

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)** **2018–2022**
- 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, Zhejiang University; ongoing, see Publications)
 - Career change (Data Analyst): training and upskilling in statistics, programming, and data science via various courses, tutorials, and [technical projects](#)
- 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 insect specimens for DNA extraction and sequencing (from PhD), 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 findings throughout PhD and at national and international conferences

Research Assistant, The University of Western Australia **2011**

- Sorted and identified thousands of terrestrial invertebrates collected from a tree restoration experiment on the university [research farm](#)
- Assisted with ecological monitoring of trees in the restoration plots
- Mapped all land parcel boundaries on the research farm using GPS/GIS
- PhD preparation: processed 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
- Generated detailed digital maps and 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 [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.). Long-term climate drying drives pollinator decline and food web disruption.

- 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.
- Ren, P., Didham, R.K., **Murphy, M.V.**, Zeng, D., Si, X. & Ding, P. (In Review). Edges increase pollinator network robustness to extinction with declining forest area.
- 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 Review). Landscape scale drivers of pollinator communities may 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 0.6.0.
- **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 DNA sequence dataset
- **Murphy, M.V.** (2019). DS-AGLSWA: New species of *Aglaotilla* (Hymenoptera: Mutillidae) from Southwest Australia, BOLD DNA 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 poster presentation for MSc, TCD, Dublin, **2008**

MEDIA COVERAGE

Rediscovery of the 'extinct' 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

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| 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 |
| Society for Conservation Biology | 2009–2012 |

PROFESSIONAL SERVICE

Journals reviewed for:

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|-------------------------------------|-------------|
| • Oecologia | 2016 |
| • Insect Conservation and Diversity | 2014 |

CONFERENCES AND WORKSHOPS

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| 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

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| 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:

- *Sphagnum* 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