

Dr. James S. Borrell

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RESEARCH EXPERIENCE

- Current** **Research Fellow – Tropical Crop Ecology, RBG Kew**
Investigating the distribution of the underutilised crop Enset in Ethiopia.
- Jan – Mar 2017** **Project Leader – Central Desert Botanic Expedition, Oman**
In collaboration with the Oman Botanic Gardens I co-led a research expedition aiming to produce species distribution models of seven poorly known and geographically localised endemics. This research sought to resolve a theory that there is a novel botanical zone along a coastal strip of the central desert supported by coastal fog.
- Oct 2012 - Jan 2017** **NERC PhD studentship, Queen Mary University of London**
A thesis entitled '*Ecological genomics for the conservation of Dwarf Birch*', supervised by Dr. Richard Buggs and Prof. Richard Nichols. We investigated the consequences of range fragmentation and retreat on introgression, genetic drift and local adaptation in relict populations of *Betula nana*. In particular, I:
- Collated historic records and produced species distribution models of *Betula* species under current and projected future climate.
 - I developed a novel method to extract high mutation rate SSR markers from RADseq data.
 - Mapped population structure, identifying the population size at which genetic drift becomes a significant detrimental factor.
- This research had direct impact on CASE partner's reforestation strategies in Scotland by A) leaving a buffer zone around existing *B. nana* populations to reduce pollen rain from congeneric species, and B) favouring planting of tetraploid *B. pubescens*, over diploid *B. pendula*, to reduce introgression.
- Dec – Jan 2015-16** **Project Leader - Expedition Angano, Northern Madagascar**
I led a Royal Geographical Society and Zoological Society of London supported expedition to Northern Madagascar investigating edge effects in fragmented forests. Specifically we sought to quantify the depth into a forest fragment at which edge effects can be detected in the assemblage of species, using biotic and abiotic indicators and *distance sampling* of herpetofauna. This project was conducted in close collaboration with Malagasy Universities.
- May-Jul 2015** **NERC Policy Fellow - Natural Capital Initiative, Royal Society of Biology**
I undertook a project evaluating natural capital monitoring metrics to identify gaps, in collaboration with the Natural Capital Committee and DEFRA.
- Jan – Mar 2012** **Chief Scientist – Empty Quarter Expedition, Oman**
I co-led a two-month expedition to Oman in the role of Chief Scientist, collaborating with the Oman Botanic Gardens and Office for Conservation. We conducted the first biodiversity survey of a remote region in the Dhofar Mountains. Three peer-reviewed papers were published as a direct result.

- Jul – Aug 2011** **Science Co-ordinator – Pacaya-Samiria Reserve, Peru**
Organised a biodiversity research programme focusing on caiman and riverine birds, in collaboration with Peruvian scientists.
- Oct 2010 – May 2011** **Big Dilemmas Sustainability Think Tank - University of Exeter**
Selected to join an interdisciplinary initiative working collaboratively to tackle complex sustainability issues, specifically focusing on *The Future of Renewable Energy in the UK*. I contributed to the Ecosystem Services working group output.
- Jul–Aug 2010** **Gatsby Plant Sciences Studentship - John Innes Centre, Norwich**
Awarded a two month Gatsby Studentship with Professor C. Dean studying the molecular basis of natural variation in plant vernalization.

EDUCATION HISTORY, SKILLS AND COURSES

- 2015** Multivariate Ecological Statistics Course – University of Oxford
2015 Species Distribution Modelling Course – University College London
2014 Taxonomy, Identification and Field Survey Skills – Royal Botanic Gardens, Kew
- 2008–11** **BSc (Hons) Biological Sciences - First class - University of Exeter**
My final year research project investigated the physical factors influencing pollen dispersal and genetic connectivity in wind-pollinated tree species by empirically measuring and mathematically modelling pollen fall speed. This was awarded a first class mark of 93%, and subsequently published.
- 2001–08** **Colchester Royal Grammar School**
A-levels: Biology (A), Chemistry (B), Design and Technology (B), General Studies (A), Physics AS (B)

Coding: Proficient in Unix and R, including implementing high throughput array jobs.
Software: Proficient using Stacks, Arlequin, Structure, Genepop, DIYABC, Bayescan, Bayenv2, GeneMarker, Blast2GO and Wordpress. Experience with GIS mapping in Arc and R, as well as species distribution modelling using MaxEnt/Dismo. Experience of distance sampling techniques, as well as analysing microsatellite, RADseq and NGS whole genome data. For more information on developed scripts: <https://github.com/JamesBorrell>

AWARDS AND GRANTS

- 2015** **Best Student Talk Prize:** Ecological Genetics Group Meeting
2013 **Anne Keymer prize:** Best postgraduate presentation, INTECOL conference
2013 **Poster Prize:** Ecological Genetics Group Meeting
2011 **William H. Fraser Prize:** For a dissertation at the University of Exeter
2011 **Dean’s Commendation:** For academic achievement at the University of Exeter
- 2017** **Whitley Wildlife Conservation Trust:** Fieldwork grant (£750)
2017 **Birdlife/RSPB:** Fieldwork grant (\$750)
2015 **Zoological Society of London:** Erasmus Darwin Barlow grant (£3000)
2015 **Royal Geographical Society:** Small fieldwork grant (£3000)
2015 **Scientific Exploration Society:** Cadogan Tate Explorer Award (£2000)
2015 **QM Public Engagement:** To further develop Discover Conservation (£675)
2014 **UnLtd Grant:** To launch an online social enterprise (£500)
2013 **EU-INTERACT Transnational Access Grant** (£3000)

INVITED AND CONTRIBUTED PRESENTATIONS

- 2016 Student Conference on Conservation Science, Cambridge
2015 European Society for Evolutionary Biology, Lausanne (Poster)
2015 Ecological Genetics Group, Liverpool
2015 London Evolutionary Research Network Annual Conference, London
2014 Citizen Cyberscience Summit, London (Opening Keynote)
2013 INTECOL, London
2013 Ecological Genetics Group, Belfast (Poster)

TEACHING AND SUPERVISION

- 2014-15 **Practical Coordinator:** Organised and managed the allocation of practical demonstrators across undergraduate lab and field courses within the School.
2012-15 **Supervision:** Throughout my PhD and projects abroad I have supervised the research projects of several Masters and undergraduate students.
2012-14 **Practical Demonstrator:** Contributed to teaching and instruction on a variety of undergraduate modules, particularly focusing on population genetics, bioinformatics and field courses including Brunei and the Cotswolds.
2008 **N.V.Q. Leadership and Management (Level 3)**

MEDIA AND SCIENCE OUTREACH

An accomplished public speaker, I have delivered conservation and research themed presentations to a variety of non-academic audiences, including: TEDx, the British Ecological Society, Kings College London, University of Exeter, the Scientific Exploration Society, the Zoological Society of London, the Royal Geographical Society, the US Charitable Trust, Earthwatch, The Philanthropy Club, the Royal Over-Seas League, Royal Society of Asian Affairs and the Anglo-Omani Society.

I have written for or been interviewed by: Al Jazeera, BBC Radio (5 Live, Devon, Ulster), the Futureproof podcast, The Guardian, Geographical Magazine, Sidetracked Magazine, The Biologist, Love Nature, The Ecologist and The Conservation.

In 2014 I launched www.DiscoverConservation.org: An online social enterprise that aims to support conservationists working in the field, whilst raising grants for the next generation of young conservation scientists.

London Evolutionary Research Network: From 2013-14 I sat on the LERN committee, contributing to the organisation of monthly seminars, networking events, fieldtrips and an annual conference.

PROFESSIONAL MEMBERSHIPS

Fellow of the Royal Geographical Society (with IBG)
Fellow of the Zoological Society of London
Member of the British Exploring Society
British Sub-Aqua Club (Sports diver qualification)

PUBLICATIONS

Borrell, J.S., Scherz, M.D., Ball, L.D., Starnes, T., Rakotondratisma, M, Reabearivony, J. (2017) The influence of edge effects on the distribution of herpetofauna in the Ampotsidy mountains, Madagascar. (*in prep.*)

Borrell, J.S., Wang, N., Nichols, R.A., Buggs, R.J.A. (2017) Combining markers with different mutation rates to infer the population genetic consequences of fragmentation in dwarf birch. *Molecular Ecology*. (*in prep for resubmission*)

Borrell, J.S., Zohren, J., Wang, N., Nichols, R.A., Buggs, R.J.A. (2017) Genomic assessment of adaptive potential in dwarf birch under present and future climates to inform assisted gene flow. (*in prep.*)

Zohren, J., Wang, N., Kardailsky, I., **Borrell, J.S.**, Joecker, A., Nichols, R.A. & Buggs, R. J. A. (2016) Unidirectional diploid-tetraploid introgression among British birch trees with shifting ranges shown by RAD markers. *Molecular Ecology* 25: 2413-2426.

Ball, L.D. & **Borrell, J.S.** (2016) An inventory of herpetofauna from Wadi Sayq, Dhofar, Oman. *Journal of Threatened Taxa*. 8(12), 9454-9460.

Borrell, J.S. (2016) 17th Student Conference on Conservation Science. *Oryx*. 50(03), 390-391.

Ball L.D., Alfazari W. & **Borrell J.S.** (2015) Birds of Wadi Sayq, Dhofar, Oman. *Sandgrouse*. 37.

Wang, N., **Borrell J.S.**, & Buggs, R.J.A. (2014). Is the Atkinson discriminant function a reliable method for distinguishing between *Betula pendula* and *B. pubescens*? *New Journal of Botany*. 4(2).

Wang, N., **Borrell, J.S.**, Bodles, W.J.A., Kuttapitiya, A., Nichols, R.A. and Buggs, R.J.A. (2014). Molecular footprints of the Holocene retreat of dwarf birch in Britain. *Molecular Ecology* 23: 2771-2782.

Borrell, J.S. (2014) Lessons from a year of citizen science. *Human Computation*. 1(2), 111-118.

Borrell, J. (2012). Rapid assessment protocol for pollen settling velocity: Implications for habitat fragmentation. *Bioscience Horizons* 5: hzs002.