Tim CD Lucas

PERSONAL INFORMATION

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PRESENT APPOINTMENT

2021–Present	**University of Leicester**
Lecturer	I am currently employed as a lecturer in the Department for Health Sciences. My research includes the development of methods to handle data with mismatches in resolution and that account for human movement. I teaech on the Biostatistics MSci.

PREVIOUS APPOINTMENTS

2020–2021	**Imperial College**
Early Career Research Fellow	During this fellowship I aim to develop statistical regression methods that properly accounts for human movement and use these methods to estimate the effects of air pollution on disease. Due to the coronavirus pandemic I have also spent a considerable fraction of my time working on models of contact tracing.
Jan–June 2020	**University of Oxford**
Senior Post Doc.	Models of neglected tropical diseases and SARS-CoV-2, contributing to software and promoting good research software practices such as version control and unit testing.
2016–2019, 2019–2020	**University of Oxford, Malaria Atlas Project**
Post Doc.	I worked as a postdoctoral research scientist in geospatial epidemiology with the Malaria Atlas Project at the University of Oxford. I made large contributions to the *first high resolution, global, space-time* estimates of both *Plasmodium falciparum* and *P. vivax* leading to two high-profile publications. Specifically I developed new statistical methods that combine *machine learning* and *geostatistics*. I also supervised research assistants on smaller projects, leading to one publication.
2018–2019	**Shared parental leave**
Parental leave	Six months shared parental leave.
Jan–July 2016	**University College London**
Research Programmer	I enabled the Madingley Model to run on a high performance cluster and ported code to R for morphological analyses amongst other tasks.

EDUCATION

2012–2016	**University College London, CoMPLEX**
PhD	*The role of population structure and size in determining bat pathogen richness*
	I used *network epidemiological models* and phylogenetic regression to study the

epidemiology of bat-borne diseases with applications to zoonotic surveillance. I conceived the projects and managed my own budget. [pdf]
Supervisors: PROF. KATE JONES & DR HILDE HERBOTS

	2011–2012 University College London, CoMPLEX
MRes	*Modelling Biological Complexity* · Merit
	2006–2010 University of Sheffield, Animal & Plant Sciences
MBioSci	*Zoology* · First

OTHER PROFESSIONAL ACTIVITIES

Peer Review   *Journals Reviewed for:*

Journal of Theoretical Biology, BMC Infectious Diseases, PLoS Pathogens, Malaria Journal, Methods in Ecology and Evolution, Global Ecology and Biogeography, Molecular Ecology, Ecology and Evolution, Remote Sensing in Ecology and Conservation, ROpenSci, National Academy Science Letters, Journal of Advances in Medicine and Medical Research, AIMS Public Health.

PEER-REVIEWED PUBLICATIONS

2021   Graham M, Ayabina D, **Lucas TCD**, *et al.* (2021) *SCHISTOX: An individual based model for the epidemiology and control of schistosomiasis.* Infectious Disease Modelling. [pdf]

Lucas TCD, Nandi AK, *et al.* (2021) *Mapping malaria by sharing spatial information between incidence and prevalence datasets.* Journal of the Royal Statistical Society C. [pdf]

Davis E*, **Lucas TCD***, *et al.* (2021) *Contact tracing is an imperfect tool for controlling COVID-19 transmission and relies on population adherence.* Nature Communications. [pdf]

Toor J, Adams ER, *et al.* (2021) *Predicted impact of COVID-19 on neglected tropical disease programs and the opportunity for innovation.* Clinical Infectious Diseases. [pdf]

Python A, *et al.* (2021) *Predicting non-state terrorism worldwide.* Science Advances. [pdf]

Lucas TCD*, Davis E*, *et al.* (2021) *Engagement and adherence trade-offs for SARS-CoV-2 contact tracing.* Philosophical Transactions of the Royal Society B. [pdf]

Crellen T, *et al.* (2021) *Dynamics of SARS-CoV-2 with waning immunity in the UK population.* Philosophical Transactions of the Royal Society B. [pdf]

2020   **Lucas TCD** (2020) *A translucent box: interpretable machine learning in ecology.* Ecological Monographs. [pdf]

Lucas TCD, Nandi AK, *et al.* (2020) *Improving disaggregation models of malaria incidence by ensembling non-linear models of prevalence.* Spatial and Spatio-temporal Epidemiology. [pdf]

Lucas TCD, Pollington T, Davis E and Hollingsworth D. (2020) *Responsible modelling: Unit testing for infectious disease epidemiology.* Epidemics. [pdf]

Nguyen M, Howes RE, **Lucas TCD**, *et al.* (2020) *Mapping malaria seasonality in Madagascar using health facility data.* BMC medicine, 18(1), 1-11 [pdf]

Rathmes G, Rumisha SF, **Lucas TCD**, *et al.* (2020) *Global estimation of anti-malarial drug effectiveness for the treatment of uncomplicated* Plasmodium falciparum *malaria 1991–2019.* Malaria Journal. [pdf]

2019 Weiss DJ, **Lucas TCD**, Nguyen M, *et al.* (2019) *The global landscape of* Plasmodium falciparum *prevalence, incidence, and mortality 2000–2017.* The Lancet 394, 10195, 322–331. doi: 10.1016/S0140-6736(19)31097-9 [pdf]

Battle KE, **Lucas TCD**, Nguyen M, *et al.* (2019) *Mapping the global endemicity and clinical burden of* Plasmodium vivax *2000–2017.* The Lancet 394, 10195, 332–343. doi: 10.1016/S0140-6736(19)31096-7 [pdf]

Zhu SJ, *et al.* (2019) *The origins and relatedness structure of mixed infections vary with local prevalence of* P. falciparum *malaria.* eLife 8 e40845. doi: 10.7554/eLife.40845 [pdf]

2018 Weiss DJ, Nelson A, Gibson HS *et al.* (2018) *A global map of travel time to cities to assess inequalities in accessibility in 2015.* Nature 553 (7688), 333 [pdf]

Pfeffer D, **Lucas TCD**, May D *et al.* (2018) *malariaAtlas: an R interface to global malariometric data hosted by the Malaria Atlas Project.* Malaria Journal 17:352 doi: 10.1186/s12936-018-2500-5 [pdf]

2017 Redding D, **Lucas TCD**, Blackburn T & Jones KE. (2017) *Evaluating Bayesian spatial methods for modelling species distributions models with clumped and restricted data.* PLoS One [pdf]

Golding N, August TA, **Lucas TCD**, Gavaghan DJ, van Loon EE & McInerny G. (2017) *The zoon R package for reproducible and shareable species distribution modelling.* Methods in Ecology and Evolution. doi: 10.1111/2041-210X.12858 [pdf]

2015 **Lucas TCD**∗, Moorcroft EA∗, Freeman R, Rowcliffe MJ & Jones KE. (2015) *A generalised random encounter model for estimating animal density with remote sensor data.* Methods in Ecology and Evolution. doi: 10.1111/2041-210X.12346 [pdf]

2013 Walters CL, Collen A, **Lucas TCD**, Mroz K, Sayer CA and Jones KE. (2013) Challenges of Using Bioacoustics to Globally Monitor Bats. in *Bat Evolution, Ecology, and Conservation.* Springer New York. 479-499.

GBD For Global Burden of Disease capstone papers please see end of document.

∗ Co-first authors.

PEER-REVIEWED CONFERENCE PROCEEDINGS

2018 Law HC, Sejdinovic D, *et al.* (2018) *Variational learning on aggregate outputs with Gaussian processes.* Advances in Neural Information Processing Systems [pdf]

GRANTS AWARDED

2020 · MRC Centre Early Career Research Fellowship. *Not all exposure to air pollution occurs at home: general methods for combining human movement and geostatistical disease data.* Three years wages and expenses. Direct costs £173,036.

2020 · Co-investigator on multi-centre grant. *An analytical framework for Test, Trace and Isolate in the UK: optimising and targeting deployment alongside other measures.* UKRI-DHSC COVID-19 Rapid Response Rolling Call. Grant COV0659. £412,720.

2020 · Paid expert consultant on grant. *Mapping coronavirus using a self-exciting spatio-temporal point process.* Zhejiang University Educational Funding. Grant 2020XGZX054. £11,000.

TEACHING AND SUPERVISION

2020 · Organised and delivered four hour workshop (twice due to demand). "Machine Learning in the Health Sciences". Two hours practical workshop and two hours of case studies from members of the department. (Student evaluation of 4.1 out of 5, n = 13).

2020 · Internal workshops on unit testing, cluster computing and mixed-effects models.

2019 · Co-wrote and ran an afternoon workshop. "Advanced Statistical Modelling with TMB". (Student evaluation of 4.1 out of 5, n = 24).

2018 · Supervised two research assistants on side projects resulting in one publication (pdf).

2017 · Wrote and gave a two day workshop 'Geospatial statistics with R and INLA' at UiTM, Malaysia.

2015 · Demonstrator for reproducible species distribution modelling workshop run by Quantitative Ecology special interest group at BES.

2013–2014 · Online teaching for SysMIC, a course for teaching quantitative skills to biologists. Answering questions online and marking assessments.

INVITED TALKS

2020   *Model stacking to incorporate auxiliary data for malaria mapping.*
Talk at workshop on: Machine Learning in Behaviour, Ecology and Evolution, University of Neuchâtel, Switzerland

2017   *Predicting malaria risk from diverse and multilevel data.*
Plenary at SDCS2017, Springer

EXPERTISE

Statistical methods   Geospatial statistics, machine learning, Bayesian inference, TMB, Stan.

Languages   R (expert level), Python, Matlab, Mathematica.

Other   Experience in R package development, shiny apps, Git/Github, unit testing, continuous integration, shell/ssh and high performance computing.

Software   Nandi A, **Lucas TCD**, Arambepola A, Python A. *disaggregation: Disaggregation Modelling.* https://github.com/aknandi/disaggregation

Pfeffer D, **Lucas TCD**, May D, Keddie S, Rozier J, Gibson H. *malariaAtlas: An R Interface to Open-Access Malaria Data, Hosted by the 'Malaria Atlas Project'.* www.github.com/malaria-atlas-project/malariaAtlas

Lucas TCD, Python A, Redding D. *INLAutils: Utility Functions for 'INLA'.* www.github.com/timcdlucas/INLAutils

Lucas TCD, Goswami A. *paleomorph: Geometric Morphometric Tools for Palaeobiology.* www.github.com/timcdlucas/paleomorph

August T, **Lucas TCD**, Golding N, van Loon E, McInerny G. *Zoon: Reproducible, Accessible & Shareable Species Distribution Modelling.* www.github.com/zoonproject/zoon

Lucas TCD. *palettetown: Use Pokemon Inspired Colour Palettes* www.github.com/timcdlucas/palettetown

CONTINUED PROFESSIONAL DEVELOPMENT

2021 · SQL Sprint Workshop. Short course.

2020 · Lectureship Applications. One day course.

REFEREES

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GLOBAL BURDEN OF DISEASE PUBLICATIONS

2020   GBD 2019 Diseases and Injuries Collaborators (2020) *Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019.* The Lancet, 396 [pdf]

2018   GBD 2017 Risk Factor Collaborators (2018) *Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017.* The Lancet, 392 [pdf]

GBD 2017 Disease and Injury Incidence and Prevalence Collaborators (2018) *Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017.* The Lancet, 392 [pdf]

GBD 2017 DALYs and HALE Collaborators (2018) *Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017.* The Lancet, 392 [pdf]

GBD 2017 Mortality Collaborators (2018) *Global, regional, and national age-sex-specific mortality and life expectancy, 1950–2017: a systematic analysis for the Global Burden of Disease Study 2017.* The Lancet, 392 [pdf]

GBD 2016 Healthcare Access and Quality Collaborators (2017) *Measuring performance on the Healthcare Access and Quality Index for 195 countries and territories and selected subnational locations: a systematic analysis from the Global Burden of Disease Study 2016.* The Lancet, 391 (10136) [pdf]

2017   GBD 2016 Disease and Injury Incidence and Prevalence Collaborators (2017) *Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016.* The Lancet, 390 [pdf]

GBD 2016 Causes of Death Collaborators (2017) *Global, regional, and national age-sex specific mortality for 264 causes of death, 1980–2016: a systematic analysis for the Global Burden of Disease Study 2016.* The Lancet, 390 [pdf]

GBD 2016 DALYs and HALE Collaborators (2017) *Global, regional, and national disability-adjusted life-years (DALYs) for 333 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016.* The Lancet, 390[pdf]

GBD 2016 SDG Collaborators (2017) *Measuring progress and projecting attainment on the basis of past trends of the health-related Sustainable Development Goals in 188 countries: an analysis from the Global Burden of Disease Study 2016.* The Lancet, 390 [pdf]

22nd October, 2021