James Briant

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Education

2021 - Present **PhD Statistical Science**, *University College London*, Supervisors: Prof. Serge Guillas (UCL), Dr. Emma Simpson (UCL), Prof. David Jackson (Met Office).

- Bayesian Calibration methods for exascale computer simulations.
- Topics include Bayesian optimisation, Gaussian Process emulation, Hamiltonian Monte Carlo methods and numerical weather prediction models.
- PhD project is part of the UCL Met Office Academic Partnership (MOAP) agreement seeking to bring the latest data science research to weather and climate forecasting.

2017 - 2021 **MMath Mathematics with Statistics**, *University of Nottingham*, Supervisor: Prof. Theodore Kypraios, Classification: First.

- Dissertation: Inference for Partially Observed Stochastic Processes.
- 4th year modules include Uncertainty Quantification (89%) and Scientific Computing & C++ (84%).
- 3rd year modules include Multivariate Analysis (87%) and Applied Statistical Modelling (80%).

PhD Research Projects

Oct 2021 - Present **Upper Atmosphere Modelling with Uncertainty Quantification**.

- Employing Gaussian Process emulation and Bayesian Calibration to aid the extension of the Met Office's Unified Model into the upper atmosphere.
- Huge computational requirements to run, design experiments and emulate the weather forecast model.
- Project with Prof. Anasuya Aruliah (UCL), Prof. David Jackson (UK Met Office) and Prof. Serge Guillas (UCL).

Jan 2023 - Present **Machine Learning and Climate Model Fusion**.

- Developing a novel method to improve representation of cloud formation in climate models. Method changes simulated climate and reduces bias in hindcasts.
- Pre-trained Gaussian Processes learn temperature and specific humidity fields from high resolution weather forecast. During climate model run-time, GP predictions add perturbations to climate model fields.
- Presented research in Statistics & Probability Poster Competition, placed in top 3.
- Project with Dr. Dan Giles (UCL), Dr. Cyril Morcrette (UK Met Office) and Prof. Serge Guillas (UCL). Initial paper being readied for submission in late 2023.

Aug 2023 - Present **Bayesian Calibration for Exascale Simulation Models**.

- Extend Kennedy & O'Hagan (2001) Bayesian Calibration framework to employ advanced MCMC techniques for complex simulation models.
- Python based project using JAX to optimise code efficiency. Available on GitHub.
- Project with Dr. Matt Graham (UCL), Dr. Mariya Mamajiwala (Sheffield) and Prof. Serge Guillas (UCL).

Academic Experience

Oct 2023 - Present **Teaching Assistant**, *Department of Statistical Science*, UCL.

- Demonstrator for Dept. of Statistical Science STAT0030 MSc module (Statistical Computing).

Jul 2023 **Paper Presentation**, *Fusing Simulation with Data Science Workshop*, University of Warwick.

- Presented novel method for fusing Gaussian Processes with weather and climate models to improve cloud representations.

Oct 2021 - May 2023 **Journal Club Officer**, *AI Society*, UCL.

- Organised a journal club within UCL's student run AI society.
- Hosted internationally recognised researchers including Prof. Marc Deisenroth (UCL), Prof. Andrew Davison (Imperial) and Dr. Raphael Köster (DeepMind).
- Assisted with organising ClimateHack.ai in Spring 2022, the inaugural student-run climate-themed hackathon.

Jul 2020 - Aug 2020 **Research Assistant**, *School of Mathematical Sciences*, University of Nottingham, Supervisor: Dr. Rowland Seymour.

- Used Bayesian non-parametric models to estimate poverty in Dar es Salaam, Tanzania.
- Contributed towards R package BSBT available on CRAN.
- Developed efficient algorithms incorporating the Bradley-Terry model to allow for rapid simulations using large volumes of data.

Jul 2019 **Machine Intelligence & Robotics**, *Shanghai Jiao Tong University*, Shanghai, China.

- Attended 3-week summer programme which introduced theories and methods in AI and machine learning. Strong emphasis on signal processing.
- Travelled around Shanghai exploring the culture, food and history.

Additional Experience

Nov 2023 - Present **International Hackathon**, *ClimateHack.ai 2023*.

- Competing in an international climate themed hackathon developing machine learning models to predict power output at UK solar farms.

Jul 2023 **Data Detectives**, *Department of Statistical Science*, UCL.

- Facilitated week-long workshop introducing A-level students to R and RStudio.
- Discussed university life and promoted academia through my experiences.

Sept 2018 - Jun 2021 **Student IT Support**, *IT Services*, University of Nottingham.

- Provide support to students by resolving issues related to the university's IT services.
- Work with Microsoft to promote the use of Microsoft Teams within university.

Sept 2018 - Jun 2019 **PASS Leader**, *School of Mathematical Sciences*, University of Nottingham.

- Peer Assisted Study Support leaders provide academic support for first year undergraduates through timetabled fortnightly problem classes.

Oct 2017 - May 2018 **Pint of Science 2018**, *STEM Outreach Society*, University of Nottingham.

- Organised 3 nights of talks in a local pub that delivered latest academic research to the public.

Programming & Technologies

Advanced	Python, R
Intermediate	JAX, PyTorch, Git, HPCs, LaTeX, MATLAB
Learning	C/C++, Docker

Interests

Current affairs; road cycling; Formula 1 and Formula E; swimming; travelling.