Siu Lun Chau

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An upcoming postdoctoral researcher at the CISPA Helmholtz Center for Information Security aspired to conduct research in the interface of economic theory and machine learning, with a focus on promoting trustworthy AI models.
PhD in Machine Learning at University of Oxford. Previously at Max Planck Institute and Amazon.

Work Experience

Mar 2025 – Mar 2023 | Postdoctoral Researcher | CISPA Helmholtz Center for Information Security, Germany
Project: Towards Trustworthy AI through Synergy between Machine Learning and Economics
- Supervisor: Dr. Krikamol Muandet

Mar 2023 – Jun 2022 | Data Science Consultant | Ravio (HR tech startup), UK
Project: Compensation Benchmarking Modelling
- Devised a Quantile Regression model for compensation modelling with monotonicity constraints to incorporate business logic.
- Utilised pre-trained language models to create word embeddings to compare and align job titles across companies for analysis.

Dec 2022 – Jun 2022 | Applied Scientist Intern | Amazon, UK
Project: Coherent Multi-granularity Demand Forecasting for the Transportation Service Outbound Network
- Developed Deep Coherent Probabilistic Forecasts on the the Amazon EU transportation network for logistic optimisation. Solutions are delivered into production-ready AWS infrastructure.
- Produced research best practice and software developement guidelines for the Applied Science Team.

Jun 2022 – Oct 2021 | Research Intern | Max Planck Institute of Intelligent System, Germany
Project: Interface between Machine Learning and Economics
- Supervised by Dr. Krikamol Muandet.
- Researched into relaxing restrictive assumptions in Instrumental Variable Regression and examined non-parametric hypothesis testing framework for Regression Discontinuity Design.

Jan 2021 – Nov 2020 | Machine Learning Consultant | gini (FinTech startup), HK
Project: Explainable Forecasting Spreadsheet Plug-in
- Developed a Gaussian Processes based explainable time series model using SAGE for giniPredict, a forecasting spreadsheet plug-in built for non-technical decision makers.

Jan 2020 – Apr 2019 | Machine Learning Consultant | Catalyst AI
- Project: Statistical Analysis on Crop Yield data for Greenvale (Argricultural tech startup)
  - Analysed crop yield data to examine seasonal effect on tuber growth across varieties.
  - Developed a short-term forecasting model using Gaussian Processes for canopy developement based on ground cover observations.
- Project: Markdown Price Optimisation for Bonmarché (Fashion retail)
  - Developed a demand forecasting model to predict pre-markdown sales and solved for the optimal discount and markdown price to reach the user-defined target sell-through.

Oct 2021 – Aug 2017 | Machine Learning Content Developer (Part Time) | Cambridge Spark, UK
- Designed and delivered ML projects and courses to up-skill students and companies. Topics covered include: ML fundamentals, graphs, model explainability using LIME and SHAP, time series forecasting, and Gaussian processes.

Apr 2019 – Apr 2017 | Cofounder & Managing Director | Oxford Strategy Group Digital, UK
- Co-founded and managed Oxford first student-led consultancy group with over 50 technical consultants.
- Pitched data science projects to multinational clients and maintained a diverse portfolio ranging from FTSE100 companies to startups, such as P&G, Unilever, Shelter, Biobeats, and National Australia Bank.

Education

Apr 2023 – Sep 2018 | DPhil in Statistical Machine Learning | St.Peter's College, University of Oxford
- Thesis: *Towards Trustworthy Machine Learning using Kernel methods and Gaussian Processes.*
- Supervised by Prof. Dino Sejdionvic, Prof. Mihai Cucuringu, and Prof. Xiaowen Dong.

Jul 2018 – Sep 2017 | MMATH in Mathematics and Statistics | Lady Margaret Hall, University of Oxford
- Graduated with First Class, ranked 2nd in the year.
- Distinction in Master's Thesis: *Modelling Diseases Trajectories with Infinite Mixture of Gaussian Processes*, supervised by Prof. Mihaela Van Der Shaar.

Jul 2017 – Sep 2014 | BA in Mathematics and Statistics | Lady Margaret Hall, University of Oxford
- Graduated with First Class, ranked 1st in the year.
- Distinction in Undergraduate Essay on Boosting methods, supervised by Prof. Francois Caron.

Skills

Software: Python, R, Git, LaTeX | **ML Package**: PyTorch, Gluon, Scikit-learn | **ML Experience**: Forecasting, Explainable AI, Causal Inference, Preference Learning, Graph ML, Uncertainty modelling, Bayesian Optimisation

Invited Talks

Sep 2022	Spectral Ranking with Covariates | ECML PKDD 2022
Sep 2022	Explainability For Kernel Methods | ELISE Theory Workshop on ML Fundamentals
Jun 2022	Deconditional Gaussian Processes | S-DCE Alan Turning Institute seminar
Apr 2022	Explaining Kernel methods with RKHS-SHAP | UCL Gatsby Unit
Feb 2022	Deconditional downscaling with Gaussian Processes | UCL Statistical Machine Learning Group
Feb 2022	Shapley values for Model Explanations | Imperial & Oxford StatML seminar
Jun 2021	Uncertainty Quantification for Causal Data Fusion | Warwick ML Group

Awards

Sep 2018	ESPRC and MRC studentship for DPhil in Statistics and Machine Learning
Sep 2017	Department Prize for FHS Mathematics and Statistics Part B (Top of the year)

Publications

May 2022 | RKHS-SHAP: Shapley Values for Kernel Methods | NeurIPS 2022 — code | pdf

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

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

May 2022 | Explaining Preference with Shapley Values | NeurIPS 2022 — code | pdf

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

- We proposed a skew-symmetric utility function to build a Shapley value-based explanation framework for preference models.

May 2022 | Giga-scale Kernel Matrix-Vector Multiplication on GPU | NeurIPS 2022 — code | pdf

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 efficiently using a single GPU.

Mar 2022 | Spectral Ranking With Covariates | ECML PKDD 2022 — code | pdf

Siu Lun Chau, Mihai Cucuringu, 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.

Mar 2022 | Learning Inconsistent Preference with Gaussian Processes | AISTATS 2022 — pdf

Siu Lun Chau, Javier Gonzalez, 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.

Dec 2021 | BayesIMP: Uncertainty Quantification for Causal Data Fusion | NeurIPS 2021 — pdf

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

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

Dec 2021 | Deconditional Downscaling with Gaussian Processees | NeurIPS 2021 — code | pdf

Siu Lun Chau*, Shahine Bouabid*, Dino Sejdinovic

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

Aug 2020 | Kernel-based Graph Learning from Smooth Signals: A Functional viewpoint | IEEE 2020 — pdf

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

- We proposed a kernel ridge regression based graph learning framework to recover topological structure from observed graph signals.