

Jesse Sun

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EDUCATION

University of Waterloo

Waterloo, ON

Bachelor of Computer Science, Honours, Co-op. cGPA: 3.84, Faculty GPA: 3.92

Sept. 2018 – Apr. 2023

- Graduate Courses: Optimization for Data Science (CS794), Continuous Optimization (CO466/666), Stochastic Processes (STAT433/833), Intro. to Machine Learning (CS480/680)
- Undergraduate Courses: Advanced Probability (STAT240), Applied Probability (STAT333), Algorithms (CS341)

EXPERIENCE

Machine Learning Engineer Intern

Jan. 2022 – Present

BetterUp — Recommendation Systems Team

San Francisco, California

- Spearheaded efforts in research and development of a feature store using Feast, Snowflake, Redis, and AWS.
- Modularized the resource recommendation pipeline for improved scalability for downstream tasks using BentoML running on AWS Fargate, orchestrated using Step Functions.
- Integrated novel modalities of items into the existing recommendation system through crafting ETL pipeline from Snowflake and indexing into Elasticsearch.

Undergraduate Research Fellow

May 2021 – Aug. 2021

University of Waterloo — Advised by Yaoliang Yu

Waterloo, Ontario

- Researched generative multivariate quantile neural models using optimal transport for probabilistic forecasting, out-of-distribution/anomaly detection, and uncertainty quantification.
- Workshop paper accepted to ICLR 2022 DGM4HSD workshop. Full paper currently in preparation for submission to a journal.

Research Intern

Sept. 2020 – Dec. 2020

University Health Network — Advised by Bo Wang

Toronto, Ontario

- Actualized novel self-supervised pre-training method for 3D point clouds in PyTorch via persistent homology.
- Improved classification accuracy of PointNet and Dynamic Graph CNN (DGCNN) models on the ModelNet40 dataset by up to 2% relative to fully supervised counterpart.
- Contributed in data collection, pre-processing, and developing a temporal convolutional network (TCN) for daily forecasting of COVID-19 cases in regions from tabular data for the global XPRIZE Pandemic Response Challenge.

Research Intern

Jan. 2020 – Apr. 2020

University Health Network — Advised by Bo Wang

Toronto, Ontario

- Built and migrated novel image segmentation framework for automatic scar quantification.
- Automated pre-processing pipeline to clean and generate ground truth masks for scars in hypertrophic cardiomyopathy patients' MR images based on manual pixel intensity heuristic used by clinicians.

Research Intern

May 2019 – Aug. 2019

University Health Network — Advised by Bo Wang

Toronto, Ontario

- Spearheaded research in deep segmentation models for automatic ventricular segmentation from MR image.
- Improved state-of-the-art on ventricular segmentation datasets SUN09 and AC17 by up to 3% in Dice score coefficient.

PUBLICATIONS, WORKSHOP PAPERS, PREPRINTS (* DENOTES EQUAL CONTRIBUTION)

4. Neural Brenier Maps as Multivariate Quantile Estimators

Jesse Sun, Dihong Jiang, Yaoliang Yu.

In preparation.

3. Conditional Generative Quantile Networks via Optimal Transport

Jesse Sun, Dihong Jiang, Yaoliang Yu.

ICLR 2022 - Deep Generative Models for Highly Structured Data Workshop.

2. Automated Left Ventricular Scar Quantification in Hypertrophic Cardiomyopathy Patients with an Interpretable Machine Learning Model

Zeinab Navidi Ghaziani*, Jesse Sun*, Raymond Chan, Kate Hanneman, Amna Al-Arnawoot, Harry Rakowski, Barry Maron, Bo Wang, Wendy Tsang

Canadian Cardiovascular Conference 2020 and Circulation.

1. SAUNet: Shape Attentive U-Net for Interpretable Medical Image Segmentation

Jesse Sun, Fatemeh Darbehani, Mark Zaidi, Bo Wang

International Conference on Medical Image Computing and Computer Assisted Intervention 2020, MICCAI 2020.

TECHNICAL SKILLS

Languages: Python, R, C++, C, Java

Tools: PyTorch, numpy, TensorFlow, Docker, JAX, OpenCV, MXNet, GluonTS, pandas, scikit-learn, Slurm

Technologies: AWS, BentoML, Haystack, Hugging Face, Feast Feature Store, Redis, Snowflake

AWARDS AND SCHOLARSHIPS

President's Research Award (\$3,000 CAD)	2021
Cheriton School of Computer Science, Undergraduate Research Fellowship (\$15,000 CAD)	2021
Software Engineering Entrance Scholarship (\$4,000 CAD)	2018
Math Faculty Entrance Scholarship (\$10,000 CAD) <i>[Declined]</i>	2018
University of Waterloo President's Scholarship of Distinction (\$2,000 CAD)	2018
Hacking Good 2017 Finalist (\$1,000 CAD)	2017

LEADERSHIP AND SERVICE

Reviewer: ICML 2022, NeurIPS 2022

Clubs: University of Waterloo Data Science Club - Education Executive.

TALKS AND PRESENTATIONS

Introduction to Deep Learning Workshop Presented at <i>Dataverse 2021</i> datathon.	Nov. 2021
Computer Vision Reading Group Presented at <i>University of Waterloo Data Science Club</i> .	Fall 2021
MICCAI 2020 Oral and Poster Sessions - Shape Attentive U-Net Presented at <i>MICCAI 2020</i> .	Oct. 2020
Self-Supervised Training of Graph Convolutional Networks Presented at University Health Network.	Aug. 2020
Graph Convolutional Networks and Applications for Drug Discovery Tasks Presented at University Health Network.	Apr. 2020
Shape Attentive U-Net Presented at University Health Network.	Jan. 2020
Neural State Machines: Learning by Abstractions Presented at University of Waterloo Data Science Club.	Nov. 2019
Intro to Neural Networks and Optimization Presented at University of Waterloo Data Science Club.	Oct. 2019
Sanity Checks in Computer Vision Presented at University Health Network.	July 2019
EfficientNet: Rethinking Model Scaling for Convolutional Neural Networks Presented at University Health Network.	June 2019