

JAMES BRIANT

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EDUCATION

UNIVERSITY COLLEGE LONDON

PhD Statistical Science

London, UK

Oct 2021 - Present

Thesis Title: Forward and Inverse Problems using Gaussian Processes in Climate Sciences.

Funding: EPSRC Maths DTP 2020 University College London - includes fees and stipend, circa £100,000.

Research visit to Stanford University completed March 2025.

UNIVERSITY OF NOTTINGHAM

MMath Mathematics with Statistics - integrated Masters course. First Class.

Nottingham, UK

Sep 2017 - Jul 2021

Dissertation Title: Inference for Partially Observed Stochastic Processes.

MSc-level courses: Uncertainty Quantification (89%), Multivariate Analysis (87%), Scientific Computing & C++ (84%).

WYKE SIXTH FORM COLLEGE

A-Levels: Maths (A*), Further Maths (A), Physics (A), EPQ (A*). AS-Level: Chemistry (A).

Hull, UK

Sep 2015 - Jul 2017

HOWDEN SECONDARY SCHOOL

GCSEs: 12 including Mathematics (A*), Further Mathematics (A*) and English (B).

Howden, UK

Sep 2010 - Jul 2015

PHD THESIS

My PhD research focuses on improving the reliability of weather and climate models by better understanding and managing their inherent uncertainties. I develop and apply advanced statistical techniques, particularly within the Bayesian framework, to calibrate these complex models using real-world data. This involves optimising computational methods for efficiency in high-dimensional problems. My work is applied in collaborations with the UK Met Office on refining precipitation forecasts and with Stanford University on calibrating multiple atmospheric processes, ultimately enhancing the accuracy and predictive power of climate science.

DOCTORAL PROJECTS

PYTHON PACKAGE - KOHGPJax

Jan 2024 - Present

- Developed a Python package using Jax and GPJax for flexible Bayesian calibration of computer simulation models.
- Uses functional programming paradigm inheriting Jax's high-performance computation and scalability.
- Investigating implementing latest developments in linear algebra routines including GPU support for optimal efficiency.
- Computational efficiencies enabled by KOHGPJax have accelerated research in projects with the UK Met Office and Stanford University.
- User-friendly design allows practitioners, not just researchers, to calibrate simulation models using Bayesian framework.
- Available open-source on GitHub.

BAYESIAN CALIBRATION OF COMPUTER MODELS

Jan 2023 - Present

- Applying modern Hamiltonian Monte Carlo (HMC) methods for efficient Bayesian calibration.
- Analyzing posterior distributions to understand parameter relationships and the influence of prior specifications.
- Investigating the impact of different variables on model alignment with observational data.

MACHINE-LEARN'T SUB-GRID VARIABILITY FOR PRECIPITATION PATTERNS

Jan 2022 - Nov 2024

- Led the experimental design for a novel machine learning approach to model sub-grid precipitation variability.
- Developed and applied Gaussian process fitting techniques within the machine learning pipeline.
- Created visualizations to effectively analyze and communicate the performance and insights from the machine-learn't precipitation patterns.
- Co-authored a publication in Nature Communications Earth & Environment.

EXPERIENCES

UNIVERSITY COLLEGE LONDON DEPARTMENT OF STATISTICAL SCIENCE

London, UK

Departmental Teaching Assistant

Jun 2023 – Present

- Demonstrator for MSc Computational Statistics module.
- Led "Data Detectives" virtual programme for A-level students: introduced R, data visualization and linear regression.
- Rewrote "Data Detectives" content, significantly enhancing programme rigor and impact to challenge the best students.

IMC PROSPERITY 3 (15-day trading competition with algorithmic and manual rounds)

Virtual

Competitor

Apr 2025

- Active interest in financial markets demonstrated through participation.
- Self-learning market making models (GLFT, Black-Scholes) and parameter estimation.

UCL STUDENT AI SOCIETY

London, UK

Journal Club Organiser

Oct 2021 – Jul 2023

- Invited London's top researchers from academia and industry to present their AI & ML research to UCL's AI society.

UNIVERSITY OF NOTTINGHAM

Nottingham, UK

Summer Research Assistant

Jul 2020 – Aug 2020

- Applied MCMC to fit Bayesian models for comparative judgement data; contributed to the BSBT R package (CRAN).

BNP PARIBAS

London, UK

Global Markets Spring Insight programme.

Apr 2019

PUBLICATIONS

Actively working towards publishing another 3 journal papers (2 as first author) before September 2025.

- Giles, D., Briant, J., Morcrette, C.J. *et al.* **Embedding machine-learnt sub-grid variability improves climate model precipitation patterns.** *Commun Earth Environ* 5, 712 (2024). <https://doi.org/10.1038/s43247-024-01885-8>

ACADEMIC PRESENTATIONS

SIAM CONFERENCE ON COMPUTATIONAL SCIENCE AND ENGINEERING 2025

Fort Worth, TX

Title: Hybrid Climate Simulations Using Machine Learning

Mar 2025

RMETS ANNUAL WEATHER AND CLIMATE CONFERENCE 2024

Reading, UK

Title: Embedding Machine-Learnt Sub-Grid Variability Improves Climate Model Biases

Jul 2024

CLIMATE INFORMATICS 2024

London, UK

Title: Hybrid Climate Simulation Including Machine-Learnt Subgrid Variability From Kilometre-Scale Weather

Apr 2024

SIAM CONFERENCE ON UNCERTAINTY QUANTIFICATION 2024

Trieste, Italy

Title: A Hybrid Machine Learning Climate Simulation Using High Resolution Convection Modelling

Feb 2024

ADDITIONAL

Technical Skills - Advanced: Python (Jax - include GPJax PR contributions, NumPy, SciPy), R

Technical Skills - Proficient: MATLAB, Docker, LaTeX, Git, HPCs, SQL, Unix

Technical Skills - Beginner: PyTorch, Flax, Polars, Dask, C/C++

Computer Operating Systems: Windows, Linux, MacOS

Languages: Native English; Beginners French

Personal Interests: Current affairs & the news cycle, running, road cycling, brewing coffee, Formula 1