Xinyue Ma

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Integrated Program in Neuroscience
McGill University
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OBJECTIVE

A self-motivated student with extensive experience in computation, biotechnology and data analysis. Skilled in computational modeling, dynamical system theory and biotechnological experiments. Experienced in coding computational toolboxes. Seeking an academic career in computational biology.

EDUCATION

Ph.D., Integrated Program in Neuroscience **09/2023 – now**
McGill University, Montreal, Quebec, Canada

M.S., Integrated Program in Neuroscience **09/2020 – 12/2022**
McGill University, Montreal, Quebec, Canada (GPA: 3.94/4.0)
Fully funded by Canadian NSERC-National Science Foundation, 2020-2022

B.S., Department of Biotechnology and Bioinformatics **09/2016 – 06/2020**
Tongji University, Shanghai, China (GPA: 4.41/5.0)
Multi-disciplinary honor program Frontier Science of Basic Subject (top 5% students)

Erasmus Tubingen Exchange Program, Faculty of Molecule Medicine **11/2019 – 03/2020**
Eberhard Karls University of Tübingen, Tübingen, Baden-Württemberg, Germany (GPA: 4.0/4.0)
Enrolled as the top 2% students

MANUSCRIPTS

2023 **Ma, Xinyue**, et al. "**Calcium buffering tunes intrinsic excitability of spinal dorsal horn parvalbumin-expressing interneurons: A computational model**." bioRxiv (2023): 2023-03. (*The Journal of Neuroscience*, *under review*)

Ma, Xinyue, et al. "**ElecFeX: A user-friendly tool for efficient deep feature extraction of electrophysiological dataset**." (*In preparation*)

POSTERS & PRESENTATIONS

15th Canadian Neuroscience Meeting **05/2023**
Poster: Calcium buffering tunes intrinsic excitability of spinal dorsal horn parvalbumin-expressing interneurons: A computational model

15th Quebec Pain Research Network Retreat **01/2023**
Three-minute Presentation: Pinning down the pain: using computational modeling

2022 Integrated Program in Neuroscience Retreat **09/2022**
Computational modeling of a calcium-dependent mechanism to regulate parvalbumin-expressing interneurons excitability in the spinal cord dorsal horn following nerve injury

26th Annual McGill Pain Day **01/2022**
Poster and Presentation: Understanding the role of parvalbumin on the excitability of parvalbumin-expressing interneurons in the spinal dorsal horn

5th Conference of China iGEMer Community (CCiC) **08/2018**

Poster and Presentation: Synthetic biology application in immunotherapy: an oral administration capsule to deliver neo-antigen through Type III Secretion System of attenuated *P. Aeruginosa*.

AWARDS & HONORS

The B21/GPS BLUE fellowship **01/2023**

The B21/GPS BLUE fellowship provide $5,000 to McGill graduate students who are in good academic standing to develop a research project that explores unconventional scientific ideas, patterns and solutions.

Mitacs Globalink Graduate Fellowship **09/2020**

The Globalink Graduate Fellowship provides $15,000 in financial support to former Globalink Research Interns who return to Canada for full master's or PhD programs, or Postdoctoral fellowships at any Mitacs partner institution

Quebec-China international Differential Fee Exemptions Award **09/2020**

Exemption from differential tuition fees granted to Chinese students of outstanding academic standing

Excellent Graduate Student Award **09/2020**

Award to first-year international graduate students of outstanding academic standing

Outstanding Undergraduate Exchange Scholarship from China Scholarship Council **07/2018**

Award outstanding Chinese students who obtain MITACS Globalink Research Internships from China Scholarship Council (CSC)

Shanghai Innovative Project Grant **09/2017**

Award to undergraduate students of excellent academic standing in Tongji University

The Second Prize Scholarship at Tongji **09/2017**

Shanghai Scientific Research Foundation to excellent outstanding research project

TECHNICAL SKILLS

Numerical Software: MATLAB, XPPAUT/AUTO, Mathematica, SPSS
Programming Languages: MATLAB, Python, R, Java
Publishing Software: ImageJ, GraphPad, CorelDraw, MS Office, Adobe Photoshop
Biological Experiments: Molecular, Cellular and Electrophysiological techniques, Behavioral tests
Languages: English (Fluent), Chinese (Advanced)

RESEARCH EXPERIENCE

Computational & pharmacological study on neural excitability **09/2020 – 12/2022**

McGill University, Montreal, QC, Canada

- **Goals**. Investigate the ionic mechanisms underlying the injury-induced reduced firing output of pain-gating spinal interneurons
- Performed current-clamp recordings of fluorescent-labeled neurons
- Created a custom MATLAB-based toolbox to analyze membrane properties of recorded neurons

- Developed a Hodgkin-Huxley type model reproducing the neural electrical activities
- Performed parameter sensitivity analysis of the model to identify ion channels inducing the electrical properties change
- Performed bifurcation analysis to illustrate the dynamics underlying the firing pattern transitions
- Developed an in vivo-like neural circuit model of spinal pain sensation pathway
- Drafted the manuscript

Psychophysical experiments on visual illusion **11/2019 – 03/2020**

Max Planck Institute of Biological Cybernetics, Tübingen, Baden-Württemberg, Germany

- **Goals**. Identify the different responses of central and peripheral visual field to the illusions
- Programed random-dot stereograms using MATLAB Psychtoolbox-3
- Recruited human subjects to collect data
- Wrote and reported the project results to the bachelor's thesis

International Genetically Engineered Machine (iGEM) competition **04/2018 – 10/2018**

Tongji University, Shanghai, China

- **Goals**. Employ a needle-like protein-transporter from the bacteria Pseudomonas aeruginosa to deliver tumor-specific antigen for cancer treatment
- Led a team of 8 students to do project design, experiments and human practice
- Developed social media strategies to advocate synthetic biology, including wiki webpages, online surveys and scientific articles
- Designed and conducted experiments including plasmid construction and immunohistochemistry.

Cytosolic mitochondrion distribution identification **07/2019 – 10/2019**

McGill University, Montreal, QC, Canada

- **Goals**. Identify the quantitative changes of mitochondria in Purkinje cells from the ataxia mice.
- Performed immunohistochemistry to visualize cytosolic mitochondria distribution
- Performed mice rotarod test to assess the mice movements
- Create a custom-made MATLAB-based toolbox to quantify cytosolic mitochondrial distribution
- Analyzed to show that mitochondria were significantly decreased in the ataxia mice model with their distribution mildly shifting towards the nuclei.

Cancer cell in-vivo tracing via bioluminescent gene **09/2017 – 06/2019**

Tongji University, Shanghai, China

- **Goals**. Assess conditions that optimize the transfection efficiency for different human tumor cells
- Designed and constructed a plasmid DNA with nano-luciferase reporter gene
- Performed transient and stable transfection to introduce the plasmid DNA into human tumor cells
- Analyzed conditions for different human tumor cell lines that optimize the transfection efficiency, parameters including the timing of transfection, type, and amount of transfection reagents.
- Organized and delivered presentations per term to report the research progress

Neural projection tracing in mouse prefrontal cortex **11/2018 – 05/2019**

Institute of Neuroscience, Shanghai Institutes for biological science, Chinese academy of Science

- **Goals**. Map long-range projections of projection neurons in the mouse prefrontal cortex
- Implemented software tool Fast Neurite Tracer (FNT) to map long-range projections of projection neurons in mouse prefrontal cortex

WORK EXPERIENCE

Mitacs Globalink Research Intern **07/2019 – 10/2019**
McGill University, Montreal, QC, Canada

Biotechnological Intern **07/2018 – 09/2018**
Anhui Toneker Biotechnology Co., Auhui, China

- Conducted biotechnological experiments including real-time fluorescence quantitative PCR
- Familiarized the team with the experiments on-site
- Prepared and conducted investigations based on laboratory testing requirements

Teaching Assistant **03/2018 – 11/2018**
TAL Education Group, Shanghai, China

- Taught English and biology course to primary and secondary students
- Assisted students in preparation for academic knowledge competitions

SCIENCE COURSEWORK

MATHEMATICS	COMPUTATION
Advanced Mathematics (A): Linear Algebra & Calculus	C/C++ Programming
Probability and Mathematical Statistics	Bioinformatics
Selected Topics in Calculus	Modern Bio-computing Environment
Statistics	Computational Neuroscience
Biostatistics	Computational Biology Methods and Research
Computational Method in Applied Math	Mobile Software Development
Honours Math Models in Biology	

NEUROSCIENCE	ACADEMIC WRITHNG
Model of Neural System	Literature Review 1: Summary & Critique
Principle of Neuroscience 2	Literature Review 2: Establish Scholarly Niches
Ion Channels	
Biomedical Signals & Systems	
Computational Neuroscience	

CO-CURRICULAR ACTIVITES

The International Buddy Program Mentor **09/2021**
International Student Service, McGill University

Women in Project Management **11/2022**
SKILLSETS Graduate Workshops, McGill University

Out Loud: The Queer Voices in Research Symposium **06/2022**
Post-Graduate Students' Society, McGill University