Tim CD Lucas

PERSONAL INFORMATION

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PRESENT APPOINTMENT

2020–present **Imperial College**

Early Career Research Fellow

During this fellowship I aim to develop statistical methods for disease mapping that properly accounts for human movement.

Jan–June 2020 **University of Oxford**

Senior Post Doc.

Models of neglected tropical diseases, contributing to software and promoting good research software practices such as version control and unit testing.

2016–2020 **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 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 PROFESSIONAL ACTIVITES

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, Remote Sensing in Ecology and Conservation, ROpenSci, National Academy Science Letters, Journal of Advances in Medicine and Medical Research.

PEER-REVIEWED PUBLICATIONS

2020

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

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

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.

∗ 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

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

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 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 (expert level), 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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