

# Jesse Sun

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## EDUCATION

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### 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

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### 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 AND WORKSHOP PAPERS (\* DENOTES EQUAL CONTRIBUTION)

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### 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

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**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

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

## LEADERSHIP AND SERVICE

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**Reviewer:** ICML 2022, NeurIPS 2022

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

## TALKS AND PRESENTATIONS

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