Matthew Lewis

4 Willow Lane, Cockermouth, Cumbria, UK, CA13 9DP | +447341939872 | matthewlewis896@gmail.com

Education

St. John's College, University of Cambridge, UK

MPhil in Biological Science (Zoology) 01/2020 – 12/2020

Fully-funded, independently conceived proposal diagnosing cause of decline and identifying habitat preferences of the Small Heath butterfly to improve its conservation status across multiple spatial and temporal scales.

BA(Hons) Natural Sciences (Zoology) 10/2016 – 07/2019

First Class | Total: 80.1% | Rank: 2/56 | Final-year Research Project Total: 95.4%
Awarded John Ray Trust Science Prize for best research project in Natural Sciences.

Cockermouth School, Cumbria, UK 2012 – 2016

A-levels: Biology, Chemistry, Maths (3 A*); French (A); Extended Project (A*) | **GCSEs:** 10 A*

Research Experience

MPhil – Insect Ecology Group, Department of Zoology, University of Cambridge 01/2020 – 12/2020

- Conducted Bayesian hierarchical modelling using *brms* R package looking at environmental factors associated with a change in butterfly populations at >1,300 sites across the UK over a range of temporal scales (interannual to decades).
- Reviewed literature to ensure strong evidence base for parameter inclusion and spatial scale.
- Extensive quantitative field data collection looking at fine-scale habitat and behavioural preferences, including microclimate, to inform better reserve management for conservation.
- Used point process models from *spatstat* R package to assess the environmental factors affecting within-reserve population clustering and determine habitat preferences.
- Optimised data manipulation function for use with *spatstat*, now included in *maptools* R package (listed as contributor).

Internship – Centre for Conservation Science, RSPB 10/2019 – 12/2019

- Conducted hierarchical distance sampling analyses of point count data and mixed effects models of ringing data to derive phenological patterns of palearctic migrant birds in the Sahel.
- Standardised and collated data from individual camera trap surveys including image management with *camtrapR* R package to allow analysis of long-term dataset of 150,000 photos.
- Contributed to RSPB's Microsoft AI for Earth project including preparing testing and training data for development of machine learning models for automated camera trap photo identification, and technical support with exif, json and *Timelapse* UI troubleshooting and bug reporting.

Internship – Climate Change and Biodiversity Programme, UNEP-WCMC & 07/2019 – 09/2019
Volunteer – Ecosystems Services and Management (ESM) Program, IIASA 09/2020 – present

- Developed spatially explicit global vulnerable soil carbon layer using Google Earth Engine as part of international, multi-institutional *Nature Map* project (https://naturemap.earth).
- Accelerated accessing and pre-processing of species data using parallel processing in R for rapidly downloading and formatting of Red List habitat data.
- Created *redlistManipulatr* R package (https://github.com/matthewlewis896/redlistManipulatr) and vignette tutorial documentation to increase utility and accessibility of internship work.
- Co-ordinated with collaborating institutions to produce range maps from point data for unmapped plant taxa in R, including data cleaning, quality control and assurance.
- Assisted managing of an *iNaturalist* Citizen Science campaign including designing an *RSelenium* macro program to flag potentially erroneous observations.
- Proactively agreed to assist with subsequent IIASA analyses alongside MPhil work.
- Extended *redListManipulatr* package to also pull-down Red List threats data using parallel processing.
- Debugged and streamlined Google Earth Engine script to calculate global forest cover in protected areas.

Final Year Undergraduate Research Project – Insect Ecology Group, as above 07/2018 – 03/2019

- Investigated thermal responses of UK butterflies to fine-scale temperature variation, looking at differing species responses and the mechanisms they use to thermoregulate.
- Conducted field surveys of UK butterflies, measuring body temperatures and morphometric characters over five weeks as a team with a post-doc, as well as collecting data for an independent sub-project alone and occasionally leading a volunteer team.
- Mapped field sites into discrete habitat type classes using random forest decision trees based on ground-truthed remote sensing data using R as well as simple digitisation using QGIS.
- Led to second author publication with Altmetric score of 398 (top 5% of all research outputs).

2nd Year Undergraduate Research Project – Insect Ecology Group, as above 10/2017 – 03/2018

- Assessed herbivory of oil palm under differing exclusion treatments to examine the relative roles of different predatory groups (vertebrates and ants) on herbivory.
- Independently researched and streamlined leaf area analysis protocol using GNU-Image Manipulation Program (GIMP) to improve speed and accuracy of data processing.
- Awarded 87.6% for project report.

Organisation, Leadership and Teamwork

President – Larmor Society, University of Cambridge, UK 2018 – 2019

- Handled £1,500 budget to organise academic talks, catered events and student advice sessions.

Vice-President – Cambridge University Wildlife Conservation Society 2018 – 2019

- Remotely led organisation of a research trip of five students to Kenya (August 2019) using camera trap data to predict carnivore movements and reduce human-wildlife conflict.
- Created detailed itinerary including collating data on local views of conservation to feed into community-based management projects and engaging local school children with conservation.
- Organised a committee, hosting events and university-wide plastic and sustainability campaigns.

Campaigns Officer – Cambridge University Wildlife Conservation Society 2017 – 2018

- Spearheaded university-wide campaign persuading Cambridge colleges to source only sustainable fish, increasing pledge participation to 2/3 of colleges.

Communication and Presentations

John Ray Trust Prize Presentation, Notley High School, Braintree, UK 11/2019

- Delivered 20-minute talk covering undergraduate research project, studying science at university level, and increasing access to Cambridge to audience of 150 GCSE science students followed by 30 minutes of questions. Feedback included *"(the) best talk of the ten years this prize has been running".*

Research Presentations, Department of Zoology, University of Cambridge, UK 09/2018, 04/2019

- Presented research from two undergraduate projects as ten-minute talks to academic audiences.

Insect Ecology Blog Post 08/2020

- Wrote general science audience blog on conservation philosophy and prioritisation targets. https://www.zoo.cam.ac.uk/research/groups/insect-ecology/news

Publications

- Bladon, **Lewis**, et al. (2020). How butterflies keep their cool: Physical and ecological traits influence thermoregulatory ability and population trends. Journal of Animal Ecology. https://doi.org/10.1111/1365-2656.13319
- Jung, … **Lewis**, et al. (*in review* for *Nature*). Areas of global importance for terrestrial biodiversity, carbon, and water.

Computing

R | Google Earth Engine | QGIS | ArcGIS | GitHub | HTML | CSS| MS Office | GIMP

References

Dr. Edgar Turner, MPhil supervisor | ect23@cam.ac.uk | +44 (0) 7738 243 676

Dr. Xavier de Lamo, UNEP-WCMC line manager | xavi.delamo@gmail.com | +44 (0) 7984 379 649