Jennifer Yu

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EDUCATION

Master of Science in Computer Science, *University of Toronto*   Toronto, ON, Canada
Supervisor: Dr. Anna Goldenberg   Research area: AI in healthcare   2022.09 – 2024.04
Bachelor of Applied Science, *University of Waterloo*   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 (Accepted)

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 (Accepted)

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

Enable Medicine
Research Intern   2023.05 – Present
Supervisor: Dr. Alexandro Trevino, Dr. James Zou (Stanford University)
● Conducting research on CODEX multiplexed tissue **image retrieval** using **self-supervised representation learning**
● Developing a **patient similarity search** algorithm based on tissue images
Collaborator: Stanford University

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
● Exploring individualized delivery readiness using machine learning methods
Collaborators: 4YouAndMe, OURA Ring, Garmin, Evidation Health, Bodyport, Sema4, Cambridge Cognition
[Link to Study]

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
[Poster][Conference Abstract]

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**

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

[Conference paper][Journal paper]

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

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

INVITED TALKS

Vector Institute – *Endless Summer School: Health Roundup Seminar,* Invited Speaker 2023.03
10ᵗʰ IEEE Swiss Conference on Data Science – *Data science techniques on data for* 2023.06
neurodegenerative diseases and mental disorders, Lighting Talk Speaker

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 - $15,000 (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 × 2 (2019 – 2020)
- 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

REFERENCES

Available upon request