

## Jennifer Yu

University of Toronto

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### EDUCATION

<b>Master of Science in Computer Science</b> , <i>University of Toronto</i>	Toronto, ON, Canada
Supervisor: Dr. Anna Goldenberg      Research area: AI in healthcare	2022.09 – 2024.04
<b>Bachelor of Applied Science</b> , <i>University of Waterloo</i>	Waterloo, ON, Canada
Honours Biomedical Engineering – Computing Minor	2017.09 – 2022.04

### PUBLICATION

**Yu, J.\***, Pai, S., & Foster, D. (2021). *Extending Similarity Network-Based Classifiers to Non-Coding Genome and Deep Learning* [Poster presentation]. Machine Learning in Computational Biology, Online.

Abedi, H., Ma, M., **Yu, J.**, He, J., Ansariyan, A., & Shaker, G. (2022). *On the Use of Machine Learning and Deep Learning for Radar- Based Passenger Monitoring* [Oral presentation]. 2022 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science, Denver, CO, USA

**Yu, J.\***; Edke, P; Zhu, R; Ali, M.; Goldenberg, A., Goodday, S., & Friend, S. (2023). *Causal Discovery in Mental Health during pregnancy* [Poster presentation]. Vector Institute Research Symposium, Toronto, ON, Canada

Abedi, H., Ma, M., **Yu, J.**, He, J., Ansariyan, A., & Shaker, G. (2023). *Deep Learning-Based In-Cabin Monitoring and Vehicle Safety System Using a 4D Imaging Radar Sensor*, IEEE Sensor Journal

**Yu, J.\***, Edke, P., Ali, M., Zhu, R., & Goldenberg, A. (2023). *Childhood Adversity's Impact on Dynamic Mental Health During and Post Pregnancy: A Causal Approach* [Lighting talk]. IEEE SDS2023 Workshop: Data science techniques on data for neurodegenerative diseases and mental disorders, Zürich, Switzerland

Hussain, A., Zhang, Z., **Yu, J.**, Wei, W., Arshad, H., Lew, J., Jaggan, C., Chen, J., & Huizinga, J. (2023). *Haustral Rhythmic Motor Patterns of the Human Large Bowel Revealed by Ultrasound*, American Journal of Physiology-Gastrointestinal and Liver Physiology

Garg, K., **Yu, J.\***, Behrouzi, T., Tonekaboni, S., & Goldenberg, A. (2023). *Dynamic Interpretable Change Point Detection* [preprint] (under review)

Nestor, B., Hartvigsen, T., **Yu, J.**, Razak, F., Verma, A., Goldenberg, A., & Ghassemi, M. (2023). *Learning Limited: How limited data sharing impacts model performance in health* (under review)

### ONGOING WORK

**Jennifer Yu**, Mai Ali, Tina Behrouzhi, Sarah Goodday, Thomas Hartvigsen, Sujay Nagaraj, Anna Goldenberg, Marzyeh Ghassemi, Stephen Friend. *BUMP: Better Understanding the Metamorphosis of Pregnancy with Multi-modal Digital Health*.

**Jennifer Yu**, Sarah Goodday, Anna Goldenberg, Stephen Friend. *Time for Baby: Leveraging Wearable Data to Enhance Personalized Pregnancy Outcomes - Delivery Readiness*

## **RESEARCH EXPERIENCE**

### **Vector Institute & The Hospital for Sick Children**

*Machine Learning Graduate Researcher*

2022.05 – Present

Supervisor: Dr. Anna Goldenberg (Department of Computer Science)

- Designed and implemented a novel **dynamic change point detection** method with better performance and interpretability
- Developing interpretable **time-series forecasting** ML models for pregnancy due date prediction using XGBoost and LSTM
- Exploring individualized delivery readiness using machine learning methods

Skills: Pandas, PyTorch, scikit-learn, XGBoost, NumPy, matplotlib, seaborn, AWS

Collaborators: 4Youandme, Evidation Health, Bodyport, Sema4, Cambridge Cognition

<https://www.clinicaltrials.gov/ct2/show/NCT04714905?term=wearables&cond=Pregnancy&draw=2&rank=1>

### **Ontario Institute for Cancer Research, Pai Lab**

*Deep Learning Researcher*

2021.05 – 2021.08

Supervisor: Dr. Shraddha Pai (Department of Adaptive Oncology)

- Developed a deep-learning patient classifier with an **accuracy of 88%** using **graph attention networks** to predict clinical outcomes of patients with cancer
- Improved model **computational efficiency by ~50%** compared to existing algorithms

Skills: scikit-learn, PyTorch, PyTorch Geometric, NumPy, Pandas, matplotlib, R

Link to the MLCB poster:

<https://drive.google.com/file/d/19tQaUnIJWnEVIMcxfT6lKaU0jvFrXG40/view?usp=sharing>

Link to the MLCB abstract:

<https://drive.google.com/file/d/1QunILdTsFyxhGbTAXutJP0pAjkoXPXNd/view?usp=sharing>

### **University of Toronto - Kang Lee Lab (Nuralogix Corporation)**

*Machine Learning Research Student (Co-op)*

2021.01 – 2021.07

Supervisors: Dr. Kang Lee, Dr. Volodymyr Turchenko, Winston De Armas

- Designed and developed a 3D-CNN computer vision model with an ensemble learning approach using facial videos; improving blood pressure estimation **accuracy by 7%**
- Proposed and implemented multiple model explainability methods, including **permutation feature importance** and **saliency map**

Skills: PyTorch, NumPy, Pandas, matplotlib, OpenCV

### **University of Waterloo, Wireless Sensors and Devices Lab**

*Undergraduate Researcher*

2020.07 – 2020.12

Supervisor: Dr. George Shaker

- Built an ML model with **high precision (0.90) and recall (0.95)** for in-car occupant detection using 4D MIMO radar

- Designed an ML data pipeline for multi-label classification with **big data**, including data pre-processing, model training & testing and performance evaluation
- Analyzed and benchmarked different neural network architectures, including 3D-CNN, **Long Short-term Memory (LSTM)** and Temporal Convolution Network

Skills: PyTorch, scikit-learn, NumPy, SciPy, matplotlib, MATLAB

Link to IEEE publication: <https://ieeexplore.ieee.org/document/9887034>

## **Huawei Technologies Canada**

*Machine Learning Research Engineer Intern*

2020.05 – 2020.08.

- Developed complex-valued neural network models that learned beamforming codebooks which **improved achievable data rates by 90%** in 5G/6G massive MIMO system
- Built regression models and deep neural networks for channel prediction that **reduced pilot overhead by 30%** in signal transmission
- Achieved reduced dimensionality of downlink channels with low precoding loss using singular value decomposition and **autoencoder** methods

Skills: NumPy, Keras, Scipy, scikit-learn, matplotlib, MATLAB

## **University of Guelph, Centre for Biodiversity Genomics**

*Bioinformatics Research Student (Co-op)*

2019.01 – 2019.12

Supervisor: Sujeevan Ratnasingham (Department of Informatics)

- Developed a multi-class ML model for taxonomic classification on nucleotide & amino acid sequences that achieved **96% accuracy**
- Performed error analysis and visualized key findings using data visualization tools

Skills: TFLearn, NumPy, SciPy, Pandas, matplotlib, seaborn, R, Excel, SQL

## **INVITED TALKS**

*Vector Institute – Endless Summer School: Health Roundup Seminar, Invited Speaker* 2023.03

*10<sup>th</sup> IEEE Swiss Conference on Data Science – Data science techniques on data for neurodegenerative diseases and mental disorders, Lighting Talk Speaker* 2023.06

## **ACTIVITIES**

Women in Engineering @ UWaterloo – *Ambassador*

2017 – 2022

BioTEC Conference – *Event Organizer Lead*

2022 – 2023

Women in STEM @ UofT – *Advisor*

2023 – Present

## **SCHOLARSHIP AND AWARDS**

- Vector Scholarship - \$17,500 (2022-2023)
- Ontario Graduate Scholarship - (2022-2023)
- NSERC Undergraduate Student Research Award - \$6,000 × 3 (2020 – 2022)
- BioTalent Canada Work Placement Program Funding - \$7,000 (2022)
- President's Research Award - \$1,500 (2020)
- President's Research Award - \$1,500 (2019)
- President's Scholarship of Distinction - \$2,000 (2018)
- Robert Tattersall Award - \$8,000 (2017)

## **SKILLS**

**Languages:** Python, MATLAB, R, C++, C#, SAS, SQL, JavaScript

**Technologies:** PyTorch, TensorFlow, Keras, TFLearn, OpenCV, scikit-learn, scikit-image, SciPy, NumPy, pandas, matplotlib, seaborn, ffmpeg, AWS, Caffe, Excel & VBA

**Research Areas:** Time Series Forecasting, Machine Learning, Computer Vision, Causality, Digital Health

**Tools:** Git, VS Code, Jupyter Notebook, Domino MLOps, Confluence, Jira, Docker, Bash  
SWE Tools

Research Tools: PyTorch, Tensorflow, NumPy, Pandas, scikit-learn, matplotlib, Scipy, AWS, Jupyter Notebook, Domino MLOps, SQL