

## WILLIAM D. PEARSE

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Canada

Advisor: Jonathan Davies  
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Date of birth: 24th of June 1987  
Nationality: British

### EDUCATION

<b>PhD</b>	Imperial College London & CEH Wallingford	2009-2012
Title <i>Phylogenetic perspectives on community change</i>		
Supervisors: Prof. Andy Purvis and Dr David Roy		
<b>MSc Ecology, Evolution &amp; Conservation</b>	Imperial College London	2008-2009
Distinction. Thesis title: <i>The community phylogenetics of Silwood Park</i>		
<b>MA Zoology (Hons.)</b>	Cambridge University	2005-2008
2i. Theses' titles: <i>Beetles and bird's nest ferns: baskets of biomass?</i> <i>Crabbing's impact on crabs: the cause, the effect, and the solution</i>		

### EMPLOYMENT

<b>Post-Doc</b>	McGill University (Davies Lab)	2015-present
Eco-evolutionary modelling and method development		
<b>Post-Doc</b>	University of Minnesota (Cavender-Bares Lab)	2013-2014
Urban Homogenization of America Project; analysis of plant community data		
<b>Intern</b>	Appin Scientific (now Ocean Science Consulting)	2006
Writing Environmental Impact Assessments, underwater survey work & data analysis		

### MAIN RESEARCH INTERESTS

Linking evolutionary processes of diversification and trait evolution to ecological assembly processes, often involving the development of new metrics and conceptual models.

The automated and reproducible construction and dating of phylogenies.

The role of phylogenetic structure in conservation prioritisation.

Variation in the tempo and mode of species' trait evolution, both of functional and morphological traits.

### SOFTWARE DEVELOPMENT

The majority of my research involves developing bioinformatics tools. All of my software is available through GitHub; I believe open source software development is a way to responsibly 'give back' to the data providers I rely on. While I specialise in phylogenetic (*phyloGenerator*) and eco-phylogenetic (*pez*) software, I maintain image analysis (*stalkless*), data management (*grabr*; *data\_frame*), Bayesian statistics (*Austin*), and GIS (GBIF) libraries in a variety of programming languages (*R*, *C++*, *Python*, and *Ruby*).

### AWARDS

2013: Robert May Award for the best paper from a young author in *Methods in Ecology and Evolution*

2011: Visiting scientist for three months in the Exelixis lab of Prof. Alexandros Stamatakis (Heidelberg Institute for Theoretical Studies, Germany)

2010: Faculty Award for Demonstrating and Tutoring (voted for by students)

2009: Southwood Prize for excellent (best) performance in MSc Ecology, Evolution & Conservation

**PUBLICATIONS—Total citations: 527; H-index: 6**

- Pearse WD**, Cadotte MW, Cavender-Bares J, Ives AR, Tucker C, Walker S, and Helmus MR (in press). *pez*: Phylogenetics for the Environmental Sciences. Bioinformatics.
- Pearse WD**, Dolphin K, Joseph J, Powney G, Preston C, Rapacciuolo G, Roy DB, and Purvis A (in press). Beyond the EDGE: prioritising British plant species according to evolutionary distinctiveness, and accuracy and magnitude of decline, using EDAM. PLoS One
- Banks-Leite C, Pardini R, Dixo M, **Pearse WD**, Tambosi LR, Bueno AA, Condez TH, Martensen AC, Bruscagin RT, Metzger JP. Using ecological thresholds to evaluate the costs and benefits of set-asides in a biodiversity hotspot. *Science* 345(6200) 1041–1045
- Two comments/responses in Science:**
- Conserving Brazil’s Atlantic forests—response (2014). *Science* 346(6214) 1193
- Response to Comment on “Using ecological thresholds to evaluate the costs and benefits of set-asides in a biodiversity hotspot” (2015). *Science* 347(6223) 731
- Pearse WD**, Cavender-Bares J, Puvis A, and Helmus M. Metrics and models of community phylogenetics (2014). In *Modern Phylogenetic Comparative Methods and their Application in Evolutionary Biology—Concepts and Practice*, book edited by László Zsolt Garamszegi
- Pearse WD**, Jones FA, and Purvis A (2013). Community structure in Barro Colorado Island has two spatial and one phylogenetic scale. *Ecology* 94(12), 2861–2872
- Ewers R, Didham R, **Pearse WD**, Lefebvre V, Rosa I, Carreiras J, Lucas R, and Reuman D (2013). Using landscape history to predict biodiversity patterns in fragmented landscapes. *Ecology Letters* 16(10), 1221–1233
- Díaz S, Purvis A, Cornelissen J, Mace G, Donoghue M, Ewers R, Jordano P, and **Pearse WD** (2013). Functional traits, the phylogeny of function, and ecosystem service security. *Ecology and Evolution* 3(9), 2958–2975
- Pearse WD** and Purvis A (2013) *phyloGenerator*: automated phylogeny generation for ecologists. *Methods in Ecology and Evolution* 4(7), 692–698
- Pearse WD** (2010) Commentary: effects of community invasion across multiple spatial scales. *Frontiers of Biogeography* 2, 3–4
- Todd VLG, **Pearse WD**, Tregenza NC, Lepper PA and Todd IB (2009). Diel echolocation activity of harbour porpoises (*Phocoena phocoena*) around North Sea offshore oil and gas installations, *ICES Journal of Marine Science* 66(4), 734–745

**IN REVIEW**

- Hall SJ, ..., **Pearse WD**, ..., Trammel TLE (minor revisions). Convergence of microclimate in residential landscapes across diverse cities in the United States. *Landscape Ecology*.
- Rebecca S. Barak, Hipp AL, Cavender-Bares J, **Pearse WD**, Hotchkiss SC, Callaway JC, Lynch JA, Calcote RR, Larkin DJ (minor revisions). Taking the long view: Integrating recorded, paleoecological, and evolutionary information into ecological restoration. *International Journal of Plant Sciences*.
- Lim J\*, **Pearse WD**, Luckett K, Suttle KB, and Purvis A. The effect of spatial scale on the community phylogenetic patterns of Silwood Park invertebrate and plant assemblages. *Ecology & Evolution*.

**IN PREP (intended for submission in 3 months)**

- Pearse WD**, Legendre P, Peres-Neto P, Davies J. An empirical test of the central assertion of community phylogenetics. Intended for *Journal of Animal Ecology*.
- Gnanadesikan GE, **Pearse WD**, Shaw AK. The evolution of breeding, refuge, and tracking migrations in mammals. Intended for *Nature*.

**NOT PEER REVIEWED**

- Pearse WD**, Purvis A, Roy DB and Stamatakis A (2014). Modelling ecological communities as if they were DNA. arXiv:1403.7668.
- Pearse WD**, Green HK, and Aldridge A (2014). Catching crabs: a case study in local-scale English conservation. arXiv:1404.0290.
- Rosindell, J., and **Pearse, W.D.** Openly streamlining peer review. *PLoS Biologues*.

PEGE Journal Club; open-discussion blog written with Lynsey McInnes (January 2013–present)  
Willeerd; ecology and evolution in R blog, writing code for new analyses (January 2014–present)

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\* indicates an undergraduate student I supervised

## FUNDING

- 2014: Organise Synthesis of Plant Trait Evolution meeting in Leipzig (Germany)
- 2013: Attend TRY workshop in Leipzig (Germany)
- 2013: Attend Phylogenomics and Metagenomics conference in Texas (USA)
- 2012: Visit Prof. Jordi Bascompte at his lab in Seville (Spain)
- 2011: Two week visit to Dr Rampal Etienne's lab in Groningen (The Netherlands)
- 2009: CASE PhD studentship from the Natural Environment Research Council
- 2008: Norfolk Council funding for crab fishing leaflet campaign based on undergraduate thesis
- 2008: Jesus college travel grant for student-organised expedition to Chile
- 2006: Old Bristolians' grant to fund diving equipment for internship

## WORKING GROUPS

- Synthesising Trait Evolution in Plants (Organiser; 2015)
  - Synthesis Centre for Biodiversity Sciences, Leipzig, Germany
- Tempo and mode of plant trait evolution: synthesizing data from extant and extinct taxa (2015)
  - National Evolutionary Synthesis Center, North Carolina, USA
- Dispersal evolution in the angiosperms: the origin of heterocarpy (2015)
  - National Evolutionary Synthesis Center, North Carolina, USA
- Plant diversity effects on ecosystem resistance to and recovery from perturbations (2014–present)
  - Synthesis Centre for Biodiversity Sciences, Leipzig, Germany
- Macroevolution of ecosystem services from trees (2013–present)
  - National Socio-Environmental Synthesis Center, Maryland, USA

## TALKS

- Empirically fitting an individual-based model of trait evolution, diversification, and dispersal (2015)
  - Evolution 2015, Brazil
- New methods to rapidly quantify (leaf) shape and model its evolution (2014)
  - Phylogenetic comparative methods* symposium at Botany 2014, Idaho, USA
- Plant diversity and community composition in six major USA cities (2014)
  - Ecological Society of America's Annual Meeting, California, USA
- 40 years of oak savanna restoration: species ecology in the context of evolutionary history (2013)
  - Taking the long-view* symposium at Society for Ecological Restoration's 2013 World Conference, Wisconsin, USA
- Niche conservatism, niche evolution, and species coexistence in butterflies and plants (2013)
  - Coexistence of closest relatives: synthesis of ecological and evolutionary perspectives* symposium at Ecological Society of America's Annual Meeting, Minnesota, USA
- Plant diversity and composition in six major USA cities (2013)
  - Ecological Society of America's Annual Meeting, Minnesota, USA
- Incorporating phylogeny into ecology (2013)
  - University of Minnesota, USA
  - University of Sheffield, UK
  - Center for Ecology and Hydrology, Wallingford, UK
- British butterflies and birds: Assemblages' phylogenetic structure through space and time (2012)
  - Evolution 2012, Ottawa (Canada)
- (Macro)ecology: Community phylogenetic structure in Barro Colorado Island (2011)
  - Advances in Biogeography, International Biogeography Society, Oxford University, UK
- Keeping it in the family: What phylogenies can tell us about ecological communities (2011)
  - Postgraduate Seminar Day, Center for Ecology and Hydrology, Wallingford, UK
  - Postgraduate Upgrade Symposium, Silwood Park, Imperial College London, UK

## TEACHING

**Lecturer** Imperial College London 2012  
BSc Biology — week-long ‘computing in biology’ course (four lectures, three practicals, one exam)

**Tutor** BES Tropical Ecology Workshop 2012  
Organised tutors for external course on data analysis, advised on statistical modelling

**Teaching assistant** Imperial College London 2009-2012  
BSc Biology (statistics, computing and biodiversity modules in all years)  
MSc ‘Ecology, Evolution & Conservation’, ‘Conservation Science’, ‘Biodiversity & Advanced Taxonomy’  
Generalised Linear Modelling (three week course for postgraduates and postdoctoral researchers)

## STUDENTS SUPERVISED

Martin Sullivan	MSc	Ecology, Evolution & Conservation	2009-2010
Jun Lim	BSc	Biology	2012
Jessica Bruan	REU	(Research Experience for Undergraduates)	2013
Erica Sarro	REU	(Research Experiences for Undergraduates)	2013
Gloria Perez	BSc	Biology	2013-2014

## REVIEWER SERVICES

I have reviewed (often many times) for: *Annals of Botany*, *Advances in Plant Sciences*, *The American Naturalist*, *Conservation Letters*, *Ecology*, *Ecology & Evolution*, *Ecology Letters*, *Environmental Research Letters*, *F1000 Research*, *Frontiers in Ecology and the Environment*, *Frontiers in Biogeography*, *Global Change Biology*, *Global Ecology & Biogeography*, *Journal of Biogeography*, *Journal of Ecology*, *Journal of Animal Ecology*, *Journal of Limnology*, *Journal of Plant Ecology*, *Methods in Ecology & Evolution*, *Plant Ecology*, *PLoS One* & *PNAS*.

## ORGANISED EVENTS

The Open Ground: Science, Biodiversity and the Imagination, London, England (June 2009).  
*A day of panel discussions with one hundred attendees, discussing links between the arts and sciences. Organised through the Conservation Today website I founded (see below).*

## PUBLIC ENGAGEMENT

Volunteered at Heritage Academy High School as a TeachSMART volunteer (2013)  
Judge at Monarch Science Fair (2013–2014)  
Planned and ran a stall at the Natural History Museum’s ‘Science Uncovered’ event (2011)  
Founded and ran ‘conservationtoday.org’ (2008-2010), encouraging scientists to communicate about conservation with the public, peaking at over 5000 unique visitors per day  
Created and distributed leaflets based on undergraduate thesis on crab fishing (2008)