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Neuroscientist

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Citizenship: Canadian

Revised March 2020

CURRENT POSITION

Postdoctoral Researcher

New York City, USA

Columbia University

Project title: The neurobiology of abstraction during complex decision-making in virtually navigating primates

EDUCATION

Doctor of Philosophy

Montréal, Canada

McGill University

Thesis title: Hippocampal function in non-human primates

Research Focus: Elucidating how the neural representations of spatial and non-spatial components of experience are mixed in the hippocampus of monkeys navigating virtually reality environments

Advisor: Dr. Julio C. Martinez-Trujillo

Master of Science

Guelph, Canada

University of Guelph

Thesis title: Exercise-induced recovery of skeletal muscle insulin response is independent of adiponectin response in high-fat fed rodents.

Research Focus: Interaction between consumption of a high-fat diet and exercise on skeletal muscle metabolism and glucose tolerance

Advisor: Dr. David J. Dyck

Bachelor of Science, Honours

Guelph, Canada

University of Guelph

Human Kinetics

PUBLICATIONS

- 1) [Gulli RA](#), Duong LR, Corrigan BW, Doucet G, Williams S, Fusi S, Martinez-Trujillo JC (2020). Context-dependent representations of objects and space in the primate hippocampus during virtual navigation. *Nature Neuroscience* 23(1):103-12. DOI: [10.1038/s41593-019-0548-3](https://doi.org/10.1038/s41593-019-0548-3)
Preprint: [Gulli RA](#), Duong LR, Corrigan BW, Doucet G, Williams S, Fusi S & Martinez-Trujillo J (2018). Flexible coding of memory and space in the primate hippocampus during virtual navigation. *bioRxiv* 295774.
- 2) Doucet G, [Gulli RA](#), Corrigan BW, Duong LR & Martinez-Trujillo JC (2019, in print). Modulation of local field potentials and neuronal activity in primate hippocampus during saccades. *Hippocampus* 30(3):192-209. DOI: [10.1002/hipo.23140](https://doi.org/10.1002/hipo.23140)
- 3) [Gulli RA](#) (2019). Beyond metaphors and semantics: A framework for causal inference in neuroscience. *Behavioral and Brain Sciences* 42. DOI: [10.1017/S0140525X19001389](https://doi.org/10.1017/S0140525X19001389)
- 4) Martinez-Trujillo JC & [Gulli RA](#) (2018). Dissecting Modulatory Effects of Visual Attention in Primate Lateral Prefrontal Cortex Using Signal Detection Theory. *Neuron* 97, 1208–1210. DOI: [10.1016/j.neuron.2018.03.012](https://doi.org/10.1016/j.neuron.2018.03.012)
- 5) Blonde J, Roussy M, Luna R, Mahmoudian B, [Gulli RA](#), Barker KC, Lau JC & Martinez-Trujillo JC (2018). Customizable cap implants for neurophysiological experimentation. *J. Neurosci. Methods* 304, 103–117. DOI: [10.1016/j.jneumeth.2018.04.016](https://doi.org/10.1016/j.jneumeth.2018.04.016)
- 6) Corrigan BW, [Gulli RA](#), Doucet G, Martinez-Trujillo JC (2017). Characterizing eye movement behaviors and kinematics of non-human primates during virtual navigation tasks. *Journal of Vision* 17(12), 15. DOI: [10.1167/17.12.15](https://doi.org/10.1167/17.12.15)
- 7) Martinez-Trujillo JC, [Gulli RA](#), Doucet G, Corrigan BW (2017). Dissociable effects of saccades on hippocampal local field potential power and phase. *Journal of Vision* 17(10), 1151.
- 8) Corrigan BW, [Gulli RA](#), Doucet G, Martinez-Trujillo JC (2017). Target presence affects the eye movement behaviour and kinematics of non-human primates in virtual navigation tasks. *Journal of Vision* 17(10), 541.
- 9) Doucet G, [Gulli RA](#), Martinez-Trujillo JC (2016). Cross-species 3D virtual reality toolbox for visual and cognitive experiments. *Journal of Neuroscience Methods* (266), 84-93. DOI: [10.1016/j.jneumeth.2016.03.009](https://doi.org/10.1016/j.jneumeth.2016.03.009)
- 10) Doucet G, Tremblay S, [Gulli RA](#), Pieper F, Sachs A, Martinez-Trujillo JC (2015). Single trial decoding of visual attention from local field potentials in the primate lateral prefrontal cortex. *Journal of Vision* 15(12), 228.

- 11) **Gulli RA**, Tremblay S, Adamantidis AR, Martinez-Trujillo JC (2013). **Optogenetic stimulation of the frontal eye field in an awake, behaving monkey.** *Journal of Vision* 13(9), 228.
- 12) **Gulli RA**, Tishinsky JM, MacDonald T, Robinson LE, Wright DC, & Dyck DJ. (2012). Exercise restores insulin, but not adiponectin, response in skeletal muscle of high-fat fed rodents. *American Journal of Physiology – Regulatory, Integrative and Comparative Physiology*, 303(10), R1062-R1070. DOI: 10.1152/ajpregu.00176.2012
- 13) Tishinsky JM, **Gulli RA**, Mullen KL, Dyck DJ, & Robinson LE. (2012). **Fish oil prevents high saturated fat diet-induced impairments in adiponectin and insulin response in rodent soleus muscle.** *American Journal of Physiology – Regulatory, Integrative and Comparative Physiology*, 302, R598-R605. DOI: 10.1152/ajpregu.00328.2011
- 14) Stefanyk LE, **Gulli RA**, Ritchie IRW, Chabowski A, Snook LA, Bonen A, & Dyck DJ. (2011). **Recovered insulin response by 2 weeks of leptin administration in high-fat fed rats is associated with restored AS160 activation and decreased reactive lipids.** *American Journal of Physiology – Regulatory, Integrative and Comparative Physiology*, 301, R159–R171. DOI: 10.1152/ajpregu.00636.2010
- 15) Ritchie IRW, **Gulli RA**, Stefanyk LE, Harasim E, Chabowski A, & Dyck DJ. (2011). **Restoration of skeletal muscle leptin response does not precede the exercise-induced recovery of insulin-stimulated glucose uptake in high-fat-fed rats.** *American Journal of Physiology – Regulatory, Integrative and Comparative Physiology*, 300, R492–R500. DOI: 10.1152/ajpregu.00602.2010
- 16) Thrush AB, Harasim E, Chabowski A, **Gulli RA**, Stefanyk LE, & Dyck DJ. (2011). **A Single Prior Bout of Exercise Protects Against Palmitate-Induced Insulin Resistance Despite an Increase in Total Ceramide Content.** *American Journal of Physiology – Regulatory, Integrative and Comparative Physiology*, 300, R1200–R1208. DOI: 10.1152/ajpregu.00091.2010
- 17) Cresser J, Bonen A, Chabowski A, Stefanyk LE, **Gulli R**, Ritchie I, & Dyck DJ. (2010). **Oral administration of a PPAR-delta agonist to rodents worsens, not improves, maximal insulin-stimulated glucose transport in skeletal muscle of different fibers.** *American Journal of Physiology – Regulatory, Integrative and Comparative Physiology*, 299, R470–R479. DOI: 10.1152/ajpregu.00431.2009

INVITED PRESENTATIONS

- Magnetic Resonance Imaging Core Meeting** *New York City, USA*
Columbia University *February 2020*
High fidelity reconstruction of skull morphology using an Ultrafast TE sequence
- Columbia University Hippocampus Club** *New York City, USA*
Columbia University *June 2019*
Objects, context, memory & space: Neuronal representations in the hippocampus of virtually navigating primates
- Society for Neuroscience Annual Meeting** *San Diego, USA*
Single-neuron and population encoding of objects and space in the hippocampus and PFC *Nov 2018*
during virtual navigation
- Special Seminar** *La Jolla, USA*
Salk Institute *Jan 2018*
Understanding hippocampal function in non-human primates
- Special Seminar** *New York City, USA*
Columbia University *Dec 2017*
Understanding hippocampal function in non-human primates
- Robarts Research Institute Data Club** *London, Canada*
University of Western Ontario *Jan 2017*
Signatures of the cognitive map in the hippocampus in virtually navigating monkeys
- Center for Visual Science Symposium: The Future of Attention** *Rochester, USA*
University of Rochester *May 2016*
Exploring the cognitive map: Hippocampal activity in virtually-navigating non-human primates
- Canadian Association for Neuroscience Satellite Symposium** *Toronto, Canada*
Place coding in the primate hippocampus is task-dependent during virtual navigation *May 2016*
- Brain and Mind Institute Annual Symposium** *London, Canada*
University of Western Ontario *June 2015*
Contextual learning in the monkey hippocampus during virtual navigation: From behaviour to single units
- Western University Systems Neuroscience Symposium** *London, Canada*
University of Western Ontario *November 2014*
Hippocampal codes for associative memory and navigation through virtual environments in rhesus monkeys
- Montreal Optogenetics Club** *Montréal, Canada*
McGill University *November 2013*
Excitatory optogenetics in non-human primates

GSAN Student Experimental Research Forum

McGill University
Optogenetics

Montréal, Canada
October 2013

Montreal Optogenetics Club

McGill University
Optogenetics in the non-human primate: Methods and advancements in targeting cortical and non-cortical structures

Montréal, Canada
July 2012

Graduate Student Symposium

University of Guelph
Restoration of adiponectin response is not necessary for the exercise-induced recovery of insulin response: preliminary results

Guelph, Canada
May 2010

HONORS AND AWARDS

Graduate Excellence Award	August 2017
Graduate Mobility Award	July 2017
CCN Summer School tuition, board, & lodging	April 2017
GREAT Travel Award	October 2014
David G. Guthrie Fellowship	September 2014
NSERC Doctoral Post-Graduate Scholarship	May 2011
Ontario Graduate Scholarship	Declined; May 2011
Sun Life Financial HH&NS Research Scholarship	August 2010
Ontario Graduate Scholarships in Science & Technology	January 2010
NSERC Undergraduate Student Research Assistantship	May 2009
Undergraduate Research Award	May 2008
University of Guelph Entrance Scholarship	September 2005

ACADEMIC APPOINTMENTS

Postdoctoral Researcher

Columbia University
Project title: Hippocampal function in non-human primates

Research Focus: Elucidating how the neural representations of spatial and non-spatial components of experience are mixed in the hippocampus of monkeys navigating virtually reality environments

New York City, USA
Jan 2019-present

Visiting Graduate Student

University of Western Ontario

London, Canada
May 2015-Oct 2018

Research Assistant

University of Guelph

Research Focus: Conducted a research project to determine whether adipose tissue hypoxia is a determinant to altered adipokine secretion in obesity. Responsibilities include experimental design and organization, methodologies including primary cell culture, ELISA procedures and Western blotting.

Supervisor: Dr. David Wright

Guelph, Canada
Sept 2010-Apr 2011

Research Assistant

University of Guelph

Guelph, Canada

May 2010-Sept 2011

Research Focus: Conducted radio-immuno assays of blood insulin for inclusion in research conducted by the Human Nutraceutical Research Unit, University of Guelph.

Supervisor: Dr. Allison Duncan

Research Assistant

University of Guelph

Guelph, Canada

May 2009-Sept 2009

Research Focus: Conducted research funded by an Undergraduate Student Research Award through NSERC (a federal funding agency). Became practiced in surgical procedures including implantation of mini-osmotic pumps into the rats as well as mitochondrial isolation and purification techniques. Work contributed to the manuscript of Stefanik *et al.* (2011).

Supervisor: Dr. David J. Dyck

Research Assistant

University of Guelph

Guelph, Canada

Sept 2008-May 2009

Research Focus: Assisted in animal care procedures, exposure of rats to experimental treatments, tissue harvest, tissue analysis, and data interpretation. Work contributed to the manuscript of Ritchie *et al.* (2011)

Supervisor: Dr. David J. Dyck

Research Assistant

University of Guelph

Guelph, Canada

May 2008-Sept 2009

Research Focus: Designed and completed a study examining the effects of intermittent hyperoxic gas exposure on blood erythropoietin and red blood cell concentration in elite runners. Study design, and organization, running experimental trials, sample collection and analysis, and data analysis. Conducted trials examining sweat rates and fluid and sodium balance. Provided subjects with feedback to optimize performance in competition. Among athletes tested were 40 players of the 2008 selection camp for the Canadian World Junior hockey team.

Supervisor: Dr. Lawrence Spriet

EDUCATIONAL CONTRIBUTIONS

DIRECT TEACHING

PHIL3993, The Ethics of Science

University of Western Ontario

London, Canada

October 2016

40 students

Contact time: 4 hours

Guest lecture: Applied Ethics of Biomedical Research

PHYS*4680, Cellular/Molecular Neurobiology

University of Western Ontario

London, Canada

October 2016

50 students

Contact time: 3 hours

Guest lecture: Conducting animal research in non-human primates

PGHY*213, Introductory Physiology

Montréal, Canada

McGill University

Winter 2014

255 students

Contact time: 100 hours

Responsibilities: Exercise Physiology lab section: set up equipment, led lab talks, instructed students through collection, analysis and discussion of data; marked completed lab reports; led review a review session prior to examination

HK*4600, Applied Human Biology II

Guelph, Canada

University of Guelph

Winter 2010

118 students

Contact time: 40 hours

Responsibilities: Set up equipment, led lab talks, and instructed students while working with equipment and collecting data; marking lab reports and midterms. Labs included: pulmonary function testing; 12-lead electrocardiograms; non-invasive manual calculation of cardiac output, and; automated calculation of cardiac output

NUTR*4210, Nutrition, Exercise and Energy Metabolism

Guelph, Canada

University of Guelph

Fall 2010

278 students

Contact time: 70 hours

Responsibilities: Attended all lectures, marked all midterms and final exams, met with students to review material, moderated online discussions

KIN*2070, Biochemistry II

Toronto, Canada

University of Guelph-Humber

Fall 2010

38 students

Contact time: 70 hours

Evaluation Score: 4.97/5.00

Responsibilities: Designed and led independent seminars; designed marking schemes for oral and written presentations; marked oral presentations and written assignments

KIN*2070, Biochemistry II

Toronto, Canada

University of Guelph-Humber

Fall 2009

35 students

Contact time: 70 hours

Evaluation Score: 4.88/5.00

Responsibilities: Independently structured and led lab periods; extensive use of lab equipment including metabolic carts, cycle ergometers, sphygmomanometers and respirometers; designed of marking schemes for written laboratory reports; and marked lab reports

EDUCATIONAL ADMINISTRATION & LEADERSHIP

Western University Systems Neuroscience Symposium

London, Canada

University of Western Ontario

Nov 2014

Co-organized a symposium spanning molecular, systems, and behavioural neuroscience at Western University for researchers from Western University, McGill University, and industry partners. The aim of this symposium was to foster collaborations and initiatives amongst researchers between campuses and across systems neuroscience.

McGill Brain Oscillations Club

McGill University

Co-organized a bi-weekly discussion of new, unpublished data from McGill University neuroscientists studying the functional role of low-frequency fluctuations recorded from the brains of humans and other mammals.

Montréal, Canada

May 2013-Apr 2014

McGill University Research Advisory Council

McGill University

Represented the McGill graduate students and the Post-Graduate Student Society at meetings of the Research Advisory Council, chaired by the McGill Vice-Principal of Research.

Montréal, Canada

Sept 2011-Sept 2013

Board of Directors

University of Guelph, Graduate Student Association

Represented the Department of Human Health and Nutritional Sciences.

Guelph, Canada

Sept 2009-May 2011

Constitution and By-laws Committee

University of Guelph, Graduate Student Association

Critically examined any changes to the GSA governing policy and to ensure the integrity of the GSA Constitution and By-laws.

Guelph, Canada

Sept 2009-May 2011

Canadian Federation of Students' Advisory Committee

University of Guelph, Graduate Student Association

An ad-hoc committee formed to critically evaluate the membership of the GSA within the federal and provincial branches of the Canadian Federation of Students.

Guelph, Canada

Sept 2009-May 2011