

ARTHUR P. GUILLAUMIN

(+44) 07508327323
a.guillaumin@gmail.com

RESEARCH INTERESTS

Spatio-temporal data, cyclostationary processes, non-stationary processes, non-Gaussian data, Physics-Informed approaches, scalable algorithms, deep neural networks, environmental sciences, exoplanets, crop yield.

EMPLOYMENT

Queen Mary University of London
Lecturer in Mathematical Data Sciences

September 2021 - Present
London, UK

- Module organizer for Sustainability and Climate Risk Analytics (MSc in Risks Analytics, Semester B 2024 - 2025)
- Module organizer for Foundation Mathematics & Statistics (MSc in Risks Analytics, Semester A 2024 - 2025)
- Module organizer for Probability & Statistics (MSc in Data Analytics, Semester A 2023 - 2024)
- Developed an online Coursera module on Probability & Statistics for MSc in Data Analytics (cancelled pre-launch)
- Co-lecturer for half of Statistical Modelling II
- Co-organized the Statistics & Data Science Seminar Series over two semesters
- Main supervisor of a PhD student (years 1 and 2)
- Established new collaborations with Dr. Cimmaron Wortham, Dr. Jeffrey Early (NorthWest Research Associates), Dr. Natalia Efremova (QMUL), Dr. Eleni Matechou (Kent University)
- Developed a Python-based interactive web interface to showcase research
- Acted as Academic Advisor for 20 undergraduate students over three years
- Supervised one MSci and two undergraduate projects with positive student feedback

Courant Institute, New York University
Research Associate

November 2019 - September 2021
New York, USA

- Applied Deep Neural Networks to develop a stochastic parameterization of subgrid momentum forcing
- Implemented models in a simplified PDE-based ocean model
- Processed extensive climate simulation data (hundreds of GBs) on a cluster

University College London
Research Associate in Statistics

October 2017 - October 2019
London, UK

- Developed new likelihood approximation for scalable parametric estimation of spatial Gaussian Processes on grids with missing observations
- Applied methodology to Venus' topography during a one-month visit to Prof. Frederik J. Simons, Princeton University
- Python package for spatial data analysis available on GitHub and PyPI
- Statistical test for spectral power change detection in EEG data, applied to study infants' reactions to pain
- Co-supervised two MSc projects on NLP for contractual documents with Clifford Chance LLP, in collaboration with Dr. Mirko Bernardoni

WORK EXPERIENCE

Electricité de France

- Research Engineer Internship *April 2014 - September 2014*
Paris, France
- Time series synthesis of renewable power production in France.
 - Dataflow implementation in Python.

University College London, Statistical Science Department

- Research Assistant Internship *February 2013 - July 2013*
London, U.K.
- Non-stationary modelling and inference of ocean surface drifters from the Global Drifter Program.
 - Matlab program for the estimation procedure.

Amadeus Ltd

- Research Engineer Internship *June 2012 - November 2012*
London, U.K.
- Time Series modelling and prediction of no-shows on commercial flights.
 - Python implementation.
 - One month in Sofia Antipolis, France, in the yield management team responsible for the optimization of the selling price of flight tickets.

EDUCATION

- University College London** *October 2014 - October 2017*
London, UK
PhD in Statistics
Doctoral supervisors: Prof. Sofia C. Olhede, Dr. Adam M. Sykulski, Prof. Petros Dellaportas
Examiners: Prof. Peter Diggle, Dr. Ioannis Kosmidis (passed with no corrections)

- Ecole Centrale de Nantes** *September 2014*
Nantes, France
MSc in General Engineering (specialization in Computer Science)
Classes préparatoires in mathematics and physics at Lycée Fénelon, Paris, France

PUBLICATIONS

1. A. P. Guillaumin, C. Wortham, J. Early, C. Lo (2025, in preparation). FFT-based inference of Gaussian processes from irregular data. *Journal of the American Statistical Association*.
2. A. P. Guillaumin, C. Wortham, J. Early. A spatio-temporal covariance model of Quasi-Geostrophic Sea Surface Height (2025, In preparation) *Journal of Advances in Modeling Earth Systems*
3. A. P. Guillaumin, A. M. Sykulski, S. C. Olhede, F. J. Simons (2024, due for submission). DSWL: A Python package for fast FFT approximate likelihood for spatiotemporal Gaussian data. *Journal of Open Source Software*.
4. T. Goodwin, A. P. Guillaumin, M. Quiroz, Robert Kohn, M. Villani (2024, submitted). Bayesian inference for random fields on a lattice via the debiased Spatial Whittle likelihood. *Bayesian Analysis*.
5. A. P. Guillaumin, N. Efremova (2024, Submitted). Tukey g-and-h neural network regression for non-Gaussian data. *IEEE Transactions on Neural Networks and Learning Systems*.
6. A. P. Guillaumin, A. M. Sykulski, S. C. Olhede, F. J. Simons (2022). The debiased spatial Whittle likelihood. *Journal of the Royal Statistical Society Series B: Statistical Methodology*, 84(4), 1526-1557.
7. Loose et al., (2022). GCM-Filters: A Python Package for Diffusion-based Spatial Filtering of Gridded Data. *Journal of Open Source Software*, 7(70), 3947.

8. A. P. Guillaumin, L. Zanna (2021). Stochastic deep-learning parameterization of ocean momentum forcing. *Journal of Advances in Modeling Earth Systems*, 13, e2021MS002534.
9. I. Grooms, N. Loose, R. Abernathey, J. Steinberg, S. C. Bachman, G. Marques, A. P. Guillaumin, E. Yankovsky (2021). Diffusion-based smoothers for spatial filtering of gridded geophysical data. *Journal of Advances in Modeling Earth Systems*, 13, e2021MS002552.
10. A. M. Sykulski, S. C. Olhede, A. P. Guillaumin, J. M. Lilly, J. J. Early (2019). The debiased Whittle likelihood. *Biometrika*, 106(2), 251–266.
11. A. P. Guillaumin, A. M. Sykulski, S. C. Olhede, J. J. Early, J. M. Lilly (2017). Non-stationary modulated time series with applications to ocean flow measurements. *Journal of Time Series Analysis*, 38(5), 668–710.

TEACHING

1. MTH7015P, Foundation Mathematics & Statistics for MSc in Risks Analytics, Module organizer, Queen Mary University of London, 2024
2. MTH794P, Probability & Statistics for Data Analytics, Module organizer, Queen Mary University of London, 2023
3. Developed online Coursera module on Probability & Statistics for MSc in Data Analytics (MSc cancelled pre-launch), 2021
4. MTH6134, Statistical Modelling II, Co-lecturer (24 hours), Queen Mary University of London, 2021
5. STAT7001, Computing for Practical Statistics, Teaching Assistant (30 hours), University College London, 2017
6. STAT1004, Introduction to Probability and Statistics, Teaching Assistant (20 hours), University College London, 2017
7. STAT7001, Computing for Practical Statistics, Teaching Assistant (30 hours), University College London, 2016

EXTERNAL FUNDING

New Investigator Award, EPSRC

£411,087.24, September 2023

Spectral inference for non-stationary and irregularly sampled spatio-temporal processes (unsuccessful, but high review scores of 5, 6, and 6 out of 6)

Role: Principal Investigator (PI)

SUPERVISION

Queen Mary University of London

Nov 2022 - Present

Cheuk Yan Cliff Lo, PhD student, London, UK

Debiased Whittle likelihood for irregularly-spaced spatio-temporal data; collaboration with NorthWest Research Associates, Seattle, USA

Queen Mary University of London

Feb 2023 - May 2023

Shuvro Khandoker, MSci student, London, UK

Final-year project, quasi-periodic kernels for Gaussian Process analysis of light curves in the study of exoplanets

New York University

Feb 2020 - Aug 2021

Meera Desai, Recurrent Neural Networks application for vertical velocity forecast in oceans

Clifford Chance LLP, London, UK

June 2019 - Aug 2019

NLP for contract documents, co-supervision with Dr. Mirko Bernardoni

INVITED CONFERENCE PRESENTATIONS

1. Dec 2022, AGU Fall Meeting, “Deep Learning Non-Gaussian subgrid parameterizations of ocean momentum forcing”, Chicago, USA
2. Dec 2020, CMStatistics 2020, “Debiased Whittle likelihood for times series, spatial data and spatio-temporal data”, London, UK
3. Dec 2017, IISA International Conference on Statistics, “Analysis of non-stationary modulated time series”, Hyderabad, India

CONFERENCE PRESENTATIONS

1. September 2024, 30 Years of Progress in Radar Altimetry Symposium, “Fast estimation of spatio-temporal covariance models of SSH from satellite track data”, Montpellier, France
2. 22nd June 2022, European Geosciences Union Conference, “The Debiased Spatial Whittle Likelihood”, Vienna, Austria
3. 8th Dec 2020, American Geosciences Union Fall Meeting 2020, “Deep Learning of subgrid parameterization of momentum forcing in a high-resolution coupled model”
4. 23rd Sept 2020, Climate Informatics, “Deep Learning of subgrid parameterization of momentum forcing in a high-resolution coupled model”, Oxford, U.K.
5. 14th Feb 2018, Ocean Sciences Meeting, “A Statistical model for Lagrangian surface drifters near the equator”, Portland, Oregon, U.S.A.
6. 24th Jul 2017, European Meeting of Statisticians, “Non-stationary modulated time series with applications to ocean surface flow measurements”, Helsinki, Finland
7. 28th Jun 2017, UCL Workshop on the Theory of Big Data, “Big data analysis of heterogeneous and complex time series”, London, U.K.
8. 8th Sep 2015, Royal Statistical Society International Conference, “Frequency domain inference for rapidly evolving non-stationary processes”, Exeter, U.K.

SEMINAR AND DEPARTMENTAL PRESENTATIONS

1. Date TBC, Southampton Statistical Sciences Research Institute (S3RI) seminar series, Title TBC, University of Southampton, Southampton, U.K.
2. 6th Nov 2023, AI group, “Fourier-based estimation of spatio-temporal covariance models with applications to environmental processes”, School of Computer Science, University of Kent, U.K.
3. 17th May 2017, Stochastic Processes Group, “Asymptotic theory of non-stationary modulated time series”, University College London, London, U.K.
4. 4th Nov 2016, PhD Seminar, “Non-stationary modulated time series with applications to ocean surface flow measurements”, University College London, London, U.K.
5. 22nd Jul 2016, Stochastic Processes Group, “Correlation theory, spectral representation and inference for time series and random fields”, University College London, London, U.K.

PHD TRAINING COURSES

London Taught Course Centre (LTCC)

Statistical inference, stochastic processes, graph theory, etc.

2014 - 2015

TECHNICAL SKILLS

Python, PyTorch, C, HTML, CSS, Django, SQL, LaTeX, Slurm (cluster jobs)

LANGUAGES

French (native), English (fluent), Spanish (intermediate), Hindi (basic)