

Jim Downie

Curriculum Vitae

Education

- 2016–2020 **PhD, Evolutionary ecology of pine-mycorrhizal interactions in the Caledonian pinewoods of Scotland**, *University of Edinburgh*, Centre for Ecology and Hydrology, Edinburgh, *Thesis submission by April 2020*.
- 2015–2016 **MSc Computational Methods in Ecology and Evolution**, *Imperial College London*, Merit.
Included 3 month research project at Kew Gardens on the biogeography of ectomycorrhizal fungi
- 2010–2014 **BSc Plant Biology**, *University of Aberdeen*, First Class Honours.
Honour's project on the ecology of lichen communities in response to heathland burning.

Research Experience

- 2021–present **Postdoc: FUTURE OAK project**, Supervisors: Prof. James McDonald.
Planning and conducting large field sampling trip of oak tissues across the UK for microbiome analysis, analysis of resulting datasets including bioinformatics and Bayesian modelling.
- 2016–2020 **PhD: Evolutionary ecology of pine-mycorrhizal interactions in the Caledonian pinewoods of Scotland**, Supervisors: Prof. Jonathan Silvertown, Prof. Richard Ennos (Institute of Evolutionary Biology, University of Edinburgh), Dr. Stephen Cavers (Centre for Ecology and Hydrology, Edinburgh).
Analysis of experimental trial data using GLMMs, molecular identification of fungi, analysis of ectomycorrhizal fungal community data using ordination and Bayesian mixed models, and spatial analysis of fungal communities at small scales.
- May–Sep 2016 **Master's research project: Biogeography of European ectomycorrhizas**, Supervisors: Dr. Martin Bidartondo, Dr. Sietse van der Linde (Kew Gardens).
Analysis of large dataset of ectomycorrhizal fungal communities from a survey of 135 European forests. Data analysis involved spatial analysis, including distance decay analysis, variance partitioning, and ordination.
- Aug–Sep 2014 **Field survey of giant hogweed biocontrol by sheep grazing**, *with Dr Rene van der Wal*, *University of Aberdeen*.
- Jul 2013–Jan 2014 **Undergraduate research project: The effect of heather burning on lichen communities in a Scottish heathland**, Supervisor: Dr Sarah Woodin (University of Aberdeen).
Analysis of heathland lichen communities using ordination and linear modelling.

Employment

- Jan 2021–present **Bangor University**, *Postdoctoral Researcher*, Bangor.
Postdoc on the FUTURE OAK project, studying the microbiomes of oak trees with and without Acute Oak Decline.
- Aug–Sep 2014 **University of Aberdeen**, *Field researcher*, Aberdeen.
Deveron Fisheries Trust funded field survey of a site near Turiff, Aberdeenshire.
- June–Aug 2014 **University of Aberdeen**, *Plant ID guide studentship*, Aberdeen.
Studentship to create three plant ID guides for teaching undergraduates plant ID. Part-funded by the Botanical Society of Scotland.

Computational skills

- Statistics Fluent in R, Python, and UNIX, proficient in manipulating a wide range of data types, strong understanding of a variety of statistical concepts.
Extensive experience analysing ecological community data using a variety of methods, including ordination and Bayesian mixed modelling.
Analysis of metabarcoding data using *QIIME2* and *physeq*.
GLMMs using a variety of R packages, including *glmmTMB* and *lme4*.
Bayesian linear models using *mcmcGLMM* and *R-INLA*.
Spatial analysis using distance-based methods such as Mantel correlograms and variance partitioning.
Spatial analysis using SPDE meshes in *R-INLA*.
- Other Version control using Git, document creation in Markdown and LaTeX, MS Office.

Field and wet lab skills

- Field Organising and conducting multi-day field excursions for sample collection. Competent in plant ID using a key, characterisation of vegetation communities.
- Laboratory Molecular biological skills, including DNA extractions, PCR, gel electrophoresis, and Sanger sequencing.
- Glasshouse Set up and maintenance of multi-month glasshouse trials, including creating experimental designs, building required equipment, and regular troubleshooting of issues.
- Microscopy Stereo and compound microscopy for fungal identification.

Additional skills

Strong written and oral presentation skills.

- Proven record of scientific writing with the ability to pitch at appropriate audience level.
Presented internally and externally at conferences (BES, SEECC), and lectured to local societies including the Glasgow Natural History Society.

Collaborative skills.

Maintained collaborations with researchers in other institutions throughout my PhD.
Work with colleagues in my department, providing help with statistical analyses.
Enjoy maintaining a friendly and helpful work environment.

Planning and organisational skills.

Self-motivated, strong organisational skills and able to work independently.
Proven ability to work to deadlines.

Full, clean driving license.

Publications

2020 **Downie, J., et al.**, *Heritable genetic variation but no local adaptation in a pine-ectomycorrhizal interaction*, Mycorrhiza (2020), <https://doi.org/10.1007/s00572-020-00941-3>.

Downie, J., et al., *Do antifungal terpenes affect pine-mycorrhizal interactions?*, (2020), (in preparation).

Downie, J., et al., *Negative interactions structure mycorrhizal root tip communities at scales*, (2020), (in preparation).

Training

2020 Introduction to Metabarcoding - Edinburgh Genomics

2020 Linux for Genomics - Edinburgh Genomics

2017, 2019 Post-graduate statistics course with Dr. Jarrod Hadfield

2012 Certificate in Field Botany at the Royal Botanic Gardens in Edinburgh – Distinction

Awards

2019 Second prize for best poster at the Scottish Ecology, Environment and Conservation Conference

2014 Botanical Society of Scotland Student Prize for best botanical dissertation

2014 Ede and Ravenscroft Award for Outstanding Performance in Plant Biology

Personal

Languages Fluent in English, learning Greek

Hobbies I enjoy cycling, climbing, camping, bike maintenance and reading