

# James Wu

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## WORK EXPERIENCES

### UNIVERSITY COLLEGE LONDON

London, UK

Research Assistant

June 2022 - Present

#### Generalised Variational Inference for Gaussian Processes

JAX, Flax, Optax

- Achieved linear-time learning objectives for **variational Gaussian processes** compared to cubic complexity approaches in existing literature
- Leveraged **generalised variational inference** (GVI) to prevent the KL divergence support mismatch of standard function space variational inference
- Developed comprehensive implementations available on **GitHub**

#### Integral Probability Metrics

JAX

- Explored kernel-based distribution discrepancies **maximum mean discrepancy** (MMD) and **kernel Stein discrepancy** (KSD)

### REVOLUT LTD.

London, UK

Machine Learning Engineer (*Junior → Mid → Senior*)

Aug 2019 - Sept 2022

#### Global Card Issuance for Company Profitability

Pyro, PyTorch, BayesOpt, Airflow, GCP

- Maintained company profitability by optimising global card issuance to acquire interchange rebates of \$100M+ per year
- Developed pipelines for **Gaussian processes** and **Bayesian optimisation** to forecast user activity, spending, and growth
- Published timeseries package to internal **PyPi** and used across the business (i.e. forecasted liquidity for Treasury Dept.)

#### Support Automation

PyTorch, MLflow, Elasticsearch, Scikit-Learn, Airflow

- Built semantic search and intent recognition of customer chat messages with **one-shot learning** and **transformer** sentence embeddings

#### User Personalisation

TensorFlow, PySpark, Airflow, GCP

- Developed **LSTMs** to predict spending behaviours on the user-level
- Clustered behaviours with **t-SNE** to guide personalised content delivery

### UNIVERSITY OF TORONTO

Toronto, CA

Research Assistant

Sept 2018 - Apr 2019

#### NLP for Biomedical Text

PyTorch

- Achieved SOTA results for biomedical **named-entity recognition** (NER) through **transfer learning** and **multi-task learning** with BERT

### ANALOG DEVICES INC.

Toronto, CA

Data Scientist (*Intern*)

May 2017 - Aug 2018

#### Power Optimisation for PPG Heart Rate Sensors

Embedded C, MATLAB

- Designed an optimisation algorithm that reduced sensor power consumption by 50% while maintaining the same signal quality

## EDUCATION

### UNIVERSITY COLLEGE LONDON

MSc. Computational Statistics & Machine Learning

Graduated First Class Honours

### UNIVERSITY OF TORONTO

BASc. Engineering Science (Robotics Specialisation)

Graduated Honours

## SOFTWARE SKILLS

**Fluent:** Python, Git, LaTeX

**Proficient:** Airflow, SQL, Docker, PySpark, GCP

**Familiar:** Kubeflow, MATLAB, C, Assembly

## PUBLICATIONS

Generalised Variational Inference for Gaussian Processes (Msc. Thesis)

Power Optimization with Photoplethysmography Signal Quality Classification (ICASSP 2020)

Biomedical Named-Entity-Recognition (BASc. Thesis)

Robust Beat-To-Beat Detection Algorithm for Pulse Rate Variability (ICASSP 2018)

3D-Printed Neuronavigation Headset for Therapeutic Brain Stimulation (JNE 2018)

## RELEVANT STUDIES

Approximate Inference

Unsupervised Learning

RKHS's in Machine Learning

Statistical Learning Theory

Convex Optimisation

Computer Vision

Supervised Learning

Algorithm Design & Analysis

Mobile Robotics & Perception