# James Wu

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## WORK EXPERIENCES

**UNIVERSITY COLLEGE LONDON** — London, UK
**Research Assistant** (MSc.) — 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 software 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

- Optimised global card issuance to maintain company profitability through interchange rebates of $100M+ per year
- Developed pipelines for **Gaussian processes** and **Bayesian optimisation** to forecast user activity, spending, and growth
- Published to internal **PyPi** for use across the business (i.e. liquidity forecasting for Treasury)

Customer 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, Dataproc, Airflow, GCP

- Developed **LSTM** solution to predict user-level spending behaviours
- Clustered behaviours with **t-SNE** to guide personalised content delivery

**UNIVERSITY OF TORONTO** — Toronto, CA
**Research Assistant** (BASc.) — Sept 2018 - Apr 2019

NLP for Biomedical Text
PyTorch

- Demonstrated state-of-the-art performance for **named-entity recognition** (NER) of biomedical literature
- Applied **transfer learning** and **multi-tasked learning** to pre-trained **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

## 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

## SOFTWARE SKILLS

**Fluent**
Python, Git, LaTeX

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

**Familiar**
C, PIC Assembly

## PUBLICATIONS

Power Optimization Using Embedded Automatic Gain Control Algorithm with Photoplethysmography Signal Quality Classification (ICASSP 2020)

Robust Beat-To-Beat Detection Algorithm for Pulse Rate Variability Analysis from Wrist Photoplethysmography Signals (ICASSP 2018)

Development and Validation of a 3D-Printed Neuronavigation Headset for Therapeutic Brain Stimulation (Journal of Neural Engineering 2018)