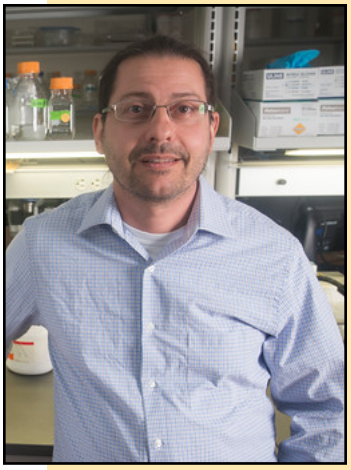

Theodore Dumas, PhD

Associate Professor, Psychology

Education

PhD, Psychology, University of Virginia

Key Interests

Brain Development | Cognitive Development | Decision Making | Learning and Memory | Mood Disorders | Brain Aging | Synaptic Plasticity | Neural Technology | Climate Change

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SELECT PUBLICATIONS

- Dumas, T.C. (2020). *If Food Could Talk: Stories from Thirteen Precious Foods Endangered by Climate Change.* KoehlerBooks.
- Sanders, E. M., *et al.* (2018). Separate functional properties of NMDARs regulate distinct aspects of spatial cognition. *Learning & Memory* 25(6), 264-272.
- McHail, D.G., Dumas, T.C. (2020) Hippocampal gamma rhythms during Y-maze navigation in the juvenile rat. *Hippocampus*. 30(5):505-525.
- Zhou, S., *et al.* (2019) Aversive conditioning in the tardigrade, Dactylobiotus dispar. *Journal of Experimental Psychology: Animal Learning and Cognition*. 45(4):405-412.

Research Focus

I apply an interdisciplinary approach to investigate the neural bases of memory and decision making with an emphasis on brain and cognitive development. I use genetic and pharmacological means to alter brain function and make anatomical, physiological, and behavioral assessments to link brain function to cognitive state. I collaborate with biologists at the Mason National Center for Biodefense and Infection Disease to study the impacts of viral infections on brain function cognitive ability. I also work with Mason mathematicians and physicists to apply machine learning algorithms to our electrophysiological signals from awake and behaving subjects and use these results to create unbiased computational models of how brain states relate to cognitive states.

Current Projects

- Engineered transgenic mice that express mutated NMDA receptors to determine the separate contributions of calcium-mediated and calcium-independent signaling streams in synaptic plasticity and memory.
- Perform in vivo electrophysiological recording in juvenile rats to understand how neural circuits operate to control spatial navigation.
- Study tardigrades to understand the metabolic necessity for memory storage.
- Perform molecular subcloning to create optogenetic actuators that can cross synapses.