Luke Leckie

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A motivated PhD student possessing a diverse, interdisciplinary, skillset with primary research interests in epidemiology, collective behaviour, immunity, and eusociality

Current Research

University of Bristol – *PhD* **September 2020-present**

As eusocial insects, ants present several epidemiologically interesting features. Hierarchical organisation of ant societies can be considered analogous to our own. Simultaneously, correlated relatedness amongst individuals means colonies may be considered as 'superorganisms', susceptible to severe epidemics. For the study of colony defence, my research exploits experimental exposure of colonies to diverse pathogen pressures under varied epidemiologic scenarios. Outcomes are established via molecular and microbiological analyses, automated tracking, and modelling.

Education

University of Bristol – *MSci Biology* (1^{st}) **September 2016-July 2020**

Modules include: Understanding data: experimental design and statistics, Quantitative methods, Computational methods, Molecular genetics, Cell and developmental, Host-parasite interactions, Advanced practical skills (APS), Parasite biology

Third-year literature review title: "To what extent can the human microbiome be considered responsible for Alzheimer's and Parkinson's disease"

- Assimilated a range of literature to gain an integrated knowledge of the microbiome and human health, achieving a 1^{st}

Final-year project title: "Implementing CRISPR/Cas9 in *Armillaria mellea*"

- Developed deep knowledge of CRISPR and its implementation from a broad pool of scientific papers for my literature review and project background
- Rapidly acquired novel practical skills necessary for the project
- Demonstrated excellent organisation and planning through disciplined delivery of protocols within specific timescales demanded by procedure duration
- Adaptable and intuitive approach in the selection of protocol to ensure effective outcomes

Gained specific skills in sterile laboratory technique, yeast recombination, miniprep, PEG-mediated transformation, competent *E. coli* transformation, (RT)PCR, nucleotide extraction, and plasmid design

Academic experience

University of Bristol **Year 4 Biology course representative** **June 2019 – Present**

- Innovative feedback provided to the dean of the life sciences faculty idea, with my idea for alumni networking events being introduced into the new faculty vision and strategy
- Collaborated with an interdisciplinary team of academics to advise course structure at meetings

University of Bristol **Lab summer placement** **June 2018 – September 2018**

- Acted in a team to perform DNA extraction, microsatellite amplification, and gel analysis to study the population genetics of the parasitic nematode *Strongyloides ratti*
- Developed excellent sterile pipette and laboratory technique in order to avoid contamination
- Critical ability to select appropriate PCR primers based upon gel electrophoresis output
- Innovated modified protocol, resulting in greater titres of DNA extracted and purified from samples

- Demonstrated motivation and persistence, successfully amplifying microsatellite loci from over 300 samples over the course of the placement
- Committed to maintaining an efficient workflow, ensuring that all tasks for the day were completed

Key skills

Organisation and project management

- Successfully acted as president of the University of Bristol Windsurfing Club (UBWC), treasurer of Bristol Donors, and biology course representative during my third year of university whilst still averaging a 1st in all of my course work
- Coordinated a national windsurfing event providing accommodation, food, evening entertainment, and windsurfing venues for an attendance of over 200 students

Willingness and ability to learn

- Independently self-taught myself the use of R ordination packages in order to analyse the community structure of a lagoon sampled in my second-year field course
- Developed extensive knowledge of the human microbiome for my third-year literature review, achieving a 1st on a previously unfamiliar topic
- Experienced in assimilating information to provide informed scientific articles from freelance writing for the epigram

Teamwork

- Highlighted as a key team member during my second-year field course where I worked in a team of 5 to rapidly capture and release marine ecological samples

Communication

- Demonstrated verbal communication through presenting a science-themed radio show, with regular interviews with academics
- Exceptional presentation skills developed through delivering numerous presentations at university which have never received a mark below 75
- Chairing of a group of 12 students and 2 academics giving presentations on the subject of metagenomics during my third year of university
- Excellent written communication developed through scientific writing throughout my degree, freelance writing for the student newspaper, and writing grant applications for Bristol Donors

Computational skills

- Extensive use of Microsoft Excel for data wrangling and visualization
- Proficient in the use of Python libraries Matplotlib and Pandas for data analysis and visualisation
- Trained in PyTorch and Scikit-learn for machine- and deep-learning analysis of MNIST and ImageNet datasets
- Experienced in R, exploiting permutation tests, NMDS, and glmm for data collected during my second- and final-year research experiences
- Utilised Word and PowerPoint throughout my degrees for report writing and presentations

Interests

- **Windsurfing:** President of university society | Increased membership by 25% and erased £1000 of a long-standing debt through active and enthusiastic leadership
- **Promoting student blood donation:** Treasurer of university society | Helped open 3 other university blood donation societies and organised fundraising to allow free transport to donation centres

References available upon request