Tim CD Lucas

PERSONAL INFORMATION

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PRESENT APPOINTMENT

2016–Present   **University of Oxford, Malaria Atlas Project**

Post Doc.   My current position is as a postdoctoral research scientist in geospatial epidemiology with the Malaria Atlas Project at the University of Oxford. I have 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. To this end I have developed new statistical methods that combine *machine learning* and *geostatistics*. I have also supervised research assistants on smaller projects, leading to one publication.

PREVIOUS APPOINTMENTS

2018–2019   **Shared parental leave**

Parental leave   Six months shared parental leave.

Jan–July 2016   **CBER, UCL**

Research Programmer   I was the staff programmer for the Centre of Biodiversity and Environment Research at UCL. I worked on two main projects. I worked with the Madingley Model to enable this ecological model to run on a *high performance cluster*. Secondly, I translated code from *Mathematica to R* for analyses of measurements of 3D objects used in *paleontological research*.

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 methods 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
Projects included adapting '*ideal gas*' models to acoustic data, analysing moment closures for a *pair-approximation* model of plant ecology and applying a novel *machine learning* method to a library of bat calls.

2006–2010   **University of Sheffield, Animal & Plant Sciences**

MBioSci   *Zoology* · First
For my final project I used *wavelet* analysis to study multi-annual *cycles in malaria* incidence in Thailand.

OTHER RESEARCH EXPERIENCE

Internship

Autumn 2014   Zoön: An R package for reproducible SDMs

I wrote the first version of an R package for *reproducible* species distribution modelling. [Github]

Volunteer Fieldwork

2011   Smithsonian Tropical Research Institute and Chiloé Silvestre, Chilé

Fieldwork in Panamá and Chilé: *Anolis* dewlap evolution, gut length plasticity in Red-eyed tree frogs and two weeks trapping Darwin's foxes.

Summer Internship

August 2010   University of Sheffield

I studied the evolutionary response of plant communities to climate change. I collected, propagated and analysed plants collected from the field.

TRANSIT Internship

August 2009   University of York, YCCSA

I studied collective foraging behaviour by programming a *complex 3D foraging model* in Java and running large simulations.

OTHER APPOINTMENTS AND AFFILIATIONS

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, Ecology and Evolution, ROpenSci, National Academy Science Letters.

PEER-REVIEWED PUBLICATIONS

2019

Weiss DJ, **Lucas TCD**, Nguyen M, *et al.* (2019) *The global landscape of* Plasmodium falciparum *prevalence, incidence, and mortality 2000–2017.* The Lancet. 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. 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]

Lucas TCD, Python A & Redding DW (2019) *Graphical outputs and Spatial Cross-validation for the R-INLA package using INLAutils.* The R Journal. In Review

Lucas TCD, Nandi A, *et al.* (2019) *Mapping malaria by sharing spatial information between incidence and prevalence datasets.* J. R. Statist. Soc. C. In Review

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.

∗ Co-first authors.

GLOBAL BURDEN OF DISEASE PUBLICATIONS

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]

PEER-REVIEWED CONFERENCE PROCEEDINGS

2019   **Lucas TCD**, Nandi A, Nguyen M, *et al.* (2019) *Model ensembles with different response variables for base and meta models: malaria disaggregation regression*

combining prevalence and incidence data. ISI World Statistics Congress Proceedings (In press)

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

INVITED CONFERENCE TALKS

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

SOFTWARE

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`

Goswami A, **Lucas TCD**, Sivasubramaniam P, Finarelli J. *A Maximum Likelihood Approach to the Analysis of Modularity.* `www.github.com/timcdlucas/EMMLi`

Lucas TCD, Goswami A. *paleomorph: Geometric Morphometric Tools for Paleobiology.* `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`

TEACHING AND SUPERVISION

2019 · Co-wrote and ran an afternoon workshop. "Advanced Statistical Modelling with TMB".

2019 · Thesis committee for PhD student Dan Pfeffer.

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 tutor for SysMIC, a course for teaching quantitative skills to biologists.

COMPUTATIONAL SKILLS

Statistical methods   Geospatial statistics, machine learning, Bayesian inference.

Languages   R (eight years), Python, Matlab, Mathematica, Java, SQL.

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

REFEREES

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