SIU LUN CHAU

Final Year DPhil Student in Statistical Machine Learning

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EDUCATION

DPhil in Statistical Machine Learning

St.Peter's College, University of Oxford   📅 2019 – Ongoing

- Supervised by Prof. Dino Sejdinovic, Prof. Mihai Cucuringu and Prof. Xiaowen Dong.
- Recipient of the ESPRC and MRC Studentship for DPhil in Statistics and Machine Learning
- Thesis: Explainability, Causality, and Preference Learning at the Interface between Kernel Methods and Gaussian Processes.

MMATH in Mathematics and Statistics

Lady Margaret Hall, University of Oxford   📅 2017 – 2018

- Graduated with 1st Class Honours
- Ranked 2nd in the year.
- Distinction in Master Thesis: Modelling Diseases Trajectories with Infinite Mixture of Gaussian Processes.

BA in Mathematics and Statistics

Lady Margaret Hall, University of Oxford   📅 2014 – 2017

- Graduated with 1st Class Honours
- Ranked 1st in the year.
- Distinction in Undergraduate Essay on Boosting methods.

SKILLS

Machine Learning Models

Kernel Methods | Neural Networks
Gaussian Processes
Graph Neural Networks

Machine Learning Applications

Causal Inference | Preference Learning
Explainable AI | Uncertainty Modelling
Bayesian Optimisation | Graph ML

Programming Language

Python | R | MATLAB

Coding software

Gpytorch | PyTorch | Sckit-Learn

Language

English | Mandarin | Cantonese

INDUSTRY EXPERIENCES

Applied Scientist Intern

Amazon | London, UK   📅 Jun-22

- Devise forecasting models for the Amazon Transportation Service group.

Data Science Consultant

Ravio | London, UK   📅 Apr-22 – Present

- Designed and implemented a word embedding model to match and compare job titles across various companies.

Research Intern

Empirical Inference, Max Planck Institute of Intelligent System | Tubingen, Germany   📅 Oct-21 – Present

- Researched into machine learning for econometrics under the supervision of Dr. Krikamol Muandet.
- Topics covered: Relaxing restrictive instrumental variable regression set up, and examining hypothesis testing framework under regression discontinuity design models.

Content Developer

Cambridge Spark | London, UK   📅 Aug-17 – Present

- Designed projects and delivered Machine Learning courses to upskill students and corporates. Topics include: basic ML, Graphs, model explainability using LIME and SHAP, time series modelling, and Gaussian processes.

Machine Learning Consultant

Gini | Hong Kong   📅 Oct-20 – Jan-21

- Developed a Gaussian Processes based explainable time series model for giniPredict, a forecasting tool built for use in Google spreadsheets for decision-makers.

Machine Learning Consultant

Catalyst AI | Cambridge, UK   📅 Apr-19 – Oct-20

- Developed forecasting models for clients from agricultural and fashion tech companies.

Cofounder and Managing Director

OSG Digital | Oxford, UK   📅 Apr-17 – Apr-19

- Cofound and managed Oxford first's student-led machine learning consultancy group with over 50 technical consultants.

PUBLICATIONS

8. Giga-scale Kernel Matrix-Vector Multiplication on GPU | Submitted

Robert Hu, **Siu Lun Chau**, Dino Sejdinovic, Joan Alexis Glaunès

- Building on top of the *Fast Multipole Method*, we proposed *Faster-Fast and Free Memory Method* (F^3M) to run Kernel Matrix Vector-Multiplication on tall ($n \sim 10^9$) and skinny ($D \leq 7$) data using a single GPU.

7. Explaining Preference with Shapley Values | Submitted

Robert Hu*, **Siu Lun Chau***, Jaime Ferrando Huertas, and Dino Sejdinovic

- We proposed Pref-SHAP, a Shapley value-based model explanation framework, to explain and interpret preference models.

6. RKHS-SHAP: Shapley Value for Kernel Methods | Submitted

Siu Lun Chau, Robert Hu, Javier Gonzalez, and Dino Sejdinovic

- We proposed RKHS-SHAP to explain and interpret RKHS functions arose in Kernel methods and Gaussian Processes using the Shapley value paradigm.
- Based on RKHS-SHAP, we proposed a *Shapley Regulariser* that can be used under the empirical risk minimisation framework to control feature's contribution during the learning procedure.

5. Spectral Ranking with Covariates | Submitted

Siu Lun Chau, Mihai Cucuringu, and Dino Sejdinovic

- We proposed three spectral ranking algorithms based on *seriation*, *low-rank assumption* and *canonical correlation*, to the problem of ranking n players given their incomplete and noisy pairwise comparisons, in light of their player covariate information.

4. Learning Inconsistent Preference with Gaussian Processes | AISTATS 2022

Siu Lun Chau, Javier Gonzalez, and Dino Sejdinovic

- We challenge the usual modelling assumption in preference models that imposes rankability of data items via latent utility function values.
- We proposed *Generalised Preferential Gaussian Process* to model preferences that depart from rankability, a common and strong assumption that is often violated in practice.

3. BayesIMP: Uncertainty Quantification for Causal Data Fusion | NeurIPS 2021

Siu Lun Chau*, Jean Francois Ton*, Yee Whye Teh, Javier Gonzalez, and Dino Sejdinovic

- We proposed *Bayesian Conditional Mean Embedding* to estimate the average treatment effect under a data fusion setting while quantifying model uncertainty.

2. Deconditional Downscaling with Gaussian Processes | NeurIPS 2021

Siu Lun Chau*, Shahine Bouabid*, and Dino Sejdinovic

- We devised a Bayesian solution for statistical downscaling which handles unmatched multi-resolution data through the proposed *Deconditional Gaussian Processes*.

1. Kernel-Based Graph Learning From Smooth Signals: A Functional Viewpoint | IEEE 2020

Xingyue Pu, **Siu Lun Chau**, Xiaowen Dong, and Dino Sejdinovic

- We proposed a graph learning framework to recover topological structure from observed graph signals.

SELECTED EXPERIENCE

Reviewer for NeuRIPS, AISTATS and IEEE Transactions on Signal and Information Processing over Networks
2020 – 2021

Tutor of the Department of Statistics, Oxford
2019 – 2021
Courses included:
- Foundations of Statistical Inference
- Computational Statistics
- Statistical Machine Learning

Consultant of the Oxford Rhodes AI Lab
2019

Vice President of the Oxford Hong Kong Postgraduate Society
2019 – 2020

Founder of the Student-led Machine Learning consultancy Oxford Strategy Group Digital
2017

Founder of the Hong Kong-based educational initiative STEM&Beyond
2017

Consultant of the Student-led business management consultancy Oxford Strategy Group
2016

Treasurer of the Oxford University Hong Kong Society
2015 – 2016