

Dr Ben Swallow,
School of Mathematics and Statistics,
University of St Andrews, St Andrews,
KY16 9LZ

Contact: bts3@st-andrews.ac.uk or <https://ben-swallow-research.github.io/>

Present Appointment

August 2022-present: Lecturer in Statistics (Research and Teaching), School of Mathematics and Statistics, University of St Andrews

Employment History

2019-2022: Lecturer in Statistics (Research and Teaching), School of Mathematics and Statistics, University of Glasgow

April-June 2015: Research Assistant, School of Mathematics and Statistics, University of St Andrews

2015-2017: Postdoctoral Research Associate, Atmospheric Chemistry Research Group, University of Bristol

2017-2019: Research Fellow, Mathematics Institute and Zeeman Institute for Systems Biology and Epidemiology Research, University of Warwick

Academic Qualifications

2021: PGcert in Academic Practice, Merit, University of Glasgow

2015: PhD Statistics, University of St Andrews

2011: MSc Statistics, Distinction, University of St Andrews

2010: BA French and Mathematics, Upper Second-Class Honours, King's College London

Research & Related Administration

Publications:

Published

1. Swallow, B., (2023) Contribution to the Discussion of 'Martingale Posterior Distributions' by Fong, Holmes and Walker, In press *JRSSB*
2. Jun Villejo, S., Illian, J. and Swallow, B., (2023) 'Data Fusion in a Two-stage Spatio-Temporal Model using the INLA-SPDE Approach.' In press *Spatial Statistics*

3. Firat, E., Swallow, B. and Laramée, R.S., (2022) 'PCP-Ed: Parallel coordinate plots for ensemble data', accepted in *Visual Analytics*
4. Rydow, E. et al., (2022) 'Development and Evaluation of Two Approaches of Visual Sensitivity Analysis to Support Epidemiological Modelling', accepted in *IEEE TVCG*
5. Shadbolt, N. et al., (2022) 'The Challenges of Data in Future Pandemics' accepted for special issue of *Epidemics*
6. Marion, G. et al., (2022) 'Modelling: understanding pandemics and how to control them' accepted for special issue of *Epidemics*
7. Zhang, H., Swallow, B. and Gupta, M., (2022) 'Bayesian hierarchical mixture models for detecting non-normal clusters applied to noisy genomic and environmental datasets', accepted for invited special issue, *Aust. N.Z. J. Stat.*
8. Panovska-Griffiths, J. et al., (2022) 'Modelling transmissibility and impact on reopening Roadmap of different SARS-CoV-2 variants in England in the Spring of 2021', invited contribution to themed issue of *PRSA*
9. Dunne, M. et al., (2022) 'Complex model calibration through emulation, a worked example for a stochastic epidemic model' in press in special issue of *Epidemics*
10. Chadwick, F. et al., (2022) 'Combining Rapid Antigen Testing and Syndromic Surveillance Improves Sensitivity and Specificity of COVID-19 Detection: A Community-Based Prospective Diagnostic Study'. Available at <http://dx.doi.org/10.2139/ssrn.3927057>, accepted in *Nature Comms*.
11. Swallow, B., et al., (2022) 'Challenges in estimation, uncertainty quantification and elicitation for pandemic modelling', in press *Epidemics*
12. Kretzschmar, M. et al., (2022) 'Challenges for modelling interventions for future pandemics' in press *Epidemics*
13. Swallow, B., Xiang, W. and Panovska-Griffiths, J., (2022) 'Tracking the national and regional COVID-19 epidemic status in the UK using directed Principal Component Analysis', accepted contribution to themed issue of *PRSA*,
14. Dykes, J. et al., (2022) 'Visualization for Epidemiological Modelling: Challenges, Solutions, Reflections & Recommendations', accepted contribution to themed issue of *PRSA*, <https://arxiv.org/abs/2204.06946>

15. Hadley, L. et al., (2021) 'Challenges on the interaction of models and policy for pandemic control,' in press *Epidemics*
16. Sacchi, G. and Swallow, B. (2021) 'Parallel tempering as a mechanism for facilitating inference in hierarchical hidden Markov models', in press for invited special issue, *Frontiers in Ecology and Evolution*
17. Swallow, B. (2021) 'A Review of Applied Hierarchical Modelling in Ecology: Volume 2 by Kéry and Royle', *JABES*, 26(2) 325-327
18. ATI Data Study Group team. (2020) 'Data Study Group Final Report: Roche', Zenodo. doi:10.5281/zenodo.3876989
19. Swallow, B., King, R., Buckland, S.T. and Toms, M.P. (2019) 'Assessing factors associated with changes in the numbers of birds visiting gardens in winter: are predators partly to blame?' *Ecology and Evolution* 6 (8515-8525)
20. Jones-Todd, C.M., Swallow, B., Illian, J. and Toms, M. P. (2017) 'A spatio-temporal multi-species model of a semi-continuous response' *JRSS(C)* 67: 705-722
21. Swallow, B., Buckland, S. T., King, R. and Toms, M. P. (2016b) 'Bayesian hierarchical modelling of continuous non-negative longitudinal data with a spike at zero: An application to a study of birds visiting gardens in winter.' *Biometrical Journal*, Special Issue 58:2
22. Swallow, B., Buckland, S.T., King, R. and Toms, M.P. (2016a) 'Identifying multispecies synchrony in response to environmental covariates.' *Ecology and Evolution* 6:23

Preprints

23. Gould, E. et al., 'Same data, different analysts: variation in effect sizes due to analytical decisions in ecology and evolutionary biology' <https://doi.org/10.32942/X2GG62> and *Nature* news article <https://doi.org/10.1038/d41586-023-03177-1>
24. Swallow, B., Rand, D.A. and Minas, G., 'Bayesian inference for stochastic oscillatory systems using the phase-corrected Linear Noise Approximation' <https://arxiv.org/abs/2205.05955> (in revision)
25. Xiang, W. and Swallow, B. 'Multivariate spatio-temporal analysis of the global COVID-19 pandemic', medrxiv.org/content/10.1101/2021.02.08.21251339v1
26. Swallow, B., Rigby, M., Rougier, J.C., Manning, A.J., Webster, H.N., Thompson, D.J., Lunt, M. and O'Doherty, S.J. 'Parametric uncertainty in complex environmental models: a

cheap emulation approach for models with high-dimensional output'
arxiv.org/abs/1702.03696, under revision in *Environmetrics*

PhD Students

Chenglei Hu, Bayesian inference for multivariate extremes

Xiahui Li, Approximate Bayesian Inference for dynamical systems using policy informed statistics

Research Grants

Grants:

1. EASTBIO Doctoral Training Partnership (c £4,500), April 2023

PI for summer student project.

2. EAVEII/PHS collaboration (£27,000), March 2023

Joint PI to employ a postdoc conducting causal inference and trial emulation work conducted on public health outcomes in Scotland.

3. NHIR/HDRUK Compound winter pressure (Total £61,411), December 2022

As Co-I of project characterizing and predicting emergency admissions for respiratory care. Honorary Researcher contract, Public Health Scotland.

4. European Crucible Leadership Network Seed Funding (Total £4,900), August 2022

As PI of project AutoDOSE for automated experimental and design for dynamic biological systems of cell autophagy.

5. European Crucible Leadership Network Seed Funding (Total £4,500), August 2022

As Co-I of project MIRROR, studying the implementation of novel materials for facilitating coral regeneration.

6. University of Glasgow 'Reinvigorating Research' scheme (Total £25,000), January 2022

Funded two research assistants on a project on Bayesian model-based approaches to zero-inflated data in biological and environmental sciences.

7. EPSRC Impact Acceleration Fund (Total £5,620), March 2022

Funded a student on a project developing a prototype for visualization of complex spatiotemporal statistical models for informing policy.

8. Edinburgh Mathematical Society Covid Recovery Grant (Total £1,000), November 2021

To provide computational resources for a project on Approximate Bayesian inference in stochastic systems.

9. EPSRC Vacation internship programme (Total £3,300), June 2021

10-week internship funded for a project on 'Visualisation of spatio-temporal model outputs for supporting areal public health policy in LMICs.'

10. Corn seed funding grant, Jean Goulding Institute for data-intensive research, (Total £4,974), March 2017

Stipend awarded for a project entitled 'Supervised learning to support the optimisation of chemical reactions' based at the Universities of Bristol and York, in collaboration with industry partners.

11. Research workshop grants, funded by EPSRC via the SECURE network, Cabot Institute and NERC (Total £2,250)

Competitive grant of £1250 awarded by SECURE for a research workshop/conference entitled 'Modelling uncertainty from multi-scale data streams in ecological and environmental sciences', with additional competitive funding of £1,000 secured from the University of Bristol's Cabot Institute.

Prizes

April 2023: Royal Society of Edinburgh Mary Somerville Medal, awarded to the EAVE II Team

Research Leadership:

2023-: Chair, Environmental Statistics Section, Royal Statistical Society.

2023/2024: Isaac Newton Institute 'Modelling and inference for pandemic preparedness' programme, lead organiser for inference stream.

2023-: National Centre for Statistical Ecology Board Member.

2020-2022: Scottish COVID-19 Response Consortium Uncertainty Quantification Lead.

2023: Invited minisymposium organiser BAMC 2023 on infectious disease modelling and inference

National Centre for Statistical Ecology Summer Meeting 2021, Local Organising Committee.

2020-2022: University of Glasgow School of Mathematics and Statistics Research Committee ECR member.

2019/20: Statistics seminar organiser and creator of ICMS virtual 'Research and Teaching in Statistical and Data Sciences' seminar series

Organiser of 4 accepted invited sessions at RSS Conferences 2021/22/23

Co-organiser and co-chair of invited session at AISC 2021 on 'Advances in Statistical Ecology'

Organiser of RSS one day meeting with Environmental Statistics Section and Glasgow local group on 'Causal inference in epidemiology and environmental health', January 2021 (115 attendees)

Supervisor of undergraduate research internships; Summer 2020 and February/March 2021 and three Summer 2021. These have led to one submitted paper and three in preparation.

Member of the EPSRC Associate College and UKRI Future Leader Peer Review College.

Esteem Indicators

Competitively selected member of European Crucible Research Leadership Network 2022.

Royal Society of Edinburgh Mary Somerville Medal 2023 team awardee.

Associate Editor, Journal of Statistical Theory and Practice

RSS Discussions Meeting Committee member and Associate Editor

School-supported research sabbatical, University of Glasgow, August 2021-July 2022

Invited member of the RSS President Nominating Committee 2021/2022

Barnett Award Lecture Chair, RSS Conference 2020

Invited talks at BAMC 2021 and 2023 and the International Society for Bayesian Analysis world meeting 2021

Invited talk at Edinburgh Futures Institute, March 2021

Invited seminars at Universities of Oxford, Auckland, Lancaster, St Andrews, Warwick, Bristol, Birmingham, Glasgow, Kent and Loughborough

Contributed talks at many international conferences and other events, including virtual National Centre for Statistical Ecology seminar series, March 2021; International Statistical Ecology Conference (Sydney and Cape Town), June 2020 and June 2022; and American Geophysical Union Fall Meeting (San Francisco), December 2016

Invited science outreach blog post for Ecology and Evolution upon publication of Swallow et al. (2019)

Scottish Ornithologists Club public engagement talk, December 2020 (over 80 attendees)

BTO press release on Swallow et al. (2016b)

Best student talk award, International Statistical Ecology Conference 2014

Teaching & Related Administration

2023-present: Director of MSc programmes in statistics, School of Mathematics and Statistics, St Andrews.

2022-2023: Industry and Employability lead, School of Mathematics and Statistics, St Andrews.

2019-present: Course head for variety of senior undergraduate and postgraduate courses in mathematics and statistics

2021-2022: Statistics PGT co-director, DataLab industrial placement co-ordinator and MRes Advanced Statistics project co-ordinator

2020-2021: Alarm Bell Steering Group, College of Science and Engineering, University of Glasgow

2019/20: University of Glasgow PGT Statistics project supervision team

2019-2022: University of Glasgow PGT Statistics curriculum review committee

Professional Activities beyond the University

I have been a reviewer for many journals, including *Biometrics*, *Annals of Applied Statistics*, *Journal of Theoretical Biology*, *Chemometrics and Intelligent Laboratory Systems* (awarded Outstanding Reviewer status November 2016), *JABES*, *Environmental and Ecological*

Statistics, Proceedings of the Royal Society A, Royal Society Open Science, Biology Letters, Studies in Automation and Information Technology and Frontiers in Ecology and Evolution.

I am Associate Fellow of the Higher Education Academy, GradStat Fellow of the Royal Statistical Society and member of the International Biometric Society, the International Environmetrics Society and the International Society for Bayesian Analysis.