Blake Porter, B.A. Hons

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Education:

Ph.D. in Psychology University of Otago – Dunedin, NZ

B.A. in Neuroscience with Honors

Minor: Human Physiology Boston University – Boston, MA

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Research Experience:

David Bilkey Lab for Brain and Behavior In conjunction with the Brain Health and Research Center University of Otago, Dunedin, NZ

Use of *in vivo* electrophysiology techniques to investigate how effort is represented at a neural level, the effects effort has on the brain's representation of the world, and the circuit level dynamics of planning actions utilizing effort information.

Howard Eichenbaum Lab for Cognitive Neurobiology Boston University, Boston, MA, USA

Use of *in vivo* electrophysiology techniques to investigate the structure of memory consolidation and organization in the hippocampus with learning, hippocampal and medial prefrontal circuit dynamics in a context-guided object association task, and to investigate the neural mechanisms by which conjunctive encoding within the dentate gyrus and between the dentate gyrus and other hippocampal subregions.

Publications:

- Lara M. Rangel, Blake Porter, Ian S. Heimbuch, Pamela D. Riverère, Katie R. Keefe, and Howard Eichenbaum. *Conjunctive encoding in the Dentate Gyrus of the Hippocampus*. (in prep)
- Lara M. Rangel, Blake Porter, Carl H. Budlong, Pamela D. Riverère, Katie R. Keefe, and Howard Eichenbaum. *Rhythmic coordination of associative memory representations*. (in prep)
- Anja Farovik, Ryan Place, Samuel McKenzie, Blake Porter, Catherine Munro, and Howard Eichenbaum. Orbitofrontal cortex encodes memories within value-based schemas and represents contexts that guide memory retrieval. Journal of Neuroscience. 27 May 2015. 35(21): 8333-8344. doi: 10.1523/JNEUROSCI.0134-15.2015

February 2014 – Present

Spring 2012 – January 2014

September 2009 - May 2013

February 2014 - Present

 Sam McKenzie, Andrea J. Frank, Nathaniel R. Kinsky, Blake Porter, Pamela D. Riverère, and Howard Eichenbaum. *Hippocampal Representation of Related and Opposing Memories Develop within Distinct, Hierarchically Organized Neural Schemas*. Neuron. 2 July 2014. 83(1)202 - 215. http://dx.doi.org/10.1016/j.neuron.2014.05.019

Poster Presentations:

- Lara M. Rangel, Katie R. Keefe, Pamela D. Riverère, Carl H. Budlong, Ian S. Heimbuch, Blake Porter, and Howard Eichenbaum. *Single cell and ensemble odor-place representations in the Dentate Gyrus and CA1 of the Hippocampus*. Society for Neuroscience 2014 Conference.
- Lara M. Rangel, Jeremiah S. Rosen, K. V. Chawla, Brian J. Ferreri, Ian Heimbuch, Blake Porter, and Howard Eichenbaum. *Persistent increases in beta frequency oscillatory activity in the Dentate Gyrus of the Hippocampus During Object-Context Association Intervals.* Society for Neuroscience 2013 Conference.
- Anja Farovik, Sam McKenzie, Ryan Place, Blake Porter, and Howard Eichenbaum. *Neural activity by Medial Prefrontal cell ensembles during context-guided object discrimination*. Society for Neuroscience 2013 Conference.
- Sam McKenzie, Andrea Frank, Lara M. Rangel, Jeremiah S. Rosen, Vittoria Smeglin, Blake Porter, and Howard Eichenbaum. *Multidimensional coding in the Hippocampal network*. Society for Neuroscience 2013 Conference.
- Blake Porter, Andrea Frank, and Howard Eichenbaum. *How does the Hippocampus integrate multiple related memory representations?* Boston University Undergraduate Research Opportunities Program Symposium, 2012.

Oral Presentations:

• Blake Porter and David Bilkey. *The network dynamics of effort encoding between the hippocampus and anterior cingulate cortex*. Brain Health Research Center Annual Conference, 2015.

Research Awards:

•	PhD Scholarship from Dr. Bilkey's Marsden Grant for	February 2014 - Present
	University of Otago	\$25,000/year
		6 2012

• UROP/HHMI Summer Grant for investigating "How Does the Hippocampus Integrate Multiple Related Memory Representations" *Boston University* Summer 2012 \$4,000

Teaching Experience:

Research Teaching and Mentoring: teaching studentsMay 2013 - Presentrodent behavioural training and *in vivo* electrophysiologymethods.Advisees (their subsequent pursuit):Ian Heimbuch (PhD student, UCLA), Brian Ferreri, and Jessica Barton (MSc, VictoriaUniversity).

Mentor for Boston University Mind and Brain SocietyFall 2011 – Spring 2013Mentored incoming freshman in the UndergraduateNeuroscience Program at BU.

Technical Expertise:

- Animal Behavior: Rat handling and training on context-object and odor-object associative memory tasks, effort modulated linear tracks, dual animal interaction task, video behavioural scoring (Cineplex Editor and Matlab), designing and implementing novel tasks targeted at effort based neural computations.
- *In vivo* electrophysiology: 8 96 channel microdrive design and construction for multisite recordings using conventional and 3D printing techniques. Implementation of wireless *in vivo* recording systems and methods. Stereotaxic surgical implantation of microdrives and electrodes for single unit and local field potential recordings in awake-behaving rats targeting hippocampal subregions (CA1, CA3, DG), medial prefrontal cortex, orbitofrontal cortex, and anterior cingulate cortex. Recording single units and local field potentials in awake-behaving rats, spike sorting, and perfusions.
- **Computer programming:** Matlab for analysis of behavioural, single unit, and local field potential data. Arduino Development Environment for Arduino microcontrollers for the use of data collection and maze controlling (ie, doors, touch screens, solenoids, etc).
- Tissue Staining: Nissel

Research Interests:

- How the brain encodes effort, how effort modulates the brain's representations of the world, and how effort influences goal setting, decision making, and persistence.
- The study of brain rhythms and their underlying mechanisms to investigate circuit level communication between the hippocampus and downstream structures, particularly the prefrontal cortex.
- How brain structures organize similar and distinct memories and how memory organization influences learning and decision making.
- How the brain represents space in three dimensions when the z-axis is behviorally relevant.