Margaret (Maggie) Chen

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Education

University of Toronto, St. George   Toronto, Canada
Honours Bachelor of Science - Computer Science Major & Neuroscience Major, GPA 3.93/4   2020 - 2024

Honors and Awards

Sigma Xi Grant Finalist	2023
John H Moss Scholarship Finalist, *University of Toronto* ($16,650, pending)	2023
Scholarship of Excellence, *EPFL* ($13,200)	2023
The Frances (Bond) McElroy Award for Study Abroad, *University of Toronto* ($3000)	2023
The Susan and Murray Armitage Scholarship, *University of Toronto* ($1000)	2023
The Susan McDonald Award, *University of Toronto* ($1000)	2023
International Genetically Engineered Machine (iGEM) Competition Gold Medal	2022
ElleHacks Scotiabank Challenge Winner (HTML, Javascript)	2022
Milne Research Award, *University of Toronto* ($500)	2022
David W. Pretty Award, *University of Toronto* ($5000)	2021
Clifton Graham Roberts Admission Award, *University of Toronto* ($5000)	2020
BC Excellence Scholarship, *Province of British Columbia* ($5000)	2020
BC Achievement Scholarship, *Province of British Columbia* ($1250)	2020
Dean's List, *University of Toronto*	2020-2024

Research Experience

MIT | Healthy ML Lab   Cambridge, Massachusetts
Research Volunteer   Oct 2023

- Train Convolutional Neural Network (CNN) models using NumPy, PyTorch, and scikit-learn on a repository of melanoma, nevus, and morphed images for image classification

STANFORD UNIVERSITY | Wu Lab   Palo Alto, California
Research Assistant   Feb 2022 - Present

- First author of a forthcoming publication on single-cell RNA sequencing (scRNA-seq) analysis of the human fetal and adult eyelid
- Independently spearheaded a scRNA-seq computational pipeline, developing UMAP Projections and RNA Velocity plots using high-performance computing clusters and various software and packages (Rstudio, Cellxgene, Seurat, Velocyto, scVelo, Google Colab, Jupyter Notebook)

EPFL, CAMPUS BIOTECH | Translational Neural Engineering Lab   Geneva, Switzerland
Research Intern   May 2023 - Sep 2023

- Selected to the Excellence Research Internship Program, a highly selective initiative that offers intensive research training experience to outstanding students in fields of engineering, science, and technology
- Transformed five months of EMG data from epidural spinal cord stimulation into actionable insights using MATLAB, employing methods in signal processing, activation threshold identification, and recruitment curves
- Formulated and identified electrical impulse patterns of muscle activation and suppression to restore the patient's motor control

YALE UNIVERSITY | Affective Science and Culture Lab   New Haven, Connecticut
Research Volunteer   May 2019 - Sep 2021
- Conducted fNIRS data analysis, such as motion artifact detection and correction, using MATLAB applications Homer3 and AtlasViewer
- Researched the correlation between culture and emotional granularity, using Nvivo to code speech and run inter-reliability tests for 25+ participants (in both Mandarin and English)
- Recruited, screened, and scheduled meetings with participants to collect a database of stimuli that can be used in the lab's research projects

Publications Under Review

M Chen, A Swarup, S Ahsanuddin, BX Li, J Yao, V Subramanium, B Scott, O Ercal, A Isakova, S Quake, AY Wu "Analysis of the Transcriptional Heterogeneity of Human Fetal and Adult Eyelid Using Single-Cell RNA sequencing". *Scientific Reports.*

Conference Presentations

Sigma Xi International Forum on Research Excellence
- **M Chen**. Single-Cell RNA Sequencing Analysis of the Transcriptional Heterogeneity of Human Fetal and Adult Eyelids. Long Beach, California. Nov 2023. [Poster].

iGEM 2022 Grand Jamboree The World Expo of Synthetic Biology
- **M Chen,** A Cheung, S Yam, M Shou. Onsite early diagnostic tool for Oak Wilt disease using LAMP. Paris, France. Oct 2022. [Oral]

Projects

EEG Controlled Grasping Exoskeleton (In progress)   2023
Microsleep Detection Device   2022
Mealfix   2022
    Winner of ElleHacks Scotiabank Challenge, a website that helps reduce food waste and food insecurity by connecting people with food that is past their peak, but still safe to consume, at a discounted price.
Portable Oak Wilt Disease LAMP diagnostic device   2022
    Awarded the International Genetically Engineered Machine (iGEM) Competition Gold Medal
My Website Portfolio (HTML, CSS, JavaScript, maintained with Git Version Control)   2022
Frogger (Assembly Language)   2022
    A fully functional arcade game, containing features like lives, pause/play, end screen, etc.
Chocotech (CircuitPython, Adafruit, TikTok**)**   2022
    Create and share videos about hardware and software, as I self-teach myself those skills. Explored NFC chips, Adafruit (using CircuitPython), and more
Sous-Chef (Java with Android GUI, maintained with Git Version Control and Jira)   2021
    An android app that keeps track of various details of the user's food inventory and suggests recipes based on these factors. Implemented design principles and patterns; incorporated accessibility features

Professional Experience

BIOBOX ANALYTICS   Toronto, Canada
Data Architect Intern   Sept 2023 - Present
- Create and train a Natural Language search engine backed by a Knowledge Graph (KG) and Language Learning Model (LLM), utilizing models and packages like BERT and scispaCy, that enables scientists to interrogate next-generation sequencing data for the purposes of drug discovery

NEUROTECH UOFT   Toronto, Canada

Co-President Operations   Jan 2021 - Present

- Managed the creation and submission of a microsleep detection project for NeuroTechX, an international neurotechnology competition; this year we are submitting an EEG-controlled hand exoskeleton
- Grow the diversity and inclusivity of the only neurotechnology student community on campus, creating 10+ educational workshops with 160+ participants in attendance, collaborating with faculty to bring research-level workshops, increasing design team size by 300%, and gaining $7200 in funding
- Lead and facilitate hands-on workshops teaching brain anatomy, EEG signal interpretation, EMG signal processing, and hardware (Arduino)

iGEM TORONTO   Toronto, Canada

Dry Lab Lead   April 2022 - Feb 2023

- Innovated a portable oak wilt disease loop-mediated isothermal amplification (LAMP) diagnostic device for the iGEM 2022 Competition, earning a Gold Medal
- Led a team of seven students in creating PrimerScorer, a Python program in Google Colab that incorporates existing primer design software (GLAPD, PrimerExplorer, and Primer3) with our team's primer selection criteria to rank primers
- Collaborated with foresters and lab researchers to ensure device accuracy and real-world applicability

BELL CANADA   Toronto, Canada

Technical Specialist / Software Engineer Intern   May 2022 - Sept 2022

- Led the full project lifecycle of a Cloud Maturity Assessment (CMA) and Dashboard feature that facilitated the transition of Bell internal teams to cloud servers
- Prototyped the CMA using Justinmind, brainstormed use cases, and communicated with stakeholders to ensure it aligned with the overall dashboard strategy and organizational goals
- Utilized Java, JavaScript, HTML, CSS, Bootstrap, and Thymeleaf to create an intuitive and user-friendly interface, connecting user inputs with back-end databases, and vice versa

Community Involvement

FRIDAYS FOR FUTURE TORONTO   Toronto, Canada

Organizer   Sept 2021 - Jan 2023

- Discussed, drafted, and revised the TransformTO Net Zero Report with city councilors and other sustainability leaders. On December 15, 2021, the report was adopted by the Toronto City Council
- Wrote our demands for climate justice and organized rallies such as the Global Climate Strike, which was attended by thousands in Toronto, and more than 6 million around the world

VICTORIA COLLEGE ATHLETICS ASSOCIATION   Toronto, Canada

Executive Member   Jan 2021 - Present

- Organize events and brainstorm ideas to engage 8000+ Victoria College students in activities that promote their health and wellbeing
- Coordinate and act as the point of contact for 3-5 Victoria College intramural teams with 50+ athletes

Skills

Programming: Python, MATLAB, R, Java, Assembly, HTML/CSS, Javascript, Latex, Command-Line Interface
Research: Light microscopy, RNA isolation, cDNA reverse transcription, qPCR amplification, scRNA-seq, EEG