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 | Gaussian Processes | Neural Networks | Graph Neural Networks

Machine Learning Applications

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

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 – June-21

- 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.

Machine Learning 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, ICML, ECML PKDD, 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