

MARK V. MURPHY

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[GitHub](#) | [Twitter](#) | [Linkedin](#) | [ResearchGate](#) | [ORCID](#) | [ResearcherID](#)

EDUCATION

- PhD Ecology, University of Western Australia** **2016**
[Thesis](#): *Interactive effects of land-use change and rainfall decline on insect species networks*
Supervisors: Prof. Raphael Didham, Dr. Rachel Standish
- MSc Biodiversity and Conservation, Trinity College Dublin** **2008**
Thesis: *The conservation importance of turlough woodlands*
Supervisor: Dr. Steve Waldren
- BA Zoology, Trinity College Dublin** **2005**
Thesis: *The effects of urban wildflower meadows on insect biodiversity*
Supervisor: Dr. Úna Fitzpatrick

RESEARCH

- Writing, Collaborations, Projects, Training, Career Change (incl. breaks)** **2018–2021**
- Finalise PhD analyses and write-up research for publication (large project)
 - Compilation, documentation, and publication of new [R package](#) for SEM effect analysis (arising from PhD work)
 - Processing and submission of hundreds of DNA barcode sequences and associated metadata to the Barcode of Life Database ([BOLD](#)) (from PhD work)
 - Contribution of ecological, entomological, and statistical expertise to research collaborations (University of Western Australia, University of Leeds; ongoing)
 - Career change – training and upskilling in statistics, programming, data science
- Research Assistant, The University of Western Australia** **2016–2018**
- Sorted and identified thousands of bees and wasps collected in Perth for a large-scale [pollinator project](#)
 - Prepared additional PhD insect specimens for DNA extraction and sequencing, processed and analysed DNA barcodes, established new species identifications and interactions for host-parasitoid networks
 - Comprehensively revised PhD analyses using new species data and updated statistical procedures, compiled new methods and results
- PhD, The University of Western Australia** **2012–2016**
- Landscape-scale [project](#) testing the interactive effects of global change drivers on insect host-parasitoid networks
 - Sampled thousands of bees, wasps and their parasitoids across 48 woodlands in the Wheatbelt region of southwest Australia
 - Reared and identified nests and insects in the lab to establish species interactions

- Analysed and wrote-up results, presented throughout PhD and at national and international conferences

Research Assistant, The University of Western Australia 2011

- Sorted and identified thousands of terrestrial invertebrates from a tree restoration [experiment](#) on the university [research farm](#)
- Assisted with ecological monitoring of trees in the restoration experiment
- Mapped all land parcel boundaries at the research farm using GPS/GIS
- Preparation for PhD: processed high volume climate and vegetation data using GIS

Research Assistant, Trinity College Dublin 2009–2011

- Mapped vegetation at 22 temporary limestone lakes (turloughs) in the west of Ireland using GPS
- Produced detailed vector maps and associated metadata using GIS
- Assisted with analysis and visualisation of vegetation data in relation to hydrological, hydrochemical, pedological, and land-use data
- Contributed data, maps, and written methodology to final report

Research Assistant, Trinity College Dublin 2004

- Processed freshwater macro- and microinvertebrate samples collected from temporary limestone lakes (turloughs) in the west of Ireland
- Identified and counted planktonic crustacean species (Cladocera)
- Contributed data and methodology to progress reports, final report, and a publication

TEACHING

Demonstrator, The University of Western Australia 2016

- Lab demonstrator for the [Animal Populations](#) module of the Zoology undergrad major
- Supervised practical classes, experiments, and final exam
- Led a discussion group critiquing an ecological paper
- Assisted on a field trip surveying lake bird populations

Field Assistant, Trinity College Dublin 2010

- Assistance on an [MSc](#) field trip to coastal and saltmarsh habitat at Bull Island, Dublin
- Demonstrated the use of GPS units to map habitat types and record locations of individual plants in the field (*Salvia verbenaca*)

PUBLICATIONS

Journal Articles

- **Murphy, M.V.**, Tylianakis, J.M., Standish, R.J., & Didham, R.K. (In Prep.). Pollinator decline and food web instability driven by long-term climate drying.
- Arnold, J.P., Tylianakis, J.M., **Murphy, M.V.**, Cawthray, G., & Didham, R.K. (In Prep.). Body-size dependent effects of landscape floral resource energetics drives bee abundance in woodland remnants.
- Gillespie, M.A.K., Baude, M., Biesmeijer, J., Boatman, N., Budge, G.E., Crowe, A., Davies, N., Evans, R., Memmott, J., Morton, R.D., Moss, E., **Murphy, M.V.**, Northing,

P., Pietravalle, S., Potts, S.G., Roberts, S., Rowland, C., Senapathi, D., Smart, S.M., Wood, C., & Kunin, W.E. (In Prep.). Landscape scale drivers of pollinator community health depend on land use configuration.

- Taylor, C.K., **Murphy, M.V.**, Hitchen, Y., & Brothers, D.J. (2019). Four new species of Australian velvet ants (Hymenoptera: Mutillidae, Aglaotilla) reared from bee and wasp nests, with a review of Australian mutillid host records. *Zootaxa*, **4609**(2), 201–224.
- Arnold, J.P., **Murphy, M.V.**, Didham, R.K., & Houston, T.F. (2019). Rediscovery of the 'extinct' bee *Hesperocolletes douglasi* Michener, 1965 (Colletidae: Colletinae: Paracolletini) in Western Australia and first description of the female. *Journal of Threatened Taxa*, **11**(3), 13310–13319.
- Reynolds, J., **Murphy, M.**, & O Connor, Á. (2004). Early season cladoceran diversity of atlantic temporary ponds (turloughs). *Archives Des Sciences*, **57**, 97–104.

Reports

- Sharkey, N., Waldren, S., Kimberley, S., González, A., **Murphy, M.**, & O'Rourke, A. (2016). Chapter 7. Turlough Vegetation: Description, Mapping and Ecology. In S. Waldren (Ed.), *Turloughs: Hydrology, Ecology and Conservation*, Report to the National Parks and Wildlife Service, Dublin, Ireland.
- **Murphy, M.** (2005). *The Effects of Urban Wildflower Meadows on Insect Biodiversity*, Report to Dublin City and County Councils, Dublin, Ireland
- Reynolds, J.D., & **Murphy, M.** (2004). *The Cladoceran Assemblages of Turloughs: Natural and Anthropogenically Driven Variation*. Report to the National Parks and Wildlife Service, Dublin, Ireland.

Software

- **Murphy, M.V.** (2021). semEff: Automatic Calculation of Effects for Piecewise Structural Equation Models. R package version 0.5.0.
- **Murphy, M.V.** (2021). dissCqN: Multiple Assemblage Dissimilarity for Orders $q = 0-N$. R package version 0.1.0.

Datasets

- **Murphy, M.V.** (Pending). DS-HYMSWA: Trap-Nesting Hymenoptera from Southwest Australia, BOLD sequence dataset
- **Murphy, M.V.** (2019). DS-AGLSWA: New species of *Aglaotilla* (Hymenoptera: Mutillidae) from Southwest Australia, BOLD sequence dataset

PRESENTATIONS

Oral Presentations (selected)

- *Rainfall decline alters food webs with contrasting outcomes for pollinators and predators*, British Ecological Society, Belfast, **2019**
- *Climate change and habitat loss interact to alter host-parasitoid network structure and function*, Ecological Society of America, Portland, **2017**.
- *Trap-nesting bees and wasps of the WA wheatbelt*, Western Australian Insect Study Society, Perth, **2016**
- *Climate and land use interact to alter insect community structure and function*, PhD completion seminar, UWA, Perth, **2016**

- *Interactive effects of land-use change and rainfall decline on bee and wasp diversity*, Ecological Society of Australia, Adelaide, **2015**
- *Model averaging as a tool for model selection*, School of Biological Sciences [R_group](#), UWA, Perth, **2015**
- *Global change impacts on insect diversity in Southwest Australia*, School of Biological Sciences Research Day, UWA, Perth, **2014**
- *River restoration & management and their role in sustaining diversity*, MSc desk study seminar, TCD, Dublin, **2008**
- *The effect of urban wildflower meadows on insect biodiversity*, BA thesis seminar, TCD, Dublin, **2005**

Posters

- *Interactive effects of habitat loss and rainfall decline on insect species networks*, EcoTAS: New Zealand Ecological Society & Ecological Society of Australia, Auckland, **2013**
- *Vulnerability of tropical montane forest ecosystems to climate change: A case study of the Monteverde Cloud Forest, Costa Rica*, joint presentation for MSc, TCD, Dublin, **2008**

MEDIA COVERAGE

Rediscovery of the bee *Hesperocolletes douglasi*

2019

- [University News](#)
- Local: [Waneroo Times](#)
- National: [Sydney Morning Herald](#)
- International: [phys.org](#)

PhD research

2014

- [University News](#)
- Radio interview: [ABC – WA Country Hour](#)
- Local: Countryman, Esperance Express, Narrogin Observer

AWARDS AND FUNDING

UWA International PhD Scholarship

2012–2016

Competitive scholarship for international postgraduate fees, comprising:

- Scholarship for International Research Fees (SIRF) ~AUD\$120K
- University International Stipend (UIS) ~AUD\$100K
- UIS Safety Net Top Up Scholarship ~AUD\$14K

PROFESSIONAL AFFILIATIONS

British Ecological Society	2019–2020
Ecological Society of America	2017–2018
Ecological Society of Australia	2012–2016
Society for Ecological Restoration	2010–2012
International Association for Landscape Ecology	2009–2012

PROFESSIONAL SERVICE

Journals reviewed for:

- Oecologia 2016
- Insect Conservation and Diversity 2014

CONFERENCES AND WORKSHOPS

British Ecological Society , Belfast	2019
Ecological Society of America , Portland	2017
School of Biological Sciences Research Day , UWA, Perth	2016
R Group Workshops , UWA, Perth	2016
Ecological Society of Australia , Adelaide	2015
School of Biological Sciences Research Day , UWA, Perth	2015
R Group Workshops , UWA, Perth	2015
School of Biological Sciences Research Day , UWA, Perth	2014
R Group Workshops , UWA, Perth	2014
EcoTas: NZ Ecological Society & Ecological Society of Australia , Auckland	2013
Ecological Society of Australia , Melbourne	2012
IAS Masterclass: Novel Ecosystems: Why Worry? , UWA, Perth	2012
Advanced Bird ID Class , Birds Australia WA, Perth	2011
R Workshop , TCD, Dublin	2010
Native Bee Workshop: Burren Bumblebee Blitz , NBDC, Co. Clare	2010
Conservation Field Course: SAC Watch , Irish Wildlife Trust, Co. Laois/Offaly	2009
Invasive Plant Workshop , TCD, Dublin	2009
Postgraduate Ecology Forum , TCD, Dublin	2008

VOCATIONAL TRAINING

First Aid Course , ABC Licence Training Pty Ltd, Perth	2013
Quad Bike Rider Awareness Training , Shawsett Training & Safety, Pingelly	2011
Off Road Driving Course , Bob Cooper Outback Survival Pty Ltd, Perth	2011
GPS Unit Training , Trimble, Dublin	2009

OUTREACH AND VOLUNTEERING

Western Australian Insect Study Society , Perth Australia	2016
Invited talk about native bees and wasps for members of a natural history society	
University of Western Australia , Perth, Australia	2011
Assistance at the Entomology stand for the university open day, chatting to students	
Irish Peatland Conservation Council , Rathangan, Ireland	2008–2009
Assistance with conservation activities on a peatland nature reserve, including:	
<ul style="list-style-type: none"> • <i>Sphagnum</i> moss restoration trials • Substrate and water level monitoring 	

- Blocking of artificial drains
- Tree and shrub clearance

Conservation Volunteers Fingal, Dublin, Ireland

2008–2009

Assistance with various conservation projects in north Dublin, including:

- Woodland thinning, management, and planting for biodiversity
- Invasive tree and shrub removal
- Fence building

Fingal County Council, Dublin Ireland

2005

Tree planting to create new native woodland for National Tree Week

TECHNICAL SKILLS

Data Analysis and Programming

- Collection, management, and processing of multiple data formats and sizes
- Experience with linear and generalised linear models, mixed models, model selection and averaging, structural equation models, bootstrapping, confidence intervals, cross-validation, cluster analysis, ordination, data visualisation
- Programming of analysis routines in R for efficiency and speed
- R package development (programming, testing, documentation, version control, etc.)
- Software: R/RStudio, VS Code, Git/GitHub

GPS, GIS, and Spatial Analysis

- Extensive use of GPS/GIS technology for ecological projects, including field recording, mapping, and geoprocessing and analysis of spatial data (CSV, vector, raster, etc.)
- Software: QGIS, ArcGIS, GRASS, Google Earth
- Hardware: Garmin GPSMap 62, Trimble Nomad and GeoExplorer, Spectra Precision EPOCH Base and Rover GNSS System

Information Technology

- General proficiency in computers, file/document management, software, and IT
- Software: MS Office, LibreOffice, Adobe Reader, Zotero, Obsidian
- Platforms: Windows, Linux (Ubuntu)

Species Identification and Taxonomy

- Identification of invertebrates and plants to species or morphospecies (field and lab), including use of keys, descriptions, reference collections, and photographs
- Specialist knowledge of Hymenoptera, particularly Aculeata (bees and wasps)
- Woody plant and herb identification (woodlands, wetlands, grasslands)

Molecular Biology and Bioinformatics

- Extraction and PCR of mitochondrial DNA (CO1) from insects
- Processing, editing, and analysis of DNA barcode sequences to identify species
- Submission of barcodes and metadata to online repositories (BOLD, GenBank)
- Software: Geneious, BOLD, MEGA