

# Zhou, Yuxin

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## Education

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### McGill University, QC, Canada

- PhD. in Genomic Medicine (McGill-Kyoto International Collaborative Joint Ph.D.) 2023 - Present
- BSc. in Neuroscience 2020 - 2023
- Cumulative GPA: 3.91 / 4.00
- Dean's Multidisciplinary Undergraduate Research List 2023
- Dean's Honour List 2022

**Marianopolis College, QC, Canada:** Diploma of college studies in Health Science (Honour Roll) 2017 - 2019

**Pensionnat du Saint-Nom-de-Marie, QC, Canada:** High School Diploma in Enriched Science 2014 - 2017

## Research Experience

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**Analysis of human telomere from long-read data generated by PacBio HiFi sequencing** Sep 2022 - May 2023

*Supervised by: Guillaume Bourque, Professor at the Department of Human Genetics, Director of Bioinformatics, McGill University*

- Investigate telomere structures of family cohorts with recently discovered bioinformatic tools (i.e., edgeCase, Telogator).
- Manipulate and process long-read sequencing data with minimap2, samtools, winnowmap, and pbmm2 in Bash.

**Detection of interictal epileptiform discharges on brain recordings using deep learning** Aug 2022 - May 2023

*Supervised by: Sylvain Baillet, Professor of Neurology and Neurosurgery and Biomedical Engineering and Computer Science, McGill University*

- Train and test convolutional neural networks (CNN) by including brain datasets of 97 epilepsy patients.
- Preprocess all the scalp EEG and whole-brain map MEG data using Brainstorm software in MATLAB.
- Construct the EEG and MEG CNN models using Keras neural network and TensorFlow software libraries within Python.

**Analysis of COVID patients' clinical measurements using Quebec COVID-19 Biobank raw data** Sep 2022 - Dec 2022

*Supervised by: Amin Emad, Assistant Professor at the Department of Electrical and Computer Engineering, McGill University*

- Discovered that serum creatinine level has a more significant decrease in COVID-positive patients with acute kidney injury and chronic kidney disease than in COVID-positive patients without these diseases.
- Analyze the evolution of COVID patients from temporal sequences of clinical observation and test results using Python.
- Reorganize, process, manipulate and visualize the remotely accessed biobank raw data with Python and Bash.

**Analysis of human transcriptome generated by Oxford Nanopore sequencing Technologies** May 2022 - Aug 2022

*Supervised by: Martin A. Smith, Assistant Professor at the Department of Biochemistry and Molecular Medicine, Université de Montréal*

- Discovered and investigated new long non-coding RNAs during brain cancer cell differentiation using bioinformatic tools and R.
- Designed and created an interactive application that allows for de novo transcriptome assembly exploration using R Shiny app.
  - *The app has features to perform differential gene expression analysis using Wald and Likelihood Ratio tests in DESeq2, visualize and interpret statistical test results using MA plot, Volcano plot and Enhanced Volcano plot. Users can explore the genomic data by selecting transcript types (lncRNA, snoRNA, etc.), accuracies of transcript assemblers (class code from GffCompare), time points to compare, cut-off values on fold changes or p-values. Many other genomic data exploration options are available using self-created R functions. Users can get useful information including gene names, chromosomal locations thanks to alignment to GENCODE 40.*
- Manipulated and visualized the genomic data using Interactive Genomics Viewer and UCSC Genome Browser.
- Performed PCR analysis with the help of Opentrons OT-s Robot using the protocol written in Python.
- Publication in preparation: *LINCing long non-coding RNAs and epigenomic regulation in human neuronal differentiation.*

## **Creation of databases and analysis of early primary visual cortex responses**

May 2022 - Aug 2022

*Supervised by: Curtis L. Baker, Professor at the Department of Ophthalmology and Visual Sciences, McGill University*

- Generated and assembled databases of early primary visual cortex responses of cat subjects to study neuronal receptive fields.
- Preprocessed the electrophysiology data from primary visual cortex recording using the Neo package in Python.
- Extracted local field potential and performed current source density (CSD) analysis using MATLAB.
- Visualized and interpreted CSD plots with CSDplotter and iCSD-master using MATLAB and Python.

## **Analysis of risk factors for dementia and human brain morphology using UK Biobank data**

Jan 2022 - May 2022

*Supervised by: Alain Dagher, MD, Professor of Neurology and Neurosurgery and Psychology, Montreal Neurological Institute, McGill University*

- Discovered that cognitive and physical activities as well as sleep duration and depression, are significantly associated with the mean cortical thickness of the left lingual gyrus, left inferior parietal cortex, left postcentral gyrus, and left pars orbitalis.
- Identified risk factors of Alzheimer's disease (AD) and dementia by conducting literature reviews.
- Extracted and evaluated relevant UK Biobank Field IDs of measurements associated with AD risk factors.
- Analyzed the impacts of AD risk factors on brain structures of 40,054 individuals using multiple linear regression models.

## **Longitudinal study on language development and language disorders in children**

Oct 2021 - Dec 2022

*Supervised by: Elin Thordardottir, Professor at the School of Communication Sciences and Disorders, McGill University*

- Transcribed, reviewed, and edited the recorded language samples and interviews from all participants.
- Translated child participants' language samples and parent interviews from Mandarin to English.
- Computed the scoring of Verbal Fluency tests using Excel.

## **Eye-tracking data collection to investigate participants' scientific data retrieval**

Jan 2021 - Aug 2021

*Supervised by: Dr. Jian Wang, Chinese Academy of Agricultural Sciences*

- Performed eye-tracking experiments and data collection using SR Research EyeLink2000.
- Conducted interviews with Ph.D. participants based on their eye-tracking activity during scientific data retrieval.

## **Biotechnological research on edible mushrooms**

Jan 2021 - Aug 2021

*Supervised by: Dr. Chen-yang Huang, Chinese Academy of Agricultural Sciences, Ministry of Agriculture and Rural Affairs*

- Performed PCR, fungal DNA extraction using liquid nitrogen, and fungal genotyping agarose gel electrophoresis.
- Prepared the Potato Dextrose Agar plates to cultivate fungal mycelia.

## **Selected Honors, Awards, and Grants**

### **Dean's Honour List, McGill University**

2022

- Awarded for achieving the top 10% of the faculty's students

### **Research internship grant, Canadian Centre of Computational Genomics (\$2336)**

Expected: Dec 2022

### **Award for oral presentation at summer research internship conference, CHU Sainte-Justine Research Center (\$200) Aug 2022**

- Topic: *Discovering New Stars in Genomic Dark Matter: New Long Non-Coding RNAs Involved in Cellular Differentiation.*

### **Summer research internship award for academic excellence, CHU Sainte-Justine Research Center (\$1000)**

May 2022

### **Summer research internship grant, CHU Sainte-Justine Research Center (\$4500)**

May 2022

### **Honour Roll, Marianopolis College**

2019

- Awarded to graduating students with recognition of outstanding academic performance with an overall average of 85% and above.

### **Dean's list, Marianopolis College**

2017, 2018

### **Academic excellence in all subjects, Pensionnat du Saint-Nom-de-Marie**

2017

### **Certificate of Distinction on Waterloo Mathematics Contests**

2016, 2017

- Awarded to students scoring in the top 25% of all competitors on Fermat and Caley Contests.

### **Recognition for hard work and persistence in all subjects, Pensionnat du Saint-Nom-de-Marie**

2016, 2017

### **Finalist in the International Championship of Mathematical and Logic Games (AQJM)**

2016

## Skills

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**Programming:** Python (Jupyter Notebook, Colab, VS Code), R (RStudio), Java, MATLAB, Linux shells (Bash, Zsh), HTML for webpage design (JavaScript, CSS)

**Language:** English (fluent), French (fluent), Mandarin (native), Spanish (conversational), Italian (conversational), Japanese (beginner)

**Bioinformatic data visualization:** Adobe Illustrator, Inkscape, IGV, UCSC Genome Browser

**Video editing and design:** Final Cut Pro X, Motion, Premiere Pro, iMovie, CapCut, Procreate, Photoshop, Lightroom, OBS, Brackets

**Other:** JASP, GitHub, Bioconductor, NoMachine, Prezi, Zotero, Microsoft Office programs (Excel, PowerPoint, Word, Remote Desktop, Teams), Google (Google Docs, Sheets, Slides, Forms)

## Certificates

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**McMedHacks Certificate of Completion:** Learn medical image analysis and deep learning in Python

**MiCM Certificate of Completion** (McGill initiative in Computational Medicine): Introduction to Git and GitHub

**Certificate of Completion, Summer Camp at Tsinghua University-Peking University Joint Center for Life Sciences**

- Attended seminars on bioinformatics, molecular biology, biochemistry, pharmacology, and plant science.

**Bronze Cross, Bronze Medallion, Lifesaving Society Emergency Certifications**

- Candidate for responsibilities as an assistant lifeguard

## Work Experience

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**Peer-Tutoring** on Mathematics and Mandarin, Learning Square Center (upon demand) **2021 - 2022**

**Peer-Tutoring** on Biology at the Cegep level, Marianopolis College (2-3 times/week) **2018 - 2019**

**Private Tutoring** on French and Mathematics at the high-school level (weekly) **2017 - 2019**

## Extra-curricular Involvement

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**Table tennis:** Member of McGill Table Tennis Club and Echo Table Tennis Club **2021 - Present**

**Crafts with wax seal stamps:** [https://yuxinnnnn.github.io/wax\\_seal\\_artcrafts/](https://yuxinnnnn.github.io/wax_seal_artcrafts/) to visit some of my works **2019 - Present**

**Video editing:** Produced a 15-second advertising video played in the subways and shopping malls (Beijing, China) **2019 - Present**

**K-pop modern dance:** Member of Hallyu Dance Team at Marianopolis College and KLMontreal Dance Studio **2017 - Present**

**Baking and cooking:** Having 800+ subscribers on one of the most popular Chinese Recipes App (Xiachufang App) **2014 - Present**

**Chinese Zither:** Obtained level 10 certification; Performed in talent shows at schools and Art Centers during festivals **2006 - Present**

**Swimming:** Butterfly, Backstroke, Breaststroke, and Front Crawl **2006 - Present**