Tom R. Booker

Contact Information

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Institute of Evolutionary Biology
Ashworth Laboratories
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Research Interests

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

Education

University of Edinburgh, Edinburgh, Scotland

Ph.D., Evolutionary Genetics, *Expected:* Autumn 2018

- Thesis Title: *Understanding patterns of genetic diversity in the genomes of wild mice*
- Supervisors: Professor Peter Keightley and Professor Brian Charlesworth
- As part of my EASTBIO scholarship, I spent 3 months learning bioinformatic approaches and techniques at Fusion Genomics, Vancouver, Canada

MSc., Quantitative Genetics and Genome Analysis, 2013 - 2014 (Distinction)

- Thesis Title: *Searching for balancing selection on a mimicry supergene in the Batesian mimic* Papilio polytes
- Supervisors: Professor Deborah Charlesworth and Dr Rob W. Ness
- In addition to the thesis component, the MSc program consisted of courses on statistical analysis, population genetics, molecular evolution and phylogenetics, as well as linkage analysis.

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
- I undertook a Summer research project on *Mimulus spp.* in Southern and Central Scotland in 2012 with Dr Vallejo-Marin. Courses taken on ecology, conservation biology and genetics. Spent a year on exchange at Simon Fraser University, Vancouver, Canada.

Experience & Skills

Population genetics

Including: theory, simulations (both forward-time and coalescent), genome scans, demographic analyses, detecting natural selection

Bioinformatics:

Including: Handling high-throughput sequence data, read-mapping, variant calling, *de novo* assembly
Attended "*GATK Best practices for variant discovery*", Edinburgh, UK (2015).

Computer skills

Scripting: Python, R and Bash as well as a little bit of C and Perl
OS: Ubuntu, Windows, Mac OSX
Various: Grid Engine clustering systems, git, emacs, ssh/scp, tmux, Microsoft Office

Science communication, both written and verbal.

Academic Service

I have reviewed articles for the following journals:

Ecology and Evolution, *Science*

Publications

1. **Booker, T. R.**, & Keightley, P. D. (*In preparation*). "Understanding the forces that shape patterns of genetic diversity in the genome of wild house mice, *Mus musculus castaneus*."
2. **Booker, T. R.**, Jackson, B. C., & Keightley, P. D. (*In press*). "Detecting positive selection in the genome." *BMC Biology*.
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
4. 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.
5. **Booker, T.**, Ness, R. W., & Charlesworth, D. (2015). "Molecular evolution: breakthroughs and mysteries in Batesian mimicry". *Current Biology*, 25(12), R506-R508.

Presentations

Selective sweeps and background selection in the genome of wild house mice, Mus musculus castaneus (Poster - *Runner up best student poster*)
ESEB 2017, Groningen, Netherlands — August 2017
Population Genetics Group 50, Cambridge, UK — Jan 2017

Hill-Robertson Interference in wild mice, Mus musculus castaneus (Oral Presentation)
SMBE, Gold Coast, Australia — July 2016
Population Genetics Group 49, Edinburgh, UK — December 2015

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

Simulating genome evolution in the house mouse: understanding the contribution of Hill-Robertson interference to patterns of genetic diversity (Oral Presentation)
Quantitative Genomics London, UK — May 2015

Academic Honours and Awards

- *Finalist*, Environment Yes! — 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

Teaching

Supervision — 2016
I have provided co-supervision to masters and honours students

Statistics and Data Analysis, MSc course — 2014-2017
Demonstrating in computer practical sessions and running tutorial sessions on probability theory and statistical analysis

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

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

Interests

Aside from evolutionary biology I have several hobbies that I try and find time for. I enjoy playing guitar, woodworking (particularly woodturning), helping out around my parents' farm, hill-walking and playing classic point-and-click adventure games.

References

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