

# CURRICULUM VITAE

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## **1. EDUCATION**

- 1995 Bachelor of Science, Psychology, University of Wisconsin – Madison, USA  
2000 Master of Science, Psychology, McGill University, Montreal, Canada  
*Memory modulation produced by post-training exposure to an aversive conditioned stimulus.*  
2003 Doctor of Philosophy, Psychology, McGill University, Montreal, Canada  
*Amygdala involvement in aversive conditioning.*

## **2. EMPLOYMENT**

- 1995 – 1997 Research Specialist, Dr. Ann Kelley, Department of Psychiatry, University of Wisconsin – Madison, Madison, WI, USA  
2002 – 2003 Research Associate, Dr. Robert McDonald and Dr. John Roder, Department of Psychology and Mount Sinai Hospital, University of Toronto, Toronto, ON, Canada  
2003 – 2006 Post-Doctoral Fellow, Dr. Aryeh Routtenberg, Departments of Psychology, Neurobiology and Physiology, Northwestern University, Evanston, IL, USA  
2006 – 2009 Assistant Professor, Department of Psychology and Institute of Neuroscience, Carleton University, Ottawa, ON, Canada  
2009 – 2010 Associate Professor, Department of Psychology and Institute of Neuroscience, Carleton University, Ottawa, ON Canada  
2010 - 2016 Associate Professor, Department of Neuroscience, Carleton University, Ottawa, ON Canada  
2016 - Professor, Department of Neuroscience, Carleton University, Ottawa, ON Canada

## **3. PUBLICATIONS**

### **3.1 PEER-REVIEWED RESEARCH ARTICLES**

1. Kelley, A.E. and Holahan, M.R. (1997). Enhanced reward-related responding following cholera toxin infusion into the nucleus accumbens. *Synapse*, 26, 46 - 54.
2. Stratford, T.R., Holahan, M.R. and Kelley, A.E. (1997). Injections of nociceptin into the nucleus accumbens shell or ventromedial hypothalamic nucleus increase food intake. *Neuroreport*, 8, 423 - 426.

3. Kelley, A.E., Smith-Roe, S. and Holahan, M.R. (1997). Response-reinforcement learning is dependent on NMDA receptor activation in the nucleus accumbens core. *Proceedings of the National Academy of Sciences*, 94, 12174 – 12179.
4. Holahan, M.R., Kalin, N.H. and Kelley, A.E. (1997). Microinfusion of corticotropin-releasing factor into the nucleus accumbens shell results in increased behavioral arousal and oral activity. *Psychopharmacology (Berlin)*, 130 (2), 189 - 196.
5. Baldwin, A.E., Holahan, M.R., Sadeghian, K. and Kelley, A.E. (2000). N-methyl-D-aspartate receptor-dependent plasticity within a distributed corticostriatal network mediates appetitive instrumental learning. *Behavioral Neuroscience*, 114(1), 84 - 98.
6. Schroeder, B.E., Holahan, M.R., Landry, C.F. and Kelley, A.E. (2000). Morphine-associated environmental cues elicit conditioned gene expression. *Synapse*, 37, 146 – 158.
7. Kelley, A.E., Bakshi, V.P., Fleming, S. and Holahan, M.R. (2000). A pharmacological analysis of the substrates underlying conditioned feeding induced by repeated opioid stimulation of the nucleus accumbens. *Neuropsychopharmacology*, 23(4), 455-467.
8. Baldwin, A.E., Sadeghian, K., Holahan, M.R. and Kelley, A.E. (2001). Appetitive instrumental learning is impaired by inhibition of cAMP-dependent protein kinase within the nucleus accumbens. *Neurobiology of Learning and Memory*, 77, 44-62.
9. Holahan, M.R. and White, N.M. (2002). Conditioned memory modulation, freezing, and avoidance as measures of amygdala-mediated conditioned fear. *Neurobiology of Learning and Memory*, 77, 255-275.
10. White, N.M., Holahan, M.R. and Goffaux, P. (2003). Involuntary, unreinforced (pure) spatial learning is impaired by fimbria-fornix but not by dorsal hippocampus lesions. *Hippocampus*, 13(1), 282 - 291.
11. Holahan, M.R. and White, N.M. (2003). Effect of muscimol inactivation of the basolateral or central amygdala on shock-conditioned responses. *Annals of the New York Academy of Sciences; The Amygdala in Brain Function: Basic and Clinical Approaches*, 985, 525 – 527.
12. Holahan, M.R. and White, N.M. (2004). Amygdala c-Fos induction corresponds to unconditioned and conditioned aversive stimuli but not to freezing. *Behavioural Brain Research*, 152(1), 109-120.
13. Holahan, M.R. and White, N.M. (2004). Amygdala inactivation blocks expression of conditioned memory modulation and the promotion of avoidance and freezing. *Behavioral Neuroscience*, 118(1), 24-35.
14. Holahan, M.R. and White, N.M. (2004). Intra-amygdala injections impair freezing and place avoidance in aversive contextual conditioning. *Learning and Memory*, 11(4), 436 - 446.
15. Holahan, M.R., Hong, N. S., Chan, C. and McDonald, R.J. (2005). Posttraining intra-amygdala amphetamine injections given during acquisition of a stimulus-response (S-R) habit task enhance the expression of stimulus-reward learning: further evidence for incidental amygdala learning. *Brain Research Bulletin*, 66, 222 – 228.
16. Holahan, M.R. (2005). Complementary roles for the amygdala and hippocampus during different phases of appetitive information processing. *Neurobiology of Learning and Memory*, 84, 124 - 131.
17. McDonald, R.J., Hong, N.S., Craig, L.A., Holahan, M.R., Louis, M. and Muller, R.U. (2005). NMDA-receptor blockade with CPP impairs post-training memory consolidation of a rapidly acquired spatial representation in rat hippocampus. *European Journal of Neuroscience*, 22, 1201 – 1213.

18. Chai, S.-C., Holahan, M.R., Shyu, B.-C. and Wang, C.-C. (2005). Differential patterns of ERK1/2 phosphorylation in rat limbic brain regions after short-term and long-term inhibitory avoidance learning. *Neuroscience*, *137*(4), 1321 - 1330.
19. Holahan, M.R., Taverna, F.A., Emrich, S.M., Louis, M., Muller, R.U., Roder, J.C. and McDonald, R.J. (2005). Impairment in long-term retention but not short-term performance on a water maze reversal task following hippocampal or mediodorsal striatal NMDA receptor blockade. *Behavioral Neuroscience*, *119*(6), 1563 – 1571.
20. Holahan, M.R., Rekart, J.L., Sandoval, J. and Routtenberg, A. (2006). Spatial learning induces presynaptic structural remodeling in the hippocampal mossy fiber system of two rat strains. *Hippocampus*, *16*(6), 560 – 570.
21. Holahan, M.R., Honegger, K.S. and Routtenberg, A. (2007). Expansion and retraction of hippocampal mossy fibers during post-weaning development: strain-specific effects of NMDA receptor blockade. *Hippocampus*, *17*(1), 58 – 67.
22. Holahan, M.R. and Routtenberg, A. (2007). Post-translational synaptic protein modification as substrate for long-lasting, remote memory: An initial test. *Hippocampus*, *17*(2), 93 - 97.
23. Holahan, M.R., Honegger, K.S., Tabatadze, N. and Routtenberg, A. (2007). GAP-43 gene expression regulates information storage. *Learning and Memory*, *14*(6), 407 - 415.
24. Holahan, M.R., Nichol, J. and Madularu, D. (2008). Spatial information processing consequences of DAMGO injections into the dorsal striatum. *Neurobiology of Learning and Memory*, *90*(2), 434 - 442.
25. Holahan, M.R. and Routtenberg, A. (2008). The protein kinase C phosphorylation site on GAP-43 differentially regulates information storage. *Hippocampus*, *18*(11), 1099 - 1102.
26. Wang C-C, Chai S-C, Holahan MR. (2010). Effect of stimulus pre-exposure on inhibitory avoidance retrieval-associated changes in the phosphorylated form of the extracellular signal-regulated kinase-1 and -2 (pERK1/2). *Neurobiology of Learning and Memory*, *93*(1), 66 - 76.
27. Holahan, M.R., Honegger, K.S. and Routtenberg, A. (2010). Ectopic growth of hippocampal mossy fibers in a mutated GAP-43 transgenic mouse with impaired spatial memory retention. *Hippocampus*, *20*(1), 58 - 64.
28. Holahan, M.R., Clarke, M.J. and Hines, D.D. (2010). Dopamine-mediated MK-801-induced elevation in food-based extinction responding in rats and associated changes in region-specific phosphorylated ERK. *Psychopharmacology*, *212*(3), 393 - 403.
29. Keeley, R.J., Wartman, B.C., Häusler, A.N. and Holahan, M.R. (2010). Effect of juvenile pretraining on adolescent structural hippocampal attributes as a substrate for enhanced spatial performance. *Learning and Memory*, *17*(7), 344 - 54.
30. Holahan, M.R. and Routtenberg, A. (2011). Lidocaine injections targeting CA3 hippocampus impair long-term spatial memory and prevent learning-induced mossy fiber remodeling. *Hippocampus*, *21*(5), 532 - 40.
31. Smith, C.A., MacDonald, A. and Holahan, M.R. (2011). Acute postnatal exposure to di(2-ethylhexyl) phthalate adversely impacts CA3 hippocampal axonal development in the rat. *Neuroscience*, *193*, 100 – 108.
32. Holahan, M.R., Madularu, D., McConnell, E.M., Walsh, R. and DeRosa, M.C. (2011). Intra-accumbens injection of a dopamine aptamer abates MK-801-induced cognitive dysfunction in a model of schizophrenia. *PLoS One*, *6*(7), e22239; 1 - 8.

33. Holahan, M.R., Westby, E.P., and Albert, K. (2011). Comparison of the MK-801-induced appetitive extinction deficit with pressing for reward and associated pERK1/2 staining in prefrontal cortex and nucleus accumbens. *Behavioral Brain Research*, 228(1), 194 - 202.
34. Wartman, B.C., Keeley, R.J. and Holahan, M.R. (2012). Estradiol treatment in preadolescent females enhances adolescent spatial memory and differentially modulates hippocampal region-specific phosphorylated ERK labeling. *Neuroscience Letters*, 528(2), 114 - 9.
35. Wartman, B.C., Gervais, N.J., Smith, C.A., Comba, R., Mumby, D.G. and Holahan, M.R. (2012). Enhanced adolescent learning and hippocampal axonal projections following preadolescent spatial exposure to a water or dry maze. *Brain Research*, 1475, 37 - 48.
36. Holahan, M.R. and White, N.M. (2013). Memory enhancement produced by post-training exposure to sucrose-conditioned cues. *F1000Research*, 2, 22; 1 - 7.
37. Davis-MacNevin, P.L., Dekraker, J., LaDouceur, L. and Holahan, M.R. (2013). Comparison of the MK-801-induced increase in non-rewarded appetitive responding with dopamine agonists and locomotor activity in rats. *Journal of Psychopharmacology*, 27(9), 854 - 64.
38. Wartman, B.C. and Holahan, M.R. (2013). The use of sequential hippocampal-dependent and -non-dependent tasks to study the activation profile of the anterior cingulate cortex during recent and remote memory tests. *Neurobiology of Learning and Memory*, 106, 334 - 42.
39. Cahill, S.P., Hatchard, T., Abizaid, A., and Holahan, M.R. (2014). An examination of early neural and cognitive alterations in hippocampal-spatial function of ghrelin receptor-deficient rats. *Behavioral Brain Research*, 264, 105 - 15.
40. Wartman, B.C. and Holahan, M.R. (2014). The impact of multiple memory formation on dendritic complexity in the hippocampus and anterior cingulate cortex assessed at recent and remote time points. *Frontiers in Behavioral Neuroscience*, 8, 1 - 14.
41. Wartman, B.C., Gabel, J., and Holahan, M.R. (2014). Inactivation of the anterior cingulate reveals enhanced reliance on cortical networks for remote spatial memory retrieval after sequential memory processing. *PLoS One*, 9(10), e108711; 1 - 12.
42. Smith, C.A. and Holahan, M.R. (2014). Reduced hippocampal dendritic spine density and BDNF expression following acute postnatal exposure to di(2-ethylhexyl) phthalate in male Long Evans rats. *PLoS One*. 9(10), e109522; 1 - 9.
43. Tuplin, E.R., Stocco, M.R., and Holahan, M.R. (2015). Attenuation of MK-801-induced behavioral perseveration by typical and atypical antipsychotic pretreatment in rats. *Behavioral Neuroscience*, 129(4), 399 - 411.
44. Comba, R., Gervais, N., Mumby, D., and Holahan, M.R. (2015). Emergence of spatial behavioral function and associated mossy fiber connectivity and c-Fos labeling patterns in the hippocampus of rats. *F1000Research*, 4, 396; 1 - 22.
45. Smith, C.A., Farmer, K., Lee, H., Holahan, M.R., and Smith, J.C. (2015). Altered Hippocampal Lipid Profile Following Acute Postnatal Exposure to Di(2-Ethylhexyl) Phthalate in Rats. *International Journal of Environmental Research and Public Health*, 12(10), 13542 - 13559.
46. Tzakis, N., Bosnic, T., Ritchie, T., Dixon, K., and Holahan, M.R. (2016). The effect of AMPA receptor blockade on spatial information acquisition, consolidation and expression in juvenile rats. *Neurobiology of Learning and Memory*, 133, 145 - 156.
47. Luu, B.E., Green, S.R., Childers, C.L., Holahan, M.R. and Storey, K.B. (2017). The roles of hippocampal microRNAs in response to acute postnatal exposure to di(2-ethylhexyl) phthalate in female and male rats. *Neurotoxicology*. pii: S0161-813X(17)30024-4.

48. Gabrys RL, Dixon K, Holahan MR, Anisman H. (2017). Self-Reported Mild Traumatic Brain Injuries in Relation to Rumination and Depressive Symptoms: Moderating Role of Sex Differences and a Brain-Derived Neurotrophic Factor Gene Polymorphism. *Clin J Sport Med.* 2017 Nov 21. doi: 10.1097/JSM.0000000000000550
49. Boutet I, Collin CA, MacLeod LS, Messier C, Holahan MR, Berry-Kravis E, Gandhi RM, Kogan CS. (2018). Utility of the Hebb-Williams Maze Paradigm for Translational Research in Fragile X Syndrome: A Direct Comparison of Mice and Humans. *Front Mol Neurosci.* 2018 Mar 28;11:99. doi: 10.3389/fnmol.2018.00099. eCollection 2018.
50. Holahan MR, Smith CA, Luu BE, Storey KB. (2018). Preadolescent Phthalate (DEHP) Exposure Is Associated With Elevated Locomotor Activity and Reward-Related Behavior and a Reduced Number of Tyrosine Hydroxylase Positive Neurons in Post-Adolescent Male and Female Rats. *Toxicol Sci.* 1;165(2):512-530. doi: 10.1093/toxsci/kfy171.
51. Noye Tuplin EW, Lightfoot SHM, Holahan MR. (2018). Comparison of the Time-Dependent Changes in Immediate Early Gene Labeling and Spine Density Following Abstinence From Contingent or Non-contingent Chocolate Pellet Delivery. *Front Behav Neurosci.* 12:144. doi: 10.3389/fnbeh.2018.00144. eCollection 2018.
52. McConnell EM, Ventura K, Dwyer Z, Hunt V, Koudrina A, Holahan MR, DeRosa MC. (2018). In Vivo Use of a Multi-DNA Aptamer-Based Payload/Targeting System To Study Dopamine Dysregulation in the Central Nervous System. *ACS Chem Neurosci.* doi: 10.1021/acscemneuro.8b00292. [Epub ahead of print].
53. Noye Tuplin EW, Holahan MR. (2019). Exploring time-dependent changes in conditioned place preference for food reward and associated changes in the nucleus accumbens. *Behav Brain Res.* 361:14-25. doi: 10.1016/j.bbr.2018.12.031. Epub 2018 Dec 18.
54. Noye Tuplin EW, Wright MT, Holahan MR. (2019). Different periods of forced abstinence after instrumental learning for food reward of different macronutrient value on responding for conditioned cues and AMPAR subunit levels. *Behav Brain Res.* Dec 16;375:112141. doi: 10.1016/j.bbr.2019.112141. Epub 2019 Aug 5.
55. Lariviere K, Bureau S, Marshall C, Holahan MR. (2019). Interaction between Age, Sex, and Mental Health Status as Precipitating Factors for Symptom Presentation in Concussed Individuals. *J Sports Med* (Hindawi Publ Corp). Dec 31:9207903. doi: 10.1155/2019/9207903.
56. Tzakis, N and Holahan, MR. (2020). Investigation of GluA1 and GluA2 AMPA Receptor Subtype Distribution in the Hippocampus and Anterior Cingulate Cortex of Long Evans Rats During Development. *IBRO Rep* Apr 3;8:91-100. doi: 10.1016/j.ibror.2020.03.003. eCollection 2020 Jun.
57. Holahan, MR and Goheen, K. (2020). Preadolescent Dopamine Receptor Antagonism Increases Postadolescent Reward-Related Operant Behaviors That May Depend on Dopamine Receptor Hypersensitivity. *Neurosci Lett.* 2020 Apr 23;725:134917. doi: 10.1016/j.neulet.2020.134917. Epub 2020 Mar 19.
58. Baidoo N, Wolter M, Holahan MR, Teale T, Winters B, Leri F. (2020). The effects of morphine withdrawal and conditioned withdrawal on memory consolidation and c-Fos expression in the central amygdala. *Addict Biol.* 2020 May 17:e12909. doi: 10.1111/adb.12909. Online ahead of print.
59. Tzakis N, Bosnic T, Holahan MR. (2020). Hippocampal and anterior cingulate cortex contribution to the processing of recently-acquired and remotely stored spatial memories in rats trained during preadolescence. *Neurobiol Learn Mem.* 2020 Sep;173:107271. doi: 10.1016/j.nlm.2020.107271. Epub 2020 Jun 19.

60. Lambert M, Marshall C, Holahan MR. (2021). Predictors of Concussion Outcomes in Individuals With ADHD. *J Head Trauma Rehabil.* 2021 Mar-Apr 01;36(2):120-127. doi: 10.1097/HTR.0000000000000621.
61. Hoffe B, Mazurkiewicz A, Thomson H, Banton R, Piehler T, Petel OE, Holahan MR. (2021). Relating strain fields with microtubule changes in porcine cortical sulci following drop impact. *J Biomech.* 2021 Nov 9;128:110708. doi: 10.1016/j.jbiomech.2021.110708. Epub 2021 Aug 27.

### 3.2. PEER-REVIEWED REVIEW ARTICLES

1. Patterson, Z.R and Holahan, M.R. (2012). Understanding the neuroinflammatory response following concussion to develop treatment strategies. *Frontiers in Cellular Neuroscience*, 6, 58.
2. Cahill, S., Tuplin, E. and Holahan, M.R. (2013). Circannual changes in stress and feeding hormones and their effect on food-seeking behaviors. *Frontiers in Neuroscience*, 7, 140; 1 – 14.
3. McConnell, E.M., Holahan, M.R., and DeRosa, M.C. (2014). Aptamers as promising molecular recognition elements for diagnostics and therapeutics in the central nervous system. *Nucleic Acid Therapeutics*, 24(6), 388 – 404.
4. Holahan, M.R. and Smith, C.A. (2015). Phthalates and neurotoxic effects on hippocampal network plasticity. *Neurotoxicology*, 48, 21 - 34.
5. Holahan, M.R. (2015). GAP-43 in synaptic plasticity: molecular perspectives. *Research and Reports in Biochemistry*, 5, 137 – 146.
6. Tuplin, E.W. and Holahan, M.R. (2017). Aripiprazole, a Drug that Displays Partial Agonism and Functional Selectivity. *Current Neuropharmacology*, 15(8):1192-1207. doi: 10.2174/1570159X15666170413115754..
7. Holahan, M.R. (2017). A Shift from a Pivotal to Supporting Role for the Growth-Associated Protein (GAP-43) in the Coordination of Axonal Structural and Functional Plasticity. *Front Cell Neurosci.* 2017 Aug 31;11:266. doi: 10.3389/fncel.2017.00266. eCollection 2017. Review.
8. Hoffe, B. and Holahan, M.R. (2019). The Use of Pigs as a Translational Model for Studying Neurodegenerative Diseases. *Front Physiol.* Jul 10;10:838. doi: 10.3389/fphys.2019.00838. eCollection 2019.
9. Tzakis, N. and Holahan, M.R. (2019). Social memory and the role of the hippocampal CA2 region. *Front Behav Neurosci.* Oct 1;13:233. doi: 10.3389/fnbeh.2019.00233. eCollection 2019.
10. Holahan MR, Tzakis N, Oliveira FA. (2019). Developmental Aspects of Glucose and Calcium Availability on the Persistence of Memory Function Over the Lifespan. *Front Aging Neurosci.* Sep 11;11:253. doi: 10.3389/fnagi.2019.00253. eCollection 2019. Review.
11. Wong VL, Holahan MR. (2019). A systematic review of aerobic and resistance exercise and inflammatory markers in people with multiple sclerosis. *Behav Pharmacol.* Dec;30(8):653-660. doi: 10.1097/FBP.0000000000000514.
12. Hoffe, B and Holahan, MR. (2022). Hyperacute Excitotoxic Mechanisms and Synaptic Dysfunction Involved in Traumatic Brain Injury. *Front Mol Neurosci.* 2022 Feb 24;15:831825. doi: 10.3389/fnmol.2022.831825. eCollection 2022.

### 3.3. CHAPTERS IN EDITED BOOKS

1. Holahan, M.R. and Routtenberg, A. (2004). Synaptic dialogue: substrate for protein-synthesis-independent long-term memory. In, *Transsynaptic Dialogue and Synaptic Plasticity*. Stanton, P.K. and Scharfman, H., (eds). Kluwer Academic/ Plenum Publishers, New York. Pp. 419 – 440.
2. Rekart, J.L., Holahan, M.R. and Routtenberg, A. (2007). Presynaptic structural plasticity and long-lasting memory: focus on the learning-induced redistribution of hippocampal mossy fibers. In, *Neural Plasticity and Memory: From Genes to Brain Imaging*. Bermudez-Rattoni, F., (ed). CRC Press, Boca Raton. Pp. 95 – 112.
3. Smith, C.A. and Holahan, M.R. (2012). The Effects of Di(2-ethylhexyl) Phthalate Exposure on Brain Development. In, *Phthalates: Chemical Properties, Impacts on Health and the Environment*. Gerardo L. Moretti and Drago Romano, (ed). Nova Science Publishers, New York. Pp. 179 – 196.
4. Wartman, B.C. and Holahan, M.R. (2013). Estradiol and Memory: Morphological and Behavioural Implications. In, *Estradiol: Synthesis, Health Effects and Drug Interactions*. Ricco Palmeri and Sal Grimaudo (eds). Nova Science Publishers, New York. Pp. 163 – 182.
5. Tzakis, N. and Holahan, M.R. (2016). AMPA Receptor Subunit Contribution to Hippocampal-Mediated Spatial Memory. In, *Spatial, Long-and Short-Term Memory: Functions, Differences and Effects of Injury*. Edward Thayer (ed). Nova Science Publishers, New York. Pp. 31 – 46.
6. Laird, L. and Holahan, M.R. (2018). Environmental Toxicants – Phthalates. In, *Handbook of Foodborne Diseases*. Don Liu (ed). CRC Press Taylor and Francis Group, Boca Raton.

## 4. CONFERENCE ABSTRACTS/ POSTERS

### 4.1 NATIONAL/ INTERNATIONAL

1. Kelley, A.E., Holahan, M.R. and Finn, M. (1995). Cholera toxin infusion into the nucleus accumbens: Interactions with motor activity, dopamine agonists, and conditioned reinforcement. *Society for Neuroscience*, 21(3), 1688.
2. Holahan, M.R., Kelley, A.E. and Kalin, N.H. (1996). Behavioral activating properties of corticotropin-releasing factor infused into the nucleus accumbens shell. *Society for Neuroscience*, 22 (1), 464.
3. Holahan, M.R., Kelley, A.E. and Baldwin, A.E. (1997). Neural basis of appetitive response learning: involvement of NMDA receptors and protein kinases in the nucleus accumbens core and amygdala. *Abstracts of FASEB Summer Research Conference: The Role of Neural and Behavioral Plasticity in Chronic Drug Abuse*.
4. Kelley, A.E., Holahan, M.R., Smith-Roe, S. and Baldwin, A.E. (1997). NMDA receptors and intracellular mechanisms within nucleus accumbens core are involved in appetitive learning. *Society for Neuroscience*, 23(2), 2119.
5. Holahan, M.R., Kelley, A.E. and Kalin, N.H. (1997). Morphine-induced conditioned motor activity is associated with increased c-Fos expression in prefrontal cortex. *Society for Neuroscience*, 23(2), 1107.

6. Baldwin, A.E., Holahan, M.R., Sadeghian, K. and Kelley, A.E. (1998). NMDA receptor activation in basolateral amygdala and medial prefrontal cortex mediates appetitive learning. *Society for Neuroscience*, 24(2),1688.
7. Holahan, M.R. and White, N.M. (1998). Memory modulation produced by post-training exposure to an aversive conditioned stimulus. *Four Decades of Memory: A Festschrift Honoring James L. McGaugh*. Abstract #5.
8. Holahan, M.R. and White, N.M. (1998). Memory modulation produced by post-training exposure to an aversive conditioned stimulus. *Society for Neuroscience*, 24(2), 1683.
9. Holahan, M.R. and White, N.M. (1999). Exposure to an aversive conditioned context and c-Fos labeling in the amygdala. *Society for Neuroscience*, 25(2), 1619.
10. Bossert, J.M., Holahan, M.R. and Milner, P.M. (1999). History of brain stimulation and self-stimulation. *Society for Neuroscience (History of Neuroscience)*, 25(1), 258.
11. Holahan, M.R., Bossert, J.M. and Melzack, R. (2000). The evolution of pain theories: from ghouls to gates. *Society for Neuroscience (History of Neuroscience)*, 26(1), 32.
12. Holahan, M.R. and White, N.M. (2001). Effect of muscimol inactivation of the basolateral or central amygdala on conditioned avoidance. *Orchestration of Cells and Systems: Making Memories in the Brain*. Abstract # 66.
13. Holahan, M.R. and White, N.M. (2001). Two-process learning theory and multiple memory systems. *Society for Neuroscience*, Vol 27, Program # 743.2.
14. Holahan, M.R. and White, N.M. (2002). Effect of muscimol inactivation of the basolateral or central amygdala on shock-conditioned responses. *New York Academy of Sciences. The amygdala in brain function: basic and clinical approaches*. Abstract # P37.
15. Holahan, M.R. and White, N.M. (2002). Conditioned modulation as an amygdala-based memory. *Society for Neuroscience*, Program # 284.1.
16. Hayes, E.L., Rekart, J.L., Holahan, M.R., Kirmani, S. and Routtenberg, A. (2003). Hippocampal protein kinase C activity and GAP-43 phosphorylation are increased after water maze training. *Society for Neuroscience*, Program #860.16.
17. Holahan, M.R. and White, N.M. (2003). Intra-amygdala muscimol injections impair acquisition and expression of incompatible behaviors in aversive contextual conditioning. *Society for Neuroscience*, Program # 290.16.
18. Routtenberg, A., Holahan, M.R., Rekart, J.L. and Sandoval, J. (2004). The game in the brain is mainly in the strain. *Society for Neuroscience*.
19. Holahan, M.R., Sandoval, J., Honegger, K., and Routtenberg, A. (2004). A unilateral CA3 “stab wound” impairs acquisition of a spatial but not cued platform water maze task. *Society for Neuroscience*.
20. Routtenberg, A., Holahan, M.R. and Rekart, J.L. (2005). A theory of long-lasting memory based strictly on posttranslational regulated feedback cascades. *Fourteenth Annual Puerto Rico Neuroscience Conference, Ponce School of Medicine*.
21. Holahan, M.R., Rekart, J.L. and Routtenberg, A. (2005). Hippocampal presynaptic remodeling mechanisms: potential role in aging and dementia. *Fifth Annual Alzheimer’s Day Conference, Northwestern University*.



22. Routtenberg, A., Holahan, M.R., Stormes, K.A., MacLusky, N.J. and Scharfman, H.E. (2005). Evidence for mossy fiber sprouting in area CA3 in response to physiological levels of estradiol. *Society for Neuroscience*.
23. Holahan, M.R. and Routtenberg, A. (2005). Expansion and retraction of hippocampal mossy fibers during development: is this mechanism redeployed during learning-dependent presynaptic plasticity? *Society for Neuroscience*.
24. Holahan, M.R., Honegger, K.S., Ainsworth, K. and Routtenberg, A. (2006). Transgenic mice that never learn a spatial location: water maze performance determined by phosphorylatable GAP-43 gene dosage. *Society for Neuroscience*.
25. Routtenberg, A., Holahan, M.R., Louie, M.W., Ainsworth, K., Tabatadze, N. and Tsao, M. (2006). Transgenic mice that never forget fear: profound and prolonged contextual conditioning in transgenic mice overexpressing a permanently phosphorylated plasticity-associated neuron-specific presynaptic protein. *Society for Neuroscience*.
26. Tabatadze, N., Holahan, M.R., Honegger, K.S. and Routtenberg, A. (2006). Mossy fiber retraction after massed training in the mouse. *Society for Neuroscience*.
27. Keeley, R., Ten Eycke, K. and Holahan, M.R. (2008). Pre- and post-synaptic developmental plasticity of the hippocampus: a strain by gender analysis. *Society for Neuroscience*.
28. Holahan, M.R., Dacey, A. and Madularu, D. (2008). Pharmacological analysis of the acquisition and extinction of appetitive learning: role of NMDA receptors. *Society for Neuroscience*.
29. Smith, C. and Holahan, M.R. (2009). The effect of pretraining and pretesting intra-CA3 kainate injections on spatial memory in rats. *Society for Neuroscience*.
30. Keeley, R.J., Wartman, B. and Holahan, M.R. (2009). The effect of estradiol treatment in juvenile rats on spatial learning and hippocampal morphology. *Society for Neuroscience*.
31. Smith, C., Wartman, B.C. and Holahan, M.R. (2010). The effect of juvenile pretraining on cognitive performance after NMDAR blockade. *CSBBCS 20<sup>th</sup> Annual Meeting, Dalhousie University, Halifax, Nova Scotia*.
32. Smith, C and Holahan, M.R. (2010). Exposure to phthalates during postnatal development adversely impacts hippocampal morphology in rats: Implications for learning and memory. *Program No. 99.24. 2010 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience*.
33. Wartman, B.C., Smith, C and Holahan, M.R. (2010). Water maze training during the juvenile period enhances later learning and pre- and post-synaptic hippocampal morphological attributes in an NMDAR-independent fashion. *Program No. 202.21. 2010 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience*.
34. Holahan, M.R., Madularu, D., McConnell, E., Walsh, R. and DeRosa, M. (2010). Exploration of in vivo uses for DNA aptamer technology to study dopamine dysregulation in preclinical animal models of psychiatric disorders. *Program No. 272.2. 2010 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience*.
35. Wartman BC, Gervais N, Smith C, Comba R, Holahan MR, Mumby DG. (2011). Dissociating the early benefit of task and spatial familiarity on both adolescent spatial performance and hippocampal connectivity. *Society for Neuroscience Abstract*.
36. Davis-MacNevin P, Holahan MR. (2011). Pretreatment with dopamine agonists, apomorphine and GBR-12909, differentially alter appetitive extinction responding. *Society for Neuroscience*.

37. Smith C, Holahan MR. (2011). Acute postnatal exposure to di(2-ethylhexyl) phthalate on neurodevelopmental and behavioral endpoints in rats. *Society for Neuroscience*.
38. Cahill, S.P., Hatchard, T., Abizaid, A. and Holahan, M.R. (2013). Effects of ghrelin knock-out and age on spatial learning, neurogenesis, and spine density in the dentate gyrus of rats. *Society for Neuroscience*, San Diego, CA. Nov 12.
39. Wartman, B.C. and Holahan, M.R. (2013). The use of sequential hippocampal-dependent and -non-dependent tasks to study changes in activation, expression and structure during recent and remote memory tests. *Society for Neuroscience*, San Diego, CA. Nov 13.
40. Holahan, M.R., Comba, R., Gervais, N.J., Wartman, B.C., Smith, C., and Mumby D.G. (2013). Development of spatial function in rats and associated c-Fos patterns in the hippocampal CA1 and CA3 regions. *Society for Neuroscience*, San Diego, CA. Nov 13.
41. Tuplin, E.W., Patrick, E., and Holahan, M.R. (2014). MK-801-induced elevation in appetitive operant extinction responding and reduced Delta FosB labeling in the nucleus accumbens. *Society for Neuroscience*, Washington, D.C. Nov 16.
42. Holahan, M.R., Dixon, K., Mahdi, M., and Tzakis, N. (2014). The acquisition and expression of remote spatial memories formed during the juvenile period are impaired by AMPA blockade. *Society for Neuroscience*, Washington, D.C. Nov 17.
43. Dixon, K.A., Gabrys, R., Holahan, M.R., and Anisman, H. (2015). Post concussive symptoms in students: The impact of genetics, coping, and executive functioning. *Society for Neuroscience*, Chicago, IL Oct 17.
44. Ventura, K., Holahan, M.R., McConnell, E., and Derosa, M.C. (2015). *In vivo* use of dopamine aptamers designed to cross the blood brain barrier in a preclinical mouse model of cocaine exposure. *Society for Neuroscience*, Chicago, IL, Oct 20.
45. Tzakis, N., Gill, N., Bosnic, T., and Holahan, M.R. (2015). Assessing the development of spatial memory consolidation in juvenile and adolescent rats. *Society for Neuroscience*, Chicago, IL, Oct 19.
46. Holahan, M.R., Weir, A., and Smith, C. (2015). Acute postnatal phthalate exposure results in both an immediate and long-term deficit in the masculinization of crucial neural circuits in the male rat brain. *Society for Neuroscience*, Chicago, IL, Oct 18.
47. Tuplin, E.W. and Holahan, M.R. (2016). The effect of active or passive chocolate delivery on cue-induced responding following periods of forced abstinence and associated changes in DeltaFosB labeling. *Society for Neuroscience*, San Diego, CA, Nov 12.
48. N. TZAKIS, B. HOFFE, M. R. HOLAHAN. (2017). Factors influencing the acquisition and retention of spatial memories in juvenile rats. *Society for Neuroscience*, Washington, D.C. Nov 14.
49. M. R. HOLAHAN, K. GOHEEN, K. HUDAK. (2017). Preadolescent treatment with MK-801 and effect on adolescent operant acquisition and extinction. *Society for Neuroscience*, Washington, D.C. Nov 12.
50. L. LAIRD, K. CHANDLER, C. A. RUDYK, M. R. HOLAHAN, N. SALMASO (2018). Early-life exposure to DEHP results in acute hyperactive phenotype and increased astrocytic protein expression in males. *Society for Neuroscience*, San Diego, CA. Nov 3.
51. K. VENTURA, E. MCCONNELL, J. CALLAHAN, V. HUNT, A. KOUDRINA, M. C. DEROSA, M. R. HOLAHAN. (2018). Investigating an alpha-synuclein binding aptamer as a potential treatment avenue to prevent protein fibril formation in Parkinson's disease. *Society for Neuroscience*, San Diego, CA. Nov 6.

52. N. TZAKIS, M. R. HOLAHAN Oct 22 2019 1:00PM. Investigation of GLuR1 and GLuR2 AMPA receptor subtype distribution in the hippocampus of long evans rats during a sensitive developmental period. *Society for Neuroscience*, Chicago, IL.
53. \*N. BAIDOO1, M. WOLTER1, B. WINTERS1, M. HOLAHAN2, F. LERI1 Oct 20 2019 8:00AM Memories that linger: Effects of acute and conditioned opiate withdrawal on memory consolidation. *Society for Neuroscience*, Chicago, IL.
54. \*B. HOFFE1, A. MAZURKIEWICZ2, T. PIEHLER3, R. BANTON3, O. PETEL2, M. R. HOLAHAN1 Oct 21 2019 8:00AM. Ex-vivo modelling of traumatic brain injury using porcine brain tissue. *Society for Neuroscience*, Chicago, IL.
55. K. VENTURA1, S. BOISJOLI2, J. CALLAHAN2, V. HUNT2, E. MCCONNELL2, M. DEROSA2, \*M. R. HOLAHAN1. Oct 23 2019 1:00PM. Utilizing an alpha-synuclein binding aptamer to prevent protein aggregation in an alpha-synuclein overexpressing cellular model of Parkinson's disease. *Society for Neuroscience*, Chicago, IL.

## 5. INVITED TALKS

1. Lesions of the amygdala subnuclei and conditioned memory modulation. Behavioral Neuroscience Seminar Series, McGill University, 1998.
2. Behavioral and neural investigation of avoidance behavior. Concordia University, 2001.
3. A neural and behavioral investigation of avoidance responses: reversible inactivation and multiple memory systems. Behavioral Neuroscience Seminar Series, McGill University, 2001.
4. Conditioned memory modulation, freezing, and avoidance as measures of amygdala-mediated conditioned fear. McGill University, Hebb Showcase Series, 2001. Nominated by Graduate Association for Students in Psychology.
5. Amygdala involvement in aversive conditioning. University of New Mexico, Department of Neuroscience, Departmental Talk, 2003.
6. Amygdala-mediation of aversive representations. University of Utah, Department of Psychology, Departmental Talk, 2003.
7. Comparison of hippocampal mossy fiber terminal fields in Long Evans and Wistar rats: relationship to enhanced information storage processes. Northwestern University Institute for Neuroscience: Information Storage Training Grant Retreat, 2004. Lake Geneva, WI.
8. Amygdala mediation of aversive representations. Northwestern University Medical School, Department of Physiology, Departmental Talk, 2004.
9. Correlations between the distribution and redistribution of mossy fiber terminals and spatial information processing. Northwestern University Medical School, Mechanisms of Aging and Dementia Training Grant Series, 2005.
10. Expansion and retraction of hippocampal mossy fibers during development: is this mechanism redeployed during learning-dependent presynaptic plasticity? Northwestern University Institute for Neuroscience: Information Storage Training Grant Retreat, 2005. Lake Geneva, WI
11. Presynaptic plasticity in the hippocampus: Studies on the hippocampal mossy fiber system. January, 2006. 30<sup>th</sup> Annual Winter Conference on the Neurobiology of Learning and Memory. Park City, UT.

12. The burden of plasticity: modeling Alzheimer's Disease with overexpression of GAP-43. Northwestern University Medical School, 2006. Mechanisms of Aging and Dementia Training Grant Lecture Series.
13. Information storage in the mammalian brain: studies on the hippocampal mossy fiber system. Evanston Northwestern Healthcare Research Park, 2006.
14. Presynaptic plasticity: studies on the hippocampal mossy fiber system. Carleton University, Institute of Neuroscience Colloquium Series. September, 2006.
15. The burden of plasticity: modelling a model of Alzheimer's disease with overexpression of GAP-43. University of Ottawa, School of Psychology, Cognition Research Group. February, 2007.
16. Memory storage regulation by transgenic overexpression of GAP-43: Troubles with the protein synthesis model of memory storage. Carleton University, First Year Neuroscience Graduate Seminar. October, 2007.
17. Dissociating "Cognitive Control" and "S-R" Territories in the Dorsal Striatum: Parallel Processing in Graduate School and Beyond. Carleton University, First Year Neuroscience Graduate Seminar. September, 2008.
18. Structural Plasticity in the CA3 Hippocampal Mossy Fiber System and its Relation to Spatial Information Processing. CSBN Fall 2009 Colloquium and Workshop, Concordia University. October 8 – 9, 2009.
19. Treating neurological disorders: From surgery to drugs to biotech and back again. Invited Talk, All Saints High School, Kanata, Ontario. June 4, 2010. (**COMMUNITY OUTREACH**)
20. Transgenic overexpression of GAP-43 and the burden of plasticity. 2010 Human Genetics Conference, McGill University, Montreal, Quebec. October, 21, 2010.
21. NMDA receptor blockade and appetitive operant extinction deficits: relationship to dopamine and reversal by novel dopamine-binding compounds. University of Guelph. October 5, 2011.
22. The Crosby Crush and Concussions. Science Café, Ottawa, ON. January 18, 2012. (**COMMUNITY OUTREACH**)
23. The Brain and Mental Illness. Ancoura Board of Directors Planning Meeting, Ottawa, ON. January 21, 2012. (**COMMUNITY OUTREACH**)
24. Can we develop a more valid animal model of pediatric concussion? Concussion Symposium, Children's Hospital of Eastern Ontario, June 12, 2012.
25. Modeling perseverative behavior with acute injections of MK-801. Psychology Department, Colby College, Waterville, ME, December 4, 2015.
26. Preclinical modeling of schizophrenia with acute injections of MK-801. Student Association for Mental Health, Carleton University, Ottawa ON, February 23, 2016.

27. Immediate and Long-Term Phthalate-Induced Neurodevelopmental Deficits in Males and Females. Interdisciplinary Environmental Toxicology Program, University of Illinois, USA, September 23, 2016.
28. Neural and behavioral factors that influence long-term storage of spatial memories in juvenile rats. Brazilian Meeting on Brain and Cognition, Universidade Federal do ABC, Brazil. September 27 - 29, 2017.
29. Utilization of aptamers as a therapeutic tool to prevent protein aggregation in Parkinson's disease-associated pathology. Life Sciences Day 2.0, Carleton University. May 30, 2018.
30. Novel treatment for Parkinson's. Discovery Café. October 26. Ottawa ON (**COMMUNITY OUTREACH**)
31. Aptamers as novel treatments in the prevention of neurodegenerative diseases. The Glebe Center, Abbotsford Community Program. November 19. Ottawa ON. (**COMMUNITY OUTREACH**)
32. Development of novel treatments for the good of treating Parkinson's disease. Carleton University Spring Conference. April 13.

## 6. LECTURE SERIES GIVEN/ ORGANIZED

1. 2009: Enrichment Mini-Courses Program at Carleton University. Myself and my graduate student (Catherine Smith) gave a course entitled "Real news about drugs and your brain: How drugs affect the long-term chemistry of the brain" to 12 students over a one-week timeframe. (**COMMUNITY OUTREACH**)
2. 2012: Learning in Retirement Series (**COMMUNITY OUTREACH**)  
The Basics About Brain Function from Early Development to Maturation and Beyond  
<https://www.youtube.com/watch?v=R-4ewKfSg7o>  
Week 1: How is the brain organized?  
Week 2: How does the brain develop and adapt from birth to the teenage years?  
Week 3: How do drugs affect and fix the adult brain?  
Week 4: Brain Injury and Stroke  
Week 5: Epilepsy and Multiple Sclerosis.  
Week 6: Parkinson's and Alzheimer's Diseases
3. 2013: Feb 21: Prevention, Signs and Symptoms and Management of Pediatric Concussions. (Organizer: **COMMUNITY OUTREACH**)  
CIHR-Funded Café Scientifique Panel Presentations.  
<https://www.youtube.com/watch?v=ut5Zjs5sEhA>  
Presenters  
Dr. Michael Vassilyadi, Children's Hospital of Eastern Ontario  
Dr. Peter Anderson, Children's Hospital of Eastern Ontario  
Dr. Anne-Lise Holahan, Children's Hospital of Eastern Ontario  
Dr. Kristian Goulet, The Pediatric Sports Medicine Clinic of Ottawa and the Eastern Ontario Concussion Clinic
4. 2013: A Four-Part Series on How the Brain Learns and Remembers (**COMMUNITY OUTREACH**)

Friday, March 7 Different Memoires, Different brain Regions  
 Friday, March 14 Brain Cells and the Basics of Memory Formation  
 Friday, March 21 What Does a Memory Look Like in the Brain?  
 Friday, April 4 How We Can Improve Memory  
 Times: noon- 12:45pm  
 Location: Multimedia Room – Discovery Centre – MacOdrum Library  
<https://www.youtube.com/watch?v=QXX58QhNfjc>

5. 2015: June 6: Symposium Title: Probing the link between brain and behavior with optogenetics. CSBBCS 25<sup>th</sup> Annual Meeting (Organizer)

Presenters:

Jonathan Britt, McGill University, Department of Psychology,  
 Ivan Trujillo-Pisanty, Concordia University, Center for Studies in Behavioral  
 Neurobiology  
 Robert Bonin, IUSMQ, Laval University, Cellular and Molecular Neuroscience Unit  
 Paul Albert, Ottawa Hospital Research Institute, University of Ottawa

## 7. GRANTS

### 7.1 GOVERNMENT

- 1999 – 2003 National Institutes of Health, Pre-Doctoral National Research Service Award, F31 MH12369 from the National Institute of Mental Health, USA.  
*Amygdala and conditioned responses to aversive stimuli* \$59,865.00 USD
- 2004 – 2006 National Institutes of Health, Post-Doctoral Fellowship, Training Grant T32 AG20506 from the National Institute of Aging, USA.  
*Role of growth proteins and plasticity in Alzheimer's disease* \$86,238.00 USD
- 2007 Canadian Foundation for Innovation Leaders of Opportunity Fund Infrastructure Grant:  
*Dietary Regulation of Cognitive Function and Brain Pathology During the Lifespan*,  
 Principal Applicant: Matthew Holahan, Co-Applicant: Alfonso Abizaid  
 \$250,000 CDN
- 2007 Ontario Research Fund: *Dietary Regulation of Cognitive Function and Brain Pathology During the Lifespan*,  
 Principal Applicant: Matthew Holahan, Co-Applicant: Alfonso Abizaid  
 \$250,000 CDN
- 2008 National Science and Engineering Research Council of Canada, Individual Discovery Grant:  
*Structural and Functional Plasticity in Hippocampal Networks During Spatial Information Processing*  
 Principal Applicant: Matthew Holahan  
 \$15,000 CDN per year for 5 years
- 2010 National Science and Engineering Research Council of Canada, Research Tools and Infrastructure Grant: *Memory and motivation: an exploration of the synaptic and systems interactions underlying the formation and extinction of addictive memories*  
 Principal Applicant: Matthew Holahan  
 \$40,000 CDN

- 2012 Canadian Institute of Health Research, Café Scientifique: *Prevention, signs and symptoms and management of pediatric concussion*  
Principal Applicant: Matthew Holahan  
*\$3,000 CDN*
- 2013 National Science and Engineering Research Council of Canada, Individual Discovery Grant: Hippocampal-cortical interactions underlying the long-term processing of spatial memories throughout the lifespan.  
Principal Applicant: Matthew Holahan  
*\$35,000 CDN per year for 5 years*
- 2017 Carleton – FAPESP SPRINT: Developmental aspects of spatial training on the persistence of memory function during normal and pathological aging.  
Principal Applicant: Matthew Holahan with Fernando A. Oliveira  
*\$10,000 CDN*
- 2017 US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND: Life Sciences Division: Experimental strain-based tissue damage analysis in impact and blast-induced traumatic brain injury scenarios.  
Principal Applicants: Oren Petel and Matthew Holahan  
*\$198,000 CDN for 3 years*
- 2018 National Science and Engineering Research Council of Canada, Individual Discovery Grant: Pharmacological and experiential factors that modulate development of neural connectivity involved in spatial and nonspatial memory processing.  
Principal Applicant: Matthew Holahan  
*\$40,000 CDN per year for 5 years*
- 2019 Canadian Institute of Health Research, Utilization of a DNA aptamer to impede the in vitro and in vivo aggregation properties of alpha-synuclein  
Principal Applicants: Maria DeRosa and Matthew Holahan  
*\$153,000 CDN for 2 years*

## 7.2 UNIVERSITY

- 2006 Carleton University, Faculty of Arts and Social Sciences, internal start-up funds.  
*\$35,000 CDN*
- 2009/10 Carleton University, Faculty of Arts and Social Sciences, Research Achievement Award.  
*\$7,500 CDN*
- 2014/15 Carleton University, Research Achievement Award.  
*\$15,000 CDN*

## 7.3 FOUNDATIONS

- 2015 The Michael J. Fox Foundation: Utilization of Aptamers to Prevent Protein Aggregation in Parkinson's Disease  
Co-Applicant with Maria DeRosa

*\$40,000 CDN per year for 2 years*

2017 The Michael J. Fox Foundation: Pharmacokinetic study of alpha synuclein-binding aptamers.  
Co-Applicant with Maria DeRosa

*\$51,000 CDN for 6 months*

#### **7.4 PATENT APPLICATIONS**

APTAMERS AS A THERAPEUTIC TOOL TO PREVENT PROTEIN AGGREGATION IN NEURODEGENERATIVE DISEASE DEROSA, Maria Cynthia; HOLAHAN, Matthew Richard; MCCONNELL, Erin Marie; VENTURA, Katelyn Victoria; CALLAHAN, Joshua Parker; HUNT, Vernon Harold Daniel US Patent Application **62/575,813**

### **8. PROFESSIONAL HONORS**

1997 Max Stern Recruitment Fellowship, McGill University.  
1999 McGill Major Fellowship, McGill University (declined for NRSA).  
2001 New York Academy of Sciences Conference Fellowship  
2002 Eighth Annual Wisconsin Symposium on Emotion: HealthEmotions Research Institute travel award  
2003 Ninth Annual Wisconsin Symposium on Emotion: HealthEmotions Research Institute travel award  
2010 Faculty of Science, Excellence in Teaching Award  
2013 Faculty Graduate Mentoring Award  
2014 Research Achievement Award  
2019 Faculty of Science Impact Award

### **9. SERVICE TO PROFESSION**

#### **9.1 JOURNAL REVIEWER**

Selected examples:

*Biological Psychology*

*Brain Research*

*Hippocampus*

*Brain Research Bulletin*

*Neurotoxicity Research*

*Neurobiology of Learning and Memory*

*Pharmacology, Biochemistry and Behavior*

*PLoS ONE*

*Regulatory Peptides*

*Neuroscience Letters*

*Behavioral Brain Research*

*Pharmacological Reports*

#### **9.2 GRANT REVIEWER**

*Wellcome Trust, UK*



*NSERC, Canada*

*Ontario Mental Health Foundation, Grant Review Committee, Toronto, ON Canada*

*Wellcome Trust/ DBT India Alliance*

*PRINBRE – Puerto Rico IDeA Network of Biomedical Research*

*New University Researchers Start Up Program of FRQNT*

*NSERC, Research Tools and Infrastructure Review Committee*

### **9.3 EDITORIAL ADVISORY BOARD**

Pearson: Psychology: From Inquiry to Understanding (2011)

Worth: Introduction to Brain and Behavior (2012; 2013; 2014; 2015)

Sinauer Associates, Inc., Publishers: Psychopharmacology (2014; 2015)

Bedford, Freeman, & Worth; revisions on Introduction to Brain & Behavior, 5e

## **10. ACADEMIC RESPONSIBILITIES**

### **10.1 GRADUATE COURSES**

Winter term, 2007: Special Topics: Neurobiology of Learning and Memory, Carleton University

### **10.2 UNDERGRADUATE COURSES**

Winter term, 2004: Special Problems in Psychology: Memory and Brain, Northwestern University

#### **10.2.1 CARLETON UNIVERSITY COURSES**

Fall term, 2006, 2007: Introduction to Psychology (1001 - LECTURE)

2007 – 2021 (continuing terms): Drugs and Behaviour (Psychopharmacology; 3204 – CUOL LECTURE)

NEUR 3204 now listed on eCampus Ontario by the Council of Ontario Universities (COU) and the Ministry of Training, Colleges, and Universities (MTCU): <https://www.ecampusontario.ca/Course#!/details/44854>

2007 – 2016 (10 terms): Biological Basis of Behavior (2200 – CUOL LECTURE)

2008 – 2011 (5 terms): Translational Neuroscience (4200 - SEMINAR)

Winter term 2015: Introduction to Techniques in Neuroscience (2003 - LECTURE)

2014 – 2020: Neurodegeneration and Aging (3501 – LECTURE)

October, 2015 approved by Carleton's Steering Committee on the Development of Online and Blended Learning to receive support from the Educational Development Centre to take part in the eCampus Ontario initiative.

2017 – current: Cellular and Molecular Neuroscience (CUOL course) replaces NEUR 2200.

## **10. STUDENTS SUPERVISED**

### **10.1 GRADUATE**

### **10.1.1 PhD: COMPLETED**

*Year:* Completed 2014 (started 2010)/ Carleton University

*Name:* Brianne Wartman (funding: NSERC PGS)

*Title:* Storage of multiple memories, by using multiple behavioural tasks, mobilizes a reorganization of brain regions for long-term memory storage.

*Year:* Completed 2014 (started 2010)/ Carleton University

*Name:* Catherine Smith (funding: Graduate Award for Ontario Students for Research in Dementia for 2011)

*Title:* Acute postnatal exposure to di(2-ethylhexyl) phthalate on neurodevelopmental and behavioral endpoints in rats

*Year:* Completed 2018 (Started 2014)/ Carleton University

*Name:* Erin Tuplin

*Title:* Incubation of appetitive conditioning and functional changes within the nucleus accumbens dopamine reward pathway.

*Year:* Completed 2020 (Started 2015)/ Carleton University

*Name:* Niko Tzakis

*Title:* The development of spatial memory processes and associated cellular correlates in juvenile rats.

*Year:* Completed 2021 (Started 2016)/ Carleton University

*Name:* Katelyn Ventura

*Title:* Utilization of Aptamers to Prevent Protein Aggregation in Parkinson's Disease.

*Year:* Completed 2022 (Started 2016)/ Carleton University

*Name:* Vicki Wong

*Title:* Concussions and Mental Health.

### **10.1.2 PhD: IN PROGRESS**

*Year:* Started 2019/ Carleton University

*Name:* Brendan Hoffe

*Title:* Modeling TBI-induced strain fields and acute neural changes in porcine brain tissue.

*Year:* Started 2020/ Carleton University

*Name:* Dennis Chan

*Title:* Aggregation properties of alpha-synuclein *in vitro* and disruption by DNA aptamers.

*Year:* Started 2021/ Carleton University

*Name:* Ashif Shahid

*Title:* Motor memory consolidation and reorganization of neural circuits.

### **10.1.3 MSc: COMPLETED**

*Year:* 2008/ Carleton University

*Name:* Jeremy Nichol

*Title:* Neurochemical investigation of the dorsal striatum in spatial processing.

*Year:* 2009/ Carleton University

*Name:* Robin Keeley (funding: Graduate Award for Ontario Students for Research in Dementia)

*Title:* Pre- and post-synaptic, input-dependent plasticity of the hippocampus: a strain by gender analysis.

*Year:* 2009/ Carleton University

*Name:* Adam Jones-Delcorde (funding: NSERC PGS)

*Title:* Phased training protects spatial working memory from noise stress in rodents.

*Year:* 2010/ Carleton University

*Name:* Catherine Smith

*Title:* Changes in spatial memory following pretesting and post-training intra-CA3 kainate injections in rats.

*Year:* 2010/ Carleton University

*Name:* Dan Madularu (funding: Graduate Award for Ontario Students for Research in Dementia)

*Title:* Novel DNA dopamine aptamer pre-treatment reverses the hypoglutamatergic-induced behavioural extinction in rats.

*Year:* 2012/ Carleton University

*Name:* Parnell Davis-MacNevin (funding: OGS)

*Title:* Manipulation of the dopamine system and appetitive extinction responding.

*Year:* 2013/ Carleton University

*Name:* Rachel Comba

*Title:* Neurobehavioral developmental aspects of hippocampal function

*Year:* 2013/ Carleton University

*Name:* Shaina Cahill

*Title:* Characterization of spatial learning and memory function in ghrelin knock-out rats

*Year:* 2014/ Carleton University

*Name:* Erin Tuplin

*Title:* Operant extinction as a model for executive dysfunction in schizophrenia and reversal by atypical antipsychotic medications.

*Year:* 2015/ Carleton University

*Name:* Nikolaos Tzakis

*Title:* The acquisition and expression of remote spatial memories formed during the juvenile period are impaired by AMPAr blockade.

*Year:* 2015/ Carleton University

*Name:* Maha Mahdi

*Title:* Structural development of the CA3 hippocampal region assessed via Golgi staining.

*Year:* 2015/ Carleton University

*Name:* Arielle Weir

*Title:* Developmental exposure to phthalates and effect on stress hormone levels and hippocampal connectivity patterns.

*Year:* 2016/ Carleton University

*Name:* Kaylyn Dixon

*Title:* Cognitive and affective outcomes of concussions in university student-athletes.

*Year:* 2016/ Carleton University

*Name:* Katelyn Ventura

*Title:* In vivo application of a DNA dopamine-binding aptamer in an attempt to reduce cocaine-induced hyperlocomotion.

*Year:* 2018/ Carleton University

*Name:* Laurie Laird

*Title:* The effect of environmental toxicants on astroglia, development, and cognition.

*Year:* 2018/ Carleton University

*Name:* Kate Goheen

*Title:* Developmental treatment with an NMDA or dopamine receptor antagonist and effect on adolescent cognitive function.

*Year:* 2019/ Carleton University

*Name:* Brendan Hoffe

*Title:* Experimental strain-based tissue damage analysis in impact and blast-induced traumatic brain injury scenarios

*Year:* 2020/ Carleton University/ University of Gothenburg

*Name:* Nour Boutaam

*Title:* Detection Of C-Fos Expression In The Nucleus Accumbens After Different Periods Of Forced Abstinence

#### **10.1.4 MSc: IN PROGRESS**

*Year:* 2020/ Carleton University

*Name:* Jake Bornheimer

*Title:* Development of hippocampal circuits and influence on remote spatial and nonspatial memory recall.

*Year:* 2020/ Carleton University

*Name:* Teresa Maletta

*Title:* Acquisition and retention of social memories in juvenile rats and contribution of the CA2 hippocampal region.

#### **10.1.5 THESIS BOARDS PARTICIPATED ON - OTHER THAN SUPERVISOR**

##### **2010/2011**

Samantha King, MSc. Candidate, Dept. Psychology, Committee Member

Kerry Rennie, PhD Candidate, Dept. Psychology, Committee Member

Marie-Ange Gravel, PhD Candidate, Dept. Biology, Internal Examiner

Michael Vandenberg, MSc. Candidate, Dept. Neuroscience, Chair of Board

Jeffrey Scharf, Msc. Candidate, Dept. Psychology, Chair of Board

Aaron Burke, MSc. Candidate, Dept. Psychology, Committee Member

##### **2011/2012**

Lauren Fitzsimmons, PhD Candidate, Dept. Biology, Committee Member

**2012/2013**

Tyson Baker, PhD Candidate, Dept. Psychology, Queen's University, External Committee Member

**2013/2014**

Veronique St-Onge, PhD Candidate, Dept. Neuroscience, Committee Member

Cheng-Wei Wu, PhD Candidate, Dept. Biology, Internal Examiner

Evan Houldin, MSc Candidate, Inst. Cognitive Science, Internal Examiner

Stephanie Rosenbaum, MSc Candidate, Dept. Neuroscience, Chair

Kylie Schibli, MSc Candidate, Dept. Neuroscience, Committee Member

Alexander Edwards, MSc Candidate, Dept. Neuroscience, Chair

Shuaib Syed, MSc Candidate, Dept. Neuroscience, Committee Member

Sara Razmjou, MSc Candidate, Dept. Neuroscience, Committee Member

**2013/2014**

Kristin Delcellier, MSc Candidate, Dept. Neuroscience, Committee Member

Jonathan Constable, MSc Candidate, Dept. Neuroscience, Committee Member

Zachary Dwyer, MSc Candidate, Dept. Neuroscience, Chair

**2016**

Heather Auld, PhD, Dept of Biology, Internal Examiner

**2017**

Natalie Prowse, MSc, Dept of Neuroscience, Committee Member

Rim Khazall, PhD, Dept of Neuroscience, Committee Member

**2018**

Genevieve Ferguson, PhD, Dept of Biology, Internal Examiner

Kyle Farmer, PhD, Dept of Neuroscience, Committee Member

Meenu Minhas, PhD, Dept of Psychology, University of Guelph, External Member

**2019**

Michael Lawrence, PhD, Dept of Biology, Internal Examiner

Kama Szereszewski, PhD, Dept of Biology/ Biochemistry, Internal Examiner

Jawaria Abdali, MSc, Dept of Neuroscience, Committee Member

**2020**

Alexander Edwards, PhD, Dept of Neuroscience, Committee Member

**10.2 UNDERGRADUATE**

**10.2.1 COMPLETED (ALL CARLETON UNIVERSITY STUDENTS)**

*Year:* 2008

*Name:* Heather Attridge

*Title:* Learning-associated axonal plasticity in hippocampal networks.

*Year:* 2008

*Name:* Ashley Dacey

*Title:* Extinction of appetitive learning and role of NMDA receptors.

*Year:* 2008

*Name:* Stephanie Hudson

*Title:* Illicit drug use in undergraduate students.

*Year:* 2008

*Name:* Dan Madularu

*Title:* The effect of ghrelin on motivated behavior.

*Year:* 2008

*Name:* Kayla Ten Eycke

*Title:* Developmental plasticity of the hippocampus in two rat strains.

*Year:* 2008

*Name:* Jason Wybenga

*Title:* Learning-associated structural plasticity in the hippocampus and formation of remote memories.

*Year:* 2009

*Name:* Brianne Wartman

*Title:* Estrogen treatment and its effect on the developmental plasticity of the hippocampus.

*Year:* 2009

*Name:* Melanie Clarke

*Title:* Role of NMDA receptors in the acquisition and extinction of appetitive learning.

*Year:* 2009

*Name:* Graham Mazereeuw

*Title:* Examining mkp-1 and pka activity in hippocampal ca1 neurons in response to stress-induced corticosterone secretion.

*Year:* 2009

*Name:* Laura Jackson

*Title:* Comparison of the acquisition and retention rates on a spatial water maze task between juvenile and adolescent rats.

*Year:* 2010

*Name:* Douglas Hines

*Title:* Role of dopamine in the acquisition and extinction of appetitive learning.

*Year:* 2010

*Name:* Ilana Hanes

*Title:* Morphological profiling of hippocampal dendritic processes during a critical developmental period.

*Year:* 2010

*Name:* Kelly Aminian

*Title:* Genetic profiling of hippocampal dendritic processes during a critical developmental period.

*Year:* 2010

Name: Alexander Haeusler

Title: Effects of early life experience on functional properties of hippocampal neurons.

Year: 2011

Name: Katrina Albert

Title: Elevated lever pressing with NMDA receptor antagonism in an appetitive extinction task and resulting pERK staining in the nucleus accumbens.

Year: 2011

Name: Kyley Allan

Title: The role of the hippocampus in long-term memory storage and retrieval based on prior experience

Year: 2011

Name: Gary Bourque

Title: Effects of di(2-ethylhexyl) phthalate (DEHP) on spatial learning and memory in rats.

Year: 2011

Name: Rachel Comba

Title: Performance versus Memory: Increased Memory Function and Hippocampal Connectivity following different Methods of Pretraining.

Year: 2011

Name: Erin Westby

Title: Dysregulation of cortico-limbic circuits in an animal model of cognitive deficits associated with schizophrenia.

Year: 2011/ co-supervisor with Dr. Steve McGarry, Dept. Electronics

Name: Laxman Pradhan, Michael Crupi and Stuart Tozer (4th-year Engineering Project, Dept. Electronics)

Title: Memrisor-based Hebbian Learning.

Year: 2012

Name: Taylor Hatchard

Title: The importance of ghrelin in spatial memory: performance deficits in GHS-R knockout rats on the water maze task

Year: 2012

Name: Elliot Thompson

Title: The role of dopamine in appetitive extinction as a model for drug addiction and craving.

Year: 2012

Name: Doris Virginia MacLeod

Title: Effects of MK-801 on the dopamine system as judged by locomotor activity in rats through the use of cocaine and flupenthixol.

Year: 2012

Name: Liane LaDouceur

Title: pERK1/2 labelling of the nucleus accumbens in the presence of dopamine agonists and uptake inhibitors as a predictor of pressing during appetitive operant extinction.

Year: 2013

Name: Sonja Jelic

Title: A mouse model of concussion results in motor impairment and increased hippocampal neurogenesis.

Year: 2013

Name: Katelyn Ventura

Title: The *in vivo* use of a DNA-based dopamine aptamer in a preclinical mouse model of cocaine addiction.

Year: 2014

Name: Emily Patrick

Title: Assessment of the transcriptional factor DeltafosB in the brain reward system following drug-induced behavioral perseveration.

Year: 2014

Name: Jordan Dekraker

Title: The processing of sequential memories and the recruitment of cortical brain regions in remote spatial memory recall.

Year: 2014

Name: Kaylyn Dixon

Title: Acquisition and expression of juvenile spatial memories are dependent on AMPA receptor function.

Year: 2014

Name: Sam Williamson

Title: The effects of early life exposure to Di(2-Ethyl Hexyl) Phthalate on substantia nigra pars compacta neurons in male and female Long Evans rats.

Year: 2015

Name: Nicholas Chin

Title: Effects of acute Di (2-Ethylhexyl) Phthalate exposure on adolescent rat hippocampal neurogenesis.

Year: 2015

Name: Nitasha Gill

Title: Assessing the development of spatial memory consolidation in juvenile and adolescent rats.

Year: 2015

Name: Jessica Passarelli

Title:  $\Delta$ FOSB expression in the nucleus accumbens following behavioural perseveration induced by MK-801 and resolved by Flupenthixol.

Year: 2015

Name: Eddy Yakubovic

Title: Assessment of DeltaFosB transcriptional factor in the nucleus accumbens of food-addicted rats undergoing aripiprazole drug treatment.

Year: 2016

Name: Thomas Ritchie

Title: Effects of Di (2-Ethylhexyl) Phthalate exposure on organizational effects in hippocampal circuitry.

Year: 2016



Name: Tim Bosnic

Title: The effects of acute Di (2-Ethylhexyl) Phthalate exposure on neurogenesis.

Year: 2016

Name: Amanda McFarlan

Title: c-Fos labeling in the nucleus accumbens following incubation of chocolate craving.

Year: 2016

Name: Phillip Cooper

Title: Measures of executive function following concussions in university student-athletes.

Year: 2016

Name: Racheal Penman

Title: Changes in affect and cognitive style following concussions in university student-athletes.

Year: 2017

Name: Katelyn Hudak

Title: Developmental Treatment with an NMDA Receptor Antagonist and Effect on Adolescent Cognitive Function

Year: 2017

Name: Laura Stokes

Title: Establishing the effects of concussion history on the stability of baseline testing through the use of neurocognitive measures

Year: 2018

Name: Viktoria Xing

Title: Pre-symptomatic Assessment of Motor Function and Alpha-synuclein Overexpression in A53T Transgenic Mouse Model

Year: 2018

Name: Madison Wright

Title: The effect of operant conditioning on cue-induced responding to palatable foods following periods of forced abstinence and associated changes in the incubation of craving

Year: 2018

Name: Jonathan Monney

Title: Spatial Memory Consolidation Development in Juvenile Long Evans Rats

Year: 2018

Name: Andrea L. Barker

Title: A comprehensive symptom profile of adolescent concussion patients in sport medicine clinics and emergency departments across Canada

Year: 2018

Name: Savannah Lightfoot

Title: The Contribution of the Nucleus Accumbens Dopaminergic Circuit to the Incubation of Chocolate Craving

Year: 2019

Name: Jovan Dhatt

Title: POSTNATAL DI-2-ETHYLHEXYL PHTHALATE EXPOSURE REDUCES SPINE DENSITY IN CA3 HIPPOCAMPAL NEURONS.

Year: 2019

Name: Reem Al-Zafiri

Title: Examining cell morphology in the anterior cingulate sulcus of ex-vivo pig brain slices to explore pathological changes associated with traumatic brain injury.

Year: 2019

Name: Ahmed El Khazndar

Title: NAVIGATING ORIENTATIONAL CHANGES OF PYRAMIDAL CELLS IN THE CINGULATE SULCUS OF PIG BRAINS AFTER A TRAUMATIC BRAIN INJURY.

Year: 2019

Name: Katie Lariviere

Title: Age, Sex, and Pre-Morbid Mental Health Conditions as Risk Factors for Symptom Presentation in Concussed Individuals.

Year: 2019

Name: Tiana Junor

Title: INVESTIGATION OF GLUR1 AND GLUR2 AMPA RECEPTOR SUBTYPE EXPRESSION IN HIPPOCAMPUS THROUGHOUT THE CRITICAL PERIOD OF SPATIAL MEMORY DEVELOPMENT FOR LER RATS

Year: 2019

Name: Dana Dusevic

Title: A METHOD FOR FIXATION AND PREPARATION OF CRICKET BRAINS FOR CRYOSECTIONING AND STAINING OF MUSHROOM BODIES

Year: 2020

Name: Sara Rwentambo

Title: Analyzing Neurodevelopment of the Anterior Cingulate Cortex During Juvenile Periods in Rats

Year: 2020

Name: Hannah Delenardo

Title: The Effects of Early Life Phthalate (DEHP) Exposure on Tyrosine Hydroxylase Positive Neurons in the Substantia Nigra and Ventral Tegmental Area in Male and Female Mice

Year: 2021

Name: Ally Villeneuve

Title: A novel alpha-synuclein-binding aptamer characterized in the cortex of a murine model for Parkinson's Disease

Year: 2021

Name: Matthew Knight

Title: Characterization and Visualization of a Novel alpha-synuclein Binding Aptamer in a Mouse Model of Parkinson's Disease

Year: 2021

Name: Molly Mullan

Title: Analyzing Cell Distances in the Cingulate Sulcus Using an Ex-vivo Porcine Model

Year: 2021

Name: Nick Panetta

Title: Analysis of Dendritic Swelling Density in Porcine Brains Using an Ex-Vivo Model of Traumatic Brain Injury

Year: 2021

Name: Grace McCloskey

Title: Different Categories of Symptoms Have Unequal Effects on Different Domains of Quality-of-Life in Adults With Post-Concussion Syndrome

Year: 2021

Name: Natalie Hyatt

Title: Exogenous PFFs recruit normally expressed wild type  $\alpha$ Syn in differentiated SH-SY5Y cells to induce aggregation in an in vitro model of Parkinson's Disease

## 11. ADMINISTRATIVE RESPONSIBILITIES

### 11.1 DEPARTMENTAL

Colloquium series (Psychology)	2006 – 2009
Faculty Education Resource Community in Psychology	2006 – 2010
Neuroscience Search Committee	2008, 2012
Chair Neuroscience Search Committee	2014, 2015
Neuroscience Graduate Recruitment	2008, 2009
Undergraduate Program Advisor in Neuroscience	2010 – 2014
Neuroscience Undergraduate Team Member	2015 - 2017
Neuroscience Space Committee	2011 – 2019
Brain Awareness Week Presenter	2011 – 2018
Ottawa Chapter of the Society for Neuroscience Faculty Rep	2012 – 2019
Neuroscience Moving Committee	2016 – 2017
Undergraduate Program Advisor in Neuroscience	2017 – 2020
Alumni Event Planning	2019
Chair Health and Safety	2020
Teaching Mentor	2020
Chair	2021

### 11.2 FACULTY (SCIENCE)

Graduate recruiting	2007, 2008
Undergraduate recruiting - Carleton University (CU Preview Day, March Break, Science Specialty Tours)	2007 – 2015
Recruitment and Retention Committee	2010 – 2012
Tenure and Promotions Committee	2010 – 2012
Science Committee on Academic Planning	2013 – 2015

Summer NSERC Participant	2009 – 2015
DSRI Mentor	2009 – 2021
Neuroscience Relocation Team	2016 – 2017
Science Committee on Academic Planning	2010 – 2014; 2017 – 2020
Health and Safety Committee	2020 - 2021

### **11.3 UNIVERSITY**

Animal Care Committee	2007-2008
Animal Care Committee Chair	2008-2010
Animal Care Committee Chair (renewed)	2010-2012
Animal Care Committee Chair (resurrected)	2015 -
Graduate NSERC Selection Committee	2007, 2008, 2009
Graduate OGS Scholarships	2012
Graduate Mentor Award Selection Committee	2013
Research Tools and Infrastructure Committee	2011, 2012
Mentor for the Sanofi-Aventis BioTalent Challenge (SABC)	2009 – 2012
Carleton Leader Program: Stream 1	2013 – 2014
I-CUREUS Mentor	2013 – 2020
Neuroscience Move Planner	2016 – 2017
FGPA PnP Programs and Planning Committee	2019 - 2021