

Yuxiang (Felix) Fu

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EDUCATION

University of British Columbia (UBC)

Sept. 2024 - Present

MASc in Electrical and Computer Engineering

Vancouver, BC

Supervisors: [Prof. Renjie Liao](#), [Prof. Lele Wang](#) | GPA: 97%

University of British Columbia (UBC)

Sept. 2019 - Nov. 2023

BSc, Honours in Computer Science with distinction

Vancouver, BC

Honors Advisor: [Prof. Andrew Roth](#) | GPA: 91% (A⁺)

Thesis: PCVAE: a Controlled deep Variational Autoencoder for Pancancer gene expressions clustering

EXPERIENCE

Vector Research Intern

Jan. 2024 - May 2024

[Vector Institute](#) | *Founded by Vector Research Grant*

Toronto, ON

- Mentored by [Prof. Geoff Pleiss](#). Explored the **conformal predictive sets** on the pedestrian trajectory samples. Evaluated the capacity of different conformal sets and re-derived the score function.
- Quantified the uncertainty of human trajectories generated from a pre-trained **diffusion** model. Defined the notation of ‘well-calibrated’ trajectory samples and investigated different covering geometry configurations of the conformal sets such as bounding rectangle, circle, ellipse and other polygons.
- Discovered the conditional coverage on the size of the conformal sets.

Team lead - Let's SOLVE it

Sept. 2023 – Dec. 2023

[Borealis AI](#)

Vancouver, BC

- **Advisors:** [Dr. Raquel Aoki](#)
- Developed EDforecast, a neural network-based solution to predict patient arrival patterns in Emergency Departments, addressing the critical issue of long wait times in Canadian hospitals where 1 in 25 patients wait over 24 hours for acute care beds, enabling optimized resource allocation and improved patient care.
- Contributed and presented in the final presentation. Compared and analyzed our EDforecast and other baseline models for time series prediction.

Research Assistant USRA - Roth Lab

May 2022 – Sept. 2022

[BC Cancer Research Centre](#) | *Founded by WLIURA*

Vancouver, BC

- Presented in a poster conference held at BCCRC with a master's student, showcasing the [LiquidBayes](#) project. The project was published at [ISMB/ECCB 2023 B-145](#) within the High Throughput Sequencing (HiTSeq) track.
- Parallelized and optimized the **Snakemake** workflow by introducing a meta-config object and parsing directory hierarchies. This led to a minimum **90%** reduction in processing time, enabling the deployment each trial with customized config files on the HPC clusters by **Slurm**.
- Implemented a Bayesian network using **Pyro** PPL supported by **Pytorch** according to well-designed probabilistic graphic models. Developed an inconsistent CN model that demonstrated impressive performance. Applied this model on the 10 real patients with matched (DLP+) sequencing data and the results beat the SOTA methods.

Undergraduate/Graduate Teaching Assistant (7 semesters)

Jan. 2021 – Present

[CPSC 210](#), [CPEN 455](#), [CPSC330](#)

Vancouver, BC

- Led several **30**-student labs both online and in-person and held customized recap and Q&A session. Relayed common problems and demands to the professor. Contributed to building questions for a sample final.
- Helped students to build and debug their projects in **Java/Python** heuristically. Proposed an upgrade plan for the autograder to better locate buggy versions of code and put it into practice.
- Received excellent evaluation scores and favorable feedback from **500+** students in teaching quality.

PUBLICATIONS

MoFlow: One-Step Flow Matching for Human Trajectory Forecasting via IMLE Distillation

Y. Fu, Q. Yan, K. Li, L. Wang, R. Liao, *Under Review*

Stochastic Trajectory Generation with Diffusion via Implicit Maximizing Likelihood Estimation Distillation

Y. Fu, Q. Yan, K. Li, L. Wang, R. Liao, *CRV 2024 Workshop*, Oral

Rotational Impedance Formulation in a Unified Viewpoint of Lie Algebra

J. Fu, S. Shen, Y. Fu, K. Xiang, *IEEE Robotics and Automation Letters 2025* [[paper](#)]

ESQmodel: biologically informed evaluation of 2-D cell segmentation quality in multiplexed tissue images

E. Lee, D. Lee, W. Fan, A. Lytle, Y. Fu, D. W. Scott, C. Steidl, S. Aparicio, A. Roth, *Bioinformatics 2023*
[[website](#)][[bioRxiv](#)][[code](#)]

LiquidBayes: Integrated analysis of single whole genome sequencing and ctDNA

K. Yang, F. Fu, P. Galipeau, M. Lepur, A. Kreitzman, M. Ko, A. Paguirigan, V. Au, V. Cerda, E. Kong, D. Lai, M. Van Vliet, E. Zaikova, A. Bouchard-Côté, S. Apricio, G. Ha and A. Roth, *ISMB/ECCB 2023* [[poster](#)][[code](#)][[thesis](#)]

PROJECTS

EDforecast | *Python, Prophet* [[proposal](#)][[slides](#)][[demo](#)][[code](#)]

Sept. 2023 - Dec. 2023

- Built a fine-grained model that predicts the number of Emergency Department (ED) patients at any time accurately by the demographic information of the corresponding district along with the weather and holiday attributes. Applied a wide spectrum of models including time-series SARIMAX on dataset provided by CIHI.

PCVAE (Honours thesis) | *PyTorch* [[content](#)][[code](#)]

Sept. 2022 - May 2023

- Designed a novel variational autoencoder architecture that controls the primary tissue effect of the bulk RNA sequencing data from [ICGC portal](#). Performed survival analysis on patients in the new site-effect-free clusters.
- PCVAE demonstrated its proficiency in removing the tissue signal under various measures, assessing the quality of latent space. Additionally, it allows for clustering on less dominant features across heterogeneous cancers.

Context retrieval evaluation on RALMs | *LangChain* [[report](#)][[code](#)]

Mar. 2023 – May 2023

- Investigated the effectiveness of in-context retrieval augmented language models (RALMs) in QA by comparing and evaluating different context retrieval methods.
- Evaluated three RALMs quantitatively in terms of context-alignment, precision, relevance and coherence.

LiquidBayes | *PyTorch, Pyro/numPyro, Snakemake* [[code](#)]

Sept. 2022 – May 2023

- A Bayesian Network for inferring tumour fraction and clonal prevalences from whole genome sequencing of cell-free DNA and Direct Library Preparation (DLP+) of a matched tissue biopsy.
- MCMC (NUTS) and Variational Inference methods are implemented in Pyro to address intractable integral.

HONORS AND AWARDS

Google CSRMP mentee Class B

Sept. 2023

Faculty of Science International Student Scholarship

Dec. 2020, Nov. 2021, Dec. 2022

- Total grant value: \$27,500

Work Learn International Undergraduate Research Awards

May 2022, May 2023

- This is equivalent to the USRA [NSERC](#) Undergraduate Student Research Awards for domestic students
- Awarded by Department of Computer Science and Department of Electrical and Computer Engineering

Trek Excellence Scholarship

Oct. 2020, Aug. 2021, Nov. 2022

- Total grant value: \$9,000, top 5% undergraduate in the Faculty of Science

Science Scholar/Dean's Honour List

May 2020, 2021, 2022, 2023