Tom R. Booker

RESEARCH INTERESTS

Theoretical and empirical population genetics, biodiversity, evolution, genomics, bioinformatics, statistical analysis

EMPLOYMENT

University of British Columbia, Vancouver, Canada
- Postdoctoral Research Fellow (Sept 2018 - October 2020)
- Supervised by Professor Michael Whitlock and Assistant Professor Samuel Yeaman (University of Calgary)

EDUCATION

University of Edinburgh, Edinburgh, Scotland

PhD., Evolutionary Genetics, October 2014 - October 2018

- Thesis Title: UNDERSTANDING PATTERNS OF GENETIC DIVERSITY IN THE HOUSE MOUSE GENOME
- Supervisors: Professor Peter Keightley and Professor Brian Charlesworth

MSc., Evolutionary Genetics, 2013 - 2014 (Distinction)

- Thesis Title: SEARCHING FOR BALANCING SELECTION ON A MIMICRY SUPERGENE IN THE BATESIAN MIMIC *Papilio polytes*
- Supervisors: Professor Deborah Charlesworth and Assistant Professor Rob W. Ness

University of Stirling, Stirling, Scotland

BSc Hons, Ecology, 2009 - 2013 (First Class)

- Dissertation Title: AN INVESTIGATION INTO THE FITNESS AND DISTRIBUTION OF A NEWLY DISCOVERED ALLOPOLYPLOID SPECIES, *Mimulus peregrinus*
- Supervisor: Dr Mario Vallejo-Marin
- Study abroad at Simon Fraser University, Vancouver, Canada. 2011-2012.

PAPERS

9. **Booker, T. R.**, Yeaman S. & Whitlock M. C. (*In revision - Evolution Letters*). "Global adaptation confounds the search for local adaptation".
   Preprint available at: https://www.biorxiv.org/content/10.1101/742247v1

8. Byers K.A., **Booker T. R.**, Combs M., Himsworth C.G., Munshi-South J., Patrick D.M., Whitlock M.C.. (*Accepted*) "Using genetic relatedness to understand heterogeneous distributions of urban rat-associated pathogens". *Evolutionary Applications*

7. **Booker, T. R.**, Yeaman S. & Whitlock M. C. (2020) "Variation in recombination rate affects detection of F_{ST} outliers under neutrality".
   Molecular Ecology, Early Access - *Highlighted on the cover and accompanying News and Views piece*

6. **Booker, T. R.** (2020) "Inferring parameters of the distribution of fitness effects of new mutations when beneficial mutations are strongly advantageous and rare".
   G3: GENES, GENOMES, GENETICS Early online May 5, 2020;

5. **Booker, T. R.**, & Keightley, P. D. (2018). "Understanding the factors that shape patterns of nucleotide diversity in the house mouse genome". *Molecular Biology and Evolution*, 35(12) 2971-2988

4. **Booker, T. R.**, Jackson, B. C., & Keightley, P. D. (2017). "Detecting positive selection in the genome". *BMC Biology*, 15:98.

3. **Booker, T. R.**, Ness, R. W., & Keightley, P. D. (2017). "The recombination landscape in wild house mice inferred using population genomic data". *Genetics*, 207(1) 297-309

2. Keightley, P. D., Campos, J. L., **Booker, T. R.**, & Charlesworth, B. (2016). "Inferring the frequency spectrum of derived variants to quantify adaptive molecular evolution in protein-coding genes of *Drosophila melanogaster*". *Genetics*, 203(2), 975-984.

1. **Booker, T.**, Ness, R. W., & Charlesworth, D. (2015). "Molecular evolution: breakthroughs and mysteries in Batesian mimicry". *Current Biology*, 25(12), R506-R508.

PAPERS IN PREPARATION

- **Booker, T. R.**, Jackson, B. Craig, R. Charlesworth, B. & Keightley, P. D. "Patterns of genetic diversity around protein-coding exons and conserved non-coding elements are explained by strong selective sweeps in mice".

ACADEMIC HONOURS AND AWARDS

- Registration Award - Society of Molecular Biology and Evolution 2019
- *Runner up* Best student talk at Population Genetics Group 51 2018
- *Runner up* Best student poster at Population Genetics Group 50 2017
- Environment Yes! *Won regional heat - runner up at the national final* Sept 2016
- EASTBIO Doctoral Training Partnership Studentship 2014-2018
- Genetics Society, Sir Kenneth Mather Memorial Prize 2013/2014
- University of Edinburgh, Douglas Falconer Award, best MSc dissertation 2013/2014
- Funding for Undergraduate Summer Project:
  Botanic Society of Scotland and the Society of Biology Summer 2012
- *Nominated*, Simon Fraser University Student Conservation Prize May 2012

ACADEMIC SERVICE

I have reviewed articles for the following journals:
PLoS Genetics, *Molecular Biology and Evolution*, *Genome Biology and Evolution*, *Ecology and Evolution*, *Frontiers in Zoology*

- 2019 - Poster Judge BIOL 310 Animal Behaviour - UBC
- 2019 - *Ongoing* Co-organiser of the Vancouver Evolution Group (VEG)
- 2019 I took part in a mentor scheme for undergraduate students attending SMBE 2019 in Manchester, UK
- 2017 I started and organised a journal club on classic population genetic papers at the University of Edinburgh in 2017

TEACHING

Mentoring

C. Atkinson - Directed studies co-supervisor - *Undergraduate student at UBC*

K.A. Byers - Bioinformatics/genomics mentor - *PhD student at UBC*

S-A. Xerri - Master's project co-supervisor - *Now PhD student at the Max Planck Institute*

C. Barata - Master's project co-supervisor- *Now PhD student at the University of St. Andrews*

B. Lecher - Honour's project co-supervisor- *Now Pre Doctoral Fellow at the European Bioinformatics Institute*

Course Instruction

Statistics and Data Analysis, MSc course 2014-2017
Demonstrated in computer practical sessions, ran tutorials on probability theory and statistical analysis and marked term papers

Population and Quantitative Genetics, MSc course 2015-2017
Ran tutorial sessions on population genetic theory

Ecology and Evolutionary Genetics, BSc course 2014-2015
Demonstrated in computer practical sessions on evolutionary biology

SELECTED PRESENTATIONS

January 2020 - American Society of Naturalists 2020, Asilomar, USA (Talk)
Global adaptation confounds the search for local adaptation

October 2019 - EcoEvo Retreat, Squamish, Canada (Talk)
Leveraging linkage information in studies of local adaptation

September 2019 - BLISS, UBC, Vancouver, Canada (Talk)
Global adaptation confounds the search for local adaptation

July 2019 - SMBE, Manchester, UK (Poster)
Patterns of genetic diversity around protein-coding exons and conserved non-coding elements are explained by strong selective sweeps in mice

September 2018 - EcoEvo Retreat, Squamish, Canada (Talk)
Estimating the parameters of selective sweeps from patterns of diversity around functional elements in wild house mice Mus musculus castaneus

January 2018 - Population Genetics Group 51, Bristol, UK (Talk)
Estimating the parameters of selective sweeps from patterns of diversity around functional elements in wild house mice Mus musculus castaneus

August 2017 - ESEB 2017, Groningen, Netherlands (Poster)
Selective sweeps and background selection in the genome of wild house mice, Mus musculus castaneus

January 2017 - Population Genetics Group 50, 2017, Cambridge, UK (Poster)
Selective sweeps and background selection in the genome of wild house mice, Mus musculus castaneus

July 2016 - SMBE, Gold Coast, Australia (Talk)
Hill-Robertson Interference in wild mice, Mus musculus castaneus

December 2015 - Population Genetics Group 49, Edinburgh, UK (Talk - Invited)
Hill-Robertson Interference in wild mice, Mus musculus castaneus

July 2015 - SMBE, 2015, Vienna, Austria (Poster)
Selective sweeps and background selection in the genome of wild house mice, Mus musculus castaneus

May 2015 - Quantitative Genomics, 2015, London, UK (Talk)

Simulating genome evolution in the house mouse: understanding the contribution of Hill-Robertson interference to patterns of genetic diversity

References

Professor Michael C. Whitlock
Postdoctoral Supervisor
Department of Zoology — E-mail: whitlock@zoology.ubc.ca
University of British Columbia

Professor Peter Keightley
PhD Supervisor
Institute of Evolutionary Biology — E-mail: peter.keightley@ed.ac.uk
University of Edinburgh

Professor Deborah Charlesworth
MSc Supervisor
Institute of Evolutionary Biology — E-mail: deborah.charlesworth@ed.ac.uk
University of Edinburgh