Curriculum Vitae: Dr. Adam M. Sykulski

I. GENERAL INFORMATION

CURRENT/PAST EMPLOYMENT

July 2022 – Ongoing	**Senior Lecturer in Statistics** Department of Mathematics Imperial College London, UK
August 2021 – June 2022	**Senior Lecturer in Data Science** Department of Mathematics & Statistics / Data Science Institute Lancaster University, UK
April 2017 – July 2021	**Lecturer in Data Science** Department of Mathematics & Statistics / Data Science Institute Lancaster University, UK
April 2016 – March 2017	**Senior Research Fellow** Marie-Curie Skłodowska International EU Fellowship University College London, UK
April 2014 – March 2016	**Research Fellow** Marie-Curie Skłodowska International EU Fellowship NorthWest Research Associates, Seattle, USA
March 2011 – March 2014	**Post-Doctoral Research Associate** University College London, UK
July 2007 – January 2008	**Corporate Analyst** Lazard, London, UK

EDUCATION AND PROFESSIONAL DEVELOPMENT

October 2018 – July 2020	**Postgraduate Certificate in Academic Practice (PGCAP)** **Teaching qualification from the Higher Education Academy**
January 2008 – March 2011	**PhD: The exploration-exploitation trade-off in sequential decision making problems** Imperial College London, UK Supervisors: Prof Niall Adams, Prof Nick Jennings
September 2007	**Certificate in Corporate Finance**
October 2003 – July 2007	**MSci: Mathematics (First Class Honours)** Imperial College London, UK

II. RESEARCH

STATEMENT OF RESEARCH

Adam's research is in spatiotemporal statistics and time series, with an application focus in environmental, climate and ocean sciences. Adam has supervised 6 PhD students to completion (with a further 3 under current supervision), 4 post-doctoral researchers and 11 Master's project students. Adam has published 30 peer-reviewed papers in leading statistics journals such as Biometrika, the Journal of the Royal Statistical Society (Series B and Series C, x3), and IEEE Transactions on Signal Processing (x2), and leading application journals such as the Journal of Geophysical Research, Scientific Data - Nature, and the European Journal of Operational Research. Adam has obtained external funding on numerous projects and is the current Discussion Papers Editor and Discussion Meetings Secretary for the Royal Statistical Society.

RESEARCH PUBLICATIONS

STATISTICAL THEORY AND METHODOLOGY

[1] Sykulski, A. M., Olhede, S. C., & Sykulska-Lawrence, H. M. (2023). The elliptical Ornstein-Uhlenbeck process. *Statistics and Its Interface, 16*(1), 133-146. Link

[2] Guillaumin, A. P., Sykulski, A. M., Olhede, S. C., & Simons, F. J. (2022). The debiased spatial Whittle likelihood. *Journal of the Royal Statistical Society: Series B (Statistical Methodology), 84*(4), 1526-1577. Link

[3] Early, J. J., & Sykulski, A. M. (2020). Smoothing and interpolating noisy GPS data with smoothing splines. *Journal of Atmospheric and Oceanic Technology*, *37*(3), 449-465. Link

[4] Sykulski, A. M., Olhede, S. C., Guillaumin, A. P., Lilly, J. M., & Early, J. J. (2019). The debiased Whittle likelihood. *Biometrika*, *106*(2), 251-266. Link

[5] Guillaumin, A. P., Sykulski, A. M., Olhede, S. C., Early, J. J., & Lilly, J. M. (2017). Analysis of nonstationary modulated time series with applications to oceanographic surface flow measurements. *Journal of Time Series Analysis*, *38*(5), 668-710. Link

[6] Sykulski, A. M., Olhede, S. C., Lilly, J. M., & Early, J. J. (2017). Frequency-domain stochastic modeling of stationary bivariate or complex-valued signals. *IEEE Transactions on Signal Processing*, *65*(12), 3136-3151. Link

[7] Lilly, J. M., Sykulski, A. M., Early, J. J., & Olhede, S. C. (2017). Fractional Brownian motion, the Matérn process, and stochastic modeling of turbulent dispersion. *Nonlinear Processes in Geophysics*, *24*(3), 481-514. Link

[8] Sykulski, A. M., Olhede, S. C., & Lilly, J. M. (2016). A widely linear complex autoregressive process of order one. *IEEE Transactions on Signal Processing*, *64*(23), 6200-6210. Link

[9] Olhede, S. C., Sykulski, A. M., & Pavliotis, G. A. (2010). Frequency domain estimation of integrated volatility for Itô processes in the presence of market-microstructure noise. *Multiscale Modeling & Simulation*, *8*(2), 393-427. Link

APPLICATIONS OF STATISTICS

[10] Laso-Jadart, R., O'Malley, M., Sykulski, A.M., Ambroise, C., & Madoui, M. A. (2023). Holistic view of the seascape dynamics and environment impact on macro-scale genetic connectivity of marine plankton populations. *BMC Ecology and Evolution 23:43.* Link

[11] Grainger, J. P., Sykulski, A. M., Ewans, K., Hansen, H. F., & Jonathan, P. (2023). A multivariate pseudo-likelihood approach to estimating directional ocean wave models. *Journal of the Royal Statistical Society: Series C (Applied Statistics), 72*(3), 544-565. Link

[12] O'Malley, M., Sykulski, A. M., Lumpkin, R., & Schuler, A. (2023). Probabilistic prediction of oceanographic velocities with multivariate Gaussian natural gradient boosting. *Environmental Data Science, 2,* e10. Link

[13] Rennie, N., Cleophas, C., Sykulski, A. M., & Dost, F. (2023). Outlier detection in network revenue management. *OR Spectrum, https://doi.org/10.1007/s00291-023-00714-2.* Link

[14] Rennie, N., Cleophas, C., Sykulski, A. M., & Dost, F. (2023). Analysis and visualising bike sharing demand with outliers. *Discover Data, 1, 1.* Link

[15] Elipot, S., Sykulski, A. M., Lumpkin, R., Centurioni, L., & Pazos, M. (2022). A dataset of hourly sea surface temperature *from* drifting buoys. *Scientific Data (Nature), 9,* 567. Link

[16] Grainger, J. P., Sykulski, A. M., Jonathan, P., & Ewans, K. (2021). Estimating the parameters of ocean wave spectra. *Ocean Engineering, 229*, 108934. Link

[17] O'Malley, M., Sykulski, A. M., Laso-Jadart, R., & Madoui, M. (2021). Estimating the travel time and the most likely path from Lagrangian drifters. *Journal of Atmospheric and Oceanic Technology, 38*(5), 1059-1073. Link

[18] Rennie, N., Cleophas, C., Sykulski A. M., & Dost, F. (2021). Identifying and responding to outlier demand in revenue management. *European Journal of Operational Research*, *293*(3), 1015-1030. Link

[19] Oscroft, S., Sykulski, A. M., & Early, J. J. (2021). Separating mesoscale and submesoscale flows from clustered drifter trajectories. *Fluids*, *6*(1), 14. Link

[20] Suibkitwanchai, K., Sykulski, A. M., Perez Algorta, G., Waller, D., & Walshe, C. (2020). Nonparametric time series summary statistics for high-frequency accelerometry data from individuals with advanced dementia. *PLOS ONE, 15*(9): e0239368. Link

[21] Elipot, S., Lumpkin, R., Perez, R. C., Lilly, J. M., Early, J. J., & Sykulski, A. M. (2016). A global surface drifter data set at hourly resolution. *Journal of Geophysical Research: Oceans*, *121*(5), 2937-2966. Link

[22] Sykulski, A. M., Olhede, S. C., Lilly, J. M., & Danioux, E. (2016). Lagrangian time series models for ocean surface drifter trajectories. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, *65*(1), 29-50. Link

ON ARXIV (UNDER REVIEW)

[23] Astfalck, L.C., Sykulski, A. M., & Cripps, E. J. (2016). Debiasing Welch's Method for Spectral Density Estimation. *Submitted to Biometrika*. Link

MACHINE LEARNING CONFERENCE PAPERS

[24] Sykulski, A. M., & Percival, D. B. (2016). Exact simulation of noncircular or improper complex-valued stationary Gaussian processes using circulant embedding. In *Proceedings of the Twenty-Sixth International Workshop on Machine Learning for Signal Processing* (pp. 1-6). Link

[25] Bartlett, T. E., Sykulski, A. M., Olhede, S. C., Lilly, J. M., & Early, J. J. (2015). A power variance test for nonstationarity in complex-valued signals. In *Proceedings of the Fourteenth International Conference on Machine Learning and Applications* (pp. 911-916). Link

[26] Sykulski, A. M., Adams, N. M., & Jennings, N. R. (2010). On-Line adaptation of exploration in the one-armed bandit with covariates problem. In *Proceedings of the Ninth International Conference on Machine Learning and Applications* (pp. 459-464). Link

[27] de Cote, E. M., Chapman, A. C., Sykulski, A. M., & Jennings, N. R. (2010). Automated planning in repeated adversarial games. In *Proceedings of the Twenty-Sixth Conference on Uncertainty in Artificial Intelligence* (pp. 376-383). Link

[28] Sykulski, A. M., Chapman, A. C., Munoz de Cote, E., & Jennings, N. R. (2010). EA2: The winning strategy for the inaugural lemonade stand game tournament. In *Proceedings of the Nineteenth European Conference on Artificial Intelligence* (pp. 209-214). Link

[29] Sykulski, A., Olhede, S. C., & Pavliotis, G. A. (2008). High frequency variability and microstructure bias. In *Proceedings of the Workshop on Inference and Estimation in Probabilistic Time Series Models*, (pp. 90-97). Link

[30] Vytelingum, P., Dash, R. K., He, M., Sykulski, A., & Jennings, N. R. (2005, July). Trading strategies for markets: A design framework and its application. In *International Workshop on Agent-Mediated Electronic Commerce* (pp. 171-186). *Lecture Notes in Computer Science*, vol 3937. Springer, Berlin, Heidelberg. Link

EXTERNAL FUNDING

AWARDED (TOTAL= C.£2.5M):

PI – Turner-Kirk Trust (funding for PDRA position), £35,000, 01/11/23-01/11/24

PI – Atomic Weapons Establishment (summer internship funding), £4,000, 01/09/23-01/10/23.

Co-I – EPSRC (large collaborative grant), *'A Data Science for the Natural Environment'*, £2,075,583, 16/04/18-15/04/24

PI – Industry funding for PhD project: '*Multivariate Time Series Modelling for Financial Market Data'*, £36,000, Morgan Stanley, 1/10/21-31/03/24

PI – Industry funding for PhD project: *'Modelling Wave Interactions Over Space and Time'*, £30,000, JBA Consulting, 1/10/19-31/03/23

PI – Industry funding for PhD project: *'Detailed Telematics Data Analysis'*, £30,000, Somerset Bridge Ltd, 1/10/18-31/03/22

PI – Summer internship funding, *'Forecasting Time Series Models when Multiple Model Components are Present'*, £645, London Mathematical Society, 29/06/20-7/08/20

PI – Marie Curie International Outgoing Fellowship, Seventh European Community Framework Programme, €294,219.60, European Commission, 01/04/14-31/03/17

Co-I – EPSRC (funding for PDRA position), *'Whittle estimation for Lagrangian trajectories – Regional analysis and environmental consequences'*, £43,606, 01/06/14-31/05/15

III. TEACHING

UNDERGRADUATE TEACHING

2022-24 IMPERIAL COLLEGE LONDON

Course leader for 3rd/4th Year undergraduate Mathematics module: MATH60139/MATH70139 Spatial Statistics. This is a new module I have proposed and designed from scratch (c. 60 students).

Bi-weekly 1st year tutorials, supervision of 2nd year group projects and 4th year individual projects

2020-22 LANCASTER UNIVERSITY

Course leader for 1st Year compulsory module in Mathematics & Statistics Department: MATH104 Statistics (c.300 Students)
2021 student evaluation: Module as a whole: 4.74/5; Quality of Teaching: 4.90/5
2022 student evaluation: Module as a whole: 4.78/5; Quality of Teaching: 4.92/5

2018-20 LANCASTER UNIVERSITY

Course leader for 3rd Year module in Mathematics & Statistics Department: MATH334 Time Series Analysis (c.65 Students)
2019 student evaluation: Module as a whole: 4.39/5; Quality of Teaching: 4.58/5
2020 student evaluation: Module as a whole: 4.84/5; Quality of Teaching: 4.87/5

POSTGRADUATE TEACHING AND SUPERVISION

2022-23 IMPERIAL COLLEGE LONDON

Course leader for MSc Statistics module in Mathematics Department: MATH70092 Multivariate Analysis
2023 student evaluation: 100% gave highest score for teaching, academic support, and content

2017-20 LANCASTER UNIVERSITY

Module Coordinator for MRes Project Module in STOR-i CDT: STOR604 Modern Topics in Statistics and Operational Research

PHD SUPERVISION (9 TOTAL, 6 GRADUATED)

Vanessa Madu (2023-ongoing, Imperial)
Jakub Pypkowski (2023-ongoing, Imperial)
Maddie Smith (2021-ongoing, Lancaster) – co-supervised with Dr Nicos Pavlidis
Dr Jake Grainger (2019-2022, Lancaster) – now at EPFL as a Post-Doctoral Researcher
Dr Keerati Suibkitwanchai (2019-2022, Lancaster) – now a Lecturer at Chulalongkorn University in Bangkok
Dr Sarah Oscroft (2017-2022, Lancaster) – now a Statistician at AlphaPlus
Dr Michael O'Malley (2018-2022, Lancaster) – now a Data Analyst at Expedia
Dr Nicola Rennie (2018-21, Lancaster) – now a Lecturer at Lancaster University
Dr Arthur Guillaumin (2014-17, UCL) – now a Lecturer at Queen Mary University of London

MASTERS' PROJECT SUPERVISION (11 TOTAL)

Imperial College London: Jakub Pypkowski, Hugo Escuret, Christophe Troalen, Christine Zhang (2023), Wanchen Yue (2022)
Lancaster University: Niamh Lamin (2021), Maddie Smith (2021), Jacob Elman (2021), Jake Grainger (2019), Michael O'Malley (2018), Sarah Oscroft (2017)

POST-DOCTORAL RESEARCH ASSOCIATE SUPERVISION (4 TOTAL)

Dr André Ribeiro Amaral, Imperial College London, January 2024-ongoing
Dr Daniel Waller, Lancaster University, January-March 2019
Dr Arthur Guillaumin, University College London, September 2017-September 2019
Dr Thomas Bartlett, University College London, January-July 2017

IV. ACADEMIC LEADERSHIP AND ENGAGEMENT

UNIVERSITY ROLES

Department Lead for Equality, Diversity and Inclusion (EDI), Department of Mathematics, Imperial College London (2023-onwards).

Co-Director, MSc Data Science at Lancaster University (2020-22). c.70 students enrolled per year. I led the delivery of the degree programme (through Covid-19), and implemented numerous important changes to its structure.

Early-career representative, Lancaster University Research Committee (2018-22). Appointed academic early-career representative for whole university, frequently raised issues regarding early-career interests, support, and progression.

Departmental representative, Faculty Course Approval Sub-committee (2019-20). Reviewing and discussion of course approval forms on behalf of the Faculty of Science and Technology at Lancaster University.

Seminar and Workshop Organisation, Data Science Institute, Lancaster University (2017-22). I organised the Data Science Institute fortnightly seminar series. I also organised two other workshops: Big Data in the Geosciences (June 2019, c.40 attendees) and Process and Data Model Integration in Environmental Data Science (June 2017, c.30 attendees).

Masterclass and Workshop Organisation, STOR-i Centre for Doctoral Training, Lancaster University (2017-22). I organised two workshops for the STOR-i CDT: Time Series and Spatial Statistics (May 2020, c.90 attendees) and Statistical Signal Processing (Apr 2018, c.50 attendees). For 3 years I organised the STOR-i masterclass series bringing world-renowned experts, such as Professor Irène Gijbels, to Lancaster to deliver research masterclass seminar series.

EXTERNAL LEADERSHIP AND ENGAGEMENT

UK

Discussion Papers Editor, Royal Statistical Society (RSS) Journals. *2021-2024 (4 year term).* Discussion Papers are publications from any of the journal's three series that are selected to be presented at Discussion Meetings – this is a core and historic activity of the society dating almost 200 years. As part of this role, I am the Editor for all papers received in Series A, B and C. I have performed numerous tasks including leading discussion paper calls on the topic of Covid-19 (2021), Climate Change (2022), Machine Learning (2023), and Citizen Science Data (2024).

Associate Editor, Journal of the Royal Statistical Society, Series C (Applied Statistics). *2019-2021*. I led the review process for numerous papers in one of the leading applied journals in statistics.

Member of the Environmental Statistics Section Committee, Royal Statistical Society. *2021-2024 (4 year term)*. I organise events for the section, for example invited sessions on *`Spatiotemporal modelling of environmental and climate data'* (2021 RSS International Conference) and *`Statistical modelling of environmental risks: waves, rainstorms and landslides'* (2023 RSS International Conference).

External Examiner at University of Liverpool, *2021-2024 (4 year term)*, for statistics modules in the BSc in Mathematics; and **King's College London**, *2023-2027 (4 year term),* in the MSc in Statistics.

INTERNATIONAL

Working Group Member, US Climate Variability and Predictability Program on Ocean Uncertainty Quantification (a joint programme of US agencies including NASA, NOAA, and the National Science Foundation). *Appointed Spring 2020.* The Working Group consists of three consecutive objectives:

1. *Develop a community-driven web platform for uncertainty quantification knowledge and strategies.*
2. *Produce peer-reviewed open-access articles on uncertainty quantification for observational and model ocean data.*
3. *Organize a summer school and/or workshop on uncertainty quantification.*

Collaboration with NOAA, the US National Oceanic and Atmospheric Administration. I have collaborated with Dr Rick Lumpkin (NOAA) and Dr Shane Elipot (Univ. Miami) to build a new high-resolution oceanographic data product (related to publications [15,21]) which is freely available from the NOAA website (www.aoml.noaa.gov/phod/gdp/hourly_data.php). I also collaborated with Michael O'Malley (Lancaster) to build a new statistical software product for oceanography (related

to publication [17]) also available from the NOAA website (www.aoml.noaa.gov/phod/gdp/drift_mlp.php). Ongoing collaborations continue.

Partner Investigator, TIDE Research Hub, Australia. *Appointed Summer 2021.* I am a partner investigator for an Australian Research Council (ARC) Research Hub called "Transforming energy Infrastructure through Digital Engineering" (TIDE), which commenced in Summer 2021. My involvement in this project will be supervising students and post-doctoral researchers and building data science methods for understanding the ocean environment with implications in the management of offshore energy infrastructure, publication [23] is affiliated with this grant.

SELECTED RESEARCH PRESENTATIONS AT CONFERENCES, WORKSHOPS, AND INSTITUTIONS

Large Conferences: RSS International Conference (2010, 2012, 2014, 2017, 2021, 2022, 2023), Joint Statistical Meetings (2014, 2015, 2019, 2020), CM Statistics (2017, 2019, 2020, 2021, 2022), International Indian Statistical Association Conference (2016, 2017), Applied Inverse Problems (2019), Ocean Sciences (2014, 2016, 2018, 2020, 2024), AGU Fall Meeting (2016), EGU General Assembly (2017).

Invited Residential Workshops: Isaac Newton Institute Programmes (Cambridge, 2014 and 2018), BIRS Workshop on Synthesis of Statistics, Data Mining and Environmental Sciences (Oaxaca, 2017), IMA Workshop on Forecasting from Complexity (Minnesota, 2018), Statistics and Data Science Workshop (KAUST, 2019), BIRS Workshop on Multitaper Spectral Analysis (Banff/Online, 2022).

Invited Departmental Talks: Oxford, UCL, Imperial, Queen Mary, Bristol, Bath, Southampton, National Oceanography Centre, Bologna, KU Leuven, Maastricht, Konstanz, Magdeburg, Emory University, Oregon State, University of Washington, Carnegie Mellon.

PEER-REVIEWER FOR

Journal of the American Statistical Association, Journal of the Royal Statistical Society, Biometrika, Annals of Applied Statistics, Journal of Computational and Graphical Statistics, Statistics and Computing, Journal of Statistical Planning and Inference, Scandinavian Journal of Statistics, Proceedings of the National Academy of Sciences, IEEE Transactions on Signal Processing, IEEE Signal Processing Letters, Signal Processing, Geophysical Research Letters, Journal of Physical Oceanography, Journal of Atmospheric and Oceanic Technology, Neural Informational Processing Systems (NIPS) Conference, Biotechnology and Biological Sciences Research Council (BBSRC).

OUTREACH ACTIVITIES

Royal Institution Masterclass titled "Understanding our world through statistics" given to Sixth Form Students (online), February 2022

Outreach Talk on Data Science and Oceans, given to Sixth Form Students at Cardinal Newman College Preston, April 2020

Public Talk on Oceans, organised by the Royal Society of Chemistry, Storey Lancaster, October 2019

Summer School Camp. I delivered an outreach session on data science and climate change to local Lancashire students aged 10-14, in collaboration with Gledus, July 2019

Natural History Museum, London. I presented at the public outreach event "Ocean's night" hosted by the Natural History Museum (attended by several hundreds), September 2017

European Commission (EC). I collaborated with journalists from the EC on a science article on my research published in August 2017 in CORDIS (the European Commission's primary service for EU-funded research results), available at https://cordis.europa.eu/article/id/202153-modelling-ocean-flows-advances-climate-change-understanding

CONTACT DETAILS AND WEBPAGE

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