available signals include mobile device sensors and our portable EEG headset. The project involves three stages: 1) preliminary familiarization with the open BCI platform by implementing a simple biosignal sampling algorithm in Matlab; 2) recording of EEG biosignals to our iOS platform; 3) transmission of recorded biosignal data to a PHP server. The tool will be used by Psychology and neuroscience students to monitor volunteers' brains and biology while they explore the world, helping us to learn how people record the spatial environment into our memories.