

Saras M Windecker

The Kids Research Institute
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<https://github.com/smwindecker>

RESEARCH OVERVIEW

I am a quantitative ecologist with expertise in statistical modelling, data visualisation and dashboard development, programming in R, and software development.

My ecological research has focused using functional traits to predict plant species' distribution across environmental gradients. I also work on imperfect detection in species distribution models and spatial risk modelling for disease and public health, including collaborations with the Doherty Institute, the Department of Health and Human Services, and Menzies Institute of Health.

I am involved in the open research community. I am interested in promoting reproducible research practices in ecology.

EDUCATION

2019 **Doctor of Philosophy.** School of BioSciences, The University of Melbourne, Melbourne, Australia.

2012 **Master of Environmental Studies.** The University of Pennsylvania, Philadelphia, PA, USA.

2012 **Bachelor of Arts.** Biology. The University of Pennsylvania, Philadelphia, PA, USA.

PROFESSIONAL SUMMARY

2023 – ongoing **Research Fellow**, *The Kids Research Institute, Perth Children's Hospital, Nedlands, WA, Australia*. Develop and implement mathematical, computational, and statistical models of infectious disease transmission, with applications to COVID- 19 and vector-borne infectious diseases including Malaria.

2020 – 2023 **Research Fellow**, *School of Environment and Forest Sciences, The University of Melbourne, Melbourne, VIC, Australia*. Develop statistical models of species range shift dynamics.

2018 – 2020 **Research Fellow**, *School of BioSciences, The University of Melbourne, Melbourne, VIC, Australia*. Develop and operationalise statistical models and prepare dashboards for disease risk.

2019 **Research Assistant**, *University of New South Wales, Sydney, NWS, Australia*. Develop computationally reproducible workflows.

2017 – 2018 **Research Assistant**, *School of BioSciences, The University of Melbourne, Melbourne, VIC, Australia*. Write vignettes and code for the species distribution modelling R package, *zoon*.

2013 – 2014 **Research Assistant**, *Waterway Ecosystem Research Group, The University of Melbourne, Melbourne, VIC, Australia*. Lead fieldwork and data analysis for geomorphology monitoring.

2011 **Research Assistant**, *United States Agency for International Development, Tel Aviv, Israel*. Researched water supply and sanitation issues in the Gaza Strip.

SOFTWARE

Windecker SM & Golding N. 2018. *mixchar*: An R package for the deconvolution of thermal decay curves. Available on CRAN.

Windecker SM & Camac J. 2017. *decaymod*: Trait-based Bayesian decomposition models with Stan.
<https://github.com/smwindecker/decaymod>.

PUBLICATIONS

Peer-reviewed publications

- Saa JP, Tse T, Koh GC-H, Yap P, Baum CM, Uribe-Rivera DE, **Windecker SM**, Ma H, Davis SM, Donnan GA, Carey LM. 2024. Characterization and individual-level prediction of cognitive state in the first year after 'mild' stroke. *PLoS ONE* 19(8): e0308103. <https://doi.org/10.1371/journal.pone.0308103>
- Portelli AM, **Windecker SM**, Pollock LJ, Neal WC, Morris WK, Khot R, Vesk PA. 2023. From mallees to mountain ash, specific leaf area is coordinated with eucalypt tree stature, resprouting, stem construction, and fruit size. *Australian Journal of Botany* 71, 506-522. <https://doi.org/10.1071/BT23028>
- Towers IR, Vesk PA, Wenk EH, Gallagher RV, **Windecker SM**, Wright IJ, Falster DS. 2023. Revisiting the role of mean annual precipitation in shaping functional trait distributions at a continental scale. *New Phytol.* <https://doi.org/10.1111/nph.19478>.
- Ivimey-Cook ER, Pick JL, Bairos-Novak K, Culina A, Gould E, Grainger M, Marshall BM, Moreau D, Paquet M, Royauté R, Sánchez-Tójar A, Silva, I, **Windecker SM**. 2023. Implementing code review in the scientific workflow: Insights from ecology and evolutionary biology. *Journal of Evolutionary Biology*, 36, 1347–1356. <https://doi.org/10.1111/jeb.14230>.
- Vandelannoote K, Buultjens AH, Porter JL, Velink A, Wallace JR, Blasdel KR, Dunn M, Boyd V, Fyfe JAM, Tay EL, Johnson PDR, **Windecker SM**, Golding N, & Stinear TP. 2023. Statistical modelling based on structured surveys of Australian native possum excreta harbouring *Mycobacterium ulcerans* predicts Buruli ulcer occurrence in humans. *eLife*, 12:e84983. <https://doi.org/10.7554/eLife.84983>.
- Nakagawa S, Ivimey-Cook E, Grainger M, O'Dea R, Burke S, Drobniak S, Gould E, Macartney EL, Martinig AR, Paquet M, Morrison K, Pick J, Pottier P, Ricolfi L, Wilkinson D, Willcox A, Williams C, Wilson L, **Windecker S**, Yang Y, & Lagisz L. 2023. Method Reporting with Initials for Transparency (MeRIT) promotes more granularity and accountability for author contributions. *Nature Communications*, 14, 1788. <https://doi.org/10.1038/s41467-023-37039-1>.
- Uribe-Rivera DE, Guillerá-Arroita G, Plischoff P, **Windecker SM**, & Wintle B. 2022. The predictive performance of process-explicit range change models remains largely untested. *Ecography*, e06048. <https://doi.org/10.1111/ecog.06048>.
- Windecker SM**, Vesk PA, Trevathan-Tackett SM, & Golding N. 2021. mixchar: An R Package for the Deconvolution of Thermal Decay Curves. *Journal of Open Research Software*, 9(1), p.27. <http://doi.org/10.5334/jors.249>.
- Carnell PE, **Windecker SM**, Brenker M, Baldock J, Maque P, Brunt K, & Macreadie PI. 2018. Carbon stocks, sequestration, and emission of wetlands in south eastern Australia. *Global Change Biol*, 24, 9. <https://doi.org/10.1111/gcb.14316>.

Book Chapters

- Catford J, Roberts J, Capon S, Froend R, **Windecker SM**, & Douglas M. 2017. Wetland vegetation of inland Australia. *Australian Vegetation* (ed. D.A. Keith). Cambridge University Press.

Technical Reports

- Carnell PE, **Windecker SM**, Brenker M, Yukate B, Johnson K, & Macreadie PI. 2016. Carbon sequestration by Victorian inland wetlands. Blue Carbon Lab, Deakin University, Victoria, Australia for the Department of Environment, Land, Water, and Planning.
- Webb A, Vietz G, **Windecker SM**, Hladysz S, Thompson R, Koster W, Jones M. 2015. Monitoring and reporting on the ecological outcomes of Commonwealth environmental water delivered in the lower Goulburn River and Broken Creek in 2013/14. Technical report for the Commonwealth Environmental Water Office.
- Windecker S**, Vietz, G. 2014. Assessing the influence of environmental flows on physical habitat. Conference Report for the 7th Australian Stream Management Conference, Townsville, QLD, AU.

GRANTS AND AWARDS

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| 2024 | AUD 720, ECR Travel Award , <i>Women in Mathematics Special Interest Group Conference 2024</i> |
| 2022 | NZD 360,000, Associate investigator, "Understanding when and why predictions succeed or fail for species distributions" , <i>Marsden Fund</i> |
| 2022 | USD 990, R in Ecology , <i>R Consortium Foundation</i> |
| 2019 | AUD 1,500, ECR Travel Award , <i>Botany Foundation at the University of Melbourne</i> |
| 2019 | AUD 1,500, "Workshop: Taking your R skills to the next level, four great strategies for reproducible research." <i>Ecological Society of Australia</i> |
| 2016 | AUD 1,500, Science Abroad Travelling Scholarship , <i>The University of Melbourne</i> |
| 2016 | AUD 7,600, "Impact of carbon source and hydrology on carbon sequestration in freshwater wetlands." <i>Australian Nuclear Science and Technology Organisation Research</i> (2 years) |
| 2016 | AUD 1,500, School of BioSciences Travel Grant , <i>The University of Melbourne</i> |
| 2015 | AUD 12,825, "The impact of vegetation communities on carbon sequestration in wetlands." <i>Holsworth Wildlife Research Endowment and The Ecological Society of Australia</i> (3 years) |
| 2015 | AUD 2,300, "The relationship between plant functional trait composition and water infiltration." <i>Lifeworks Foundation via University of Melbourne Botany Foundation</i> |

- 2015 AUD 1,163, **Travel Grant**, *Centre of Excellence for Environmental Decisions*
- 2014 **Melbourne International Fee Remission Scholarship**, *The University of Melbourne*
- 2014 **Melbourne International Research Scholarship**, *The University of Melbourne*
- 2012 USD 1,100, **“Distribution and habitat characteristics of a freshwater gastropod, *Pleurocera proxima*, in eastern Pennsylvania.”** Master of Environmental Science Capstone Research Grant, *University of Pennsylvania*
- 2012 **Dean’s List Scholar**, *University of Pennsylvania*
- 2011 USD 5,300. **“Trophic interactions in Mediterranean rocky shore ecosystems.”** University Scholars Research Grant, *University of Pennsylvania*

SUPERVISION

- 2021-2022 Rohan Khot, *Improving Trait-based Eucalyptus Species Distribution Models in the Grampians-Gariwerd National Park*, Masters, University of Melbourne
- 2020 Antoinette Portelli, *Exploration of Functional Trait Correlations in the Eucalypts in a Phylogenetically Informed Context*, 3rd year research project, University of Melbourne

WORKSHOPS

- Incorporating reproducible research practices into your research code**, Malaria Modellers Australia Conference, Perth, WA, Australia, 9 Sept 2024
- Model-based data integration: a primer and practical guide**, Species on the Move Conference, Bonita Springs, FL, USA, May 2023 & International Statistical Ecology Conference, Cape Town, South Africa, Jun 2022
- Curso-Taller R para Investigadores**, Universidad Mayor de San Andres, La Paz & Universidad Mayor de San Simon, Cochabamba, Bolivia, Feb – Mar 2023
- Bayesian inference in R for ecologists**, Deakin University, Burwood, Australia, Oct 2022
- Developing a model for peer code review in ecology and evolutionary biology**, Unconference and Hackathon, Society for Open, Reliable, and Transparent Ecology and Evolutionary Biology Conference, online, Jul 2021 & Jul 2022
- Level-up your R package**, International Statistical Ecology Conference, Sydney, NSW, Australia, Jun 2020
- Introduction to R packages and version control**, rOpenSci Oz Unconference, Sydney, NSW, Australia, 11 Dec 2019
- Taking your R skills to the next level: four great strategies for reproducible research**, Australian Interdisciplinary Meta-research and Open Science Conference, Melbourne, VIC, Australia, 7 Nov 2019 & Ecological Society of Australia Conference, Launceston, TAS, Australia, 28 Nov 2019
- Introduction to Bayesian Analysis in R (Demonstrator)**, User! 2019 Conference, Toulouse, France, 9 Jul 2019
- Bayesian Modeling for Ecology**, Charles Darwin University, Darwin, NT, Australia, 16 – 18 Apr 2019
- Introduction to R packages and version control**, rOpenSci Oz Unconference, Melbourne, VIC, Australia, 21 Nov 2018
- Introduction to Generalised Linear Models and Mixed Effects Models in R (Demonstrator)**, University of Melbourne, Melbourne, VIC, Australia, 2 Nov 2018
- Introduction to R (Demonstrator)**, User! Conference, Brisbane, QLD, Australia, 10 Jul 2018

TEACHING

- 2022 Co-coordinator, **Research Methods for Life Sciences**, School of Environment and Forest Sciences, University of Melbourne, Melbourne, VIC, Australia
- 2017 Demonstrator, **Applied Ecology**, School of BioSciences, University of Melbourne, Melbourne, VIC, Australia
- 2017 Tutor, **Environmental Impact Assessment**, School of Geography, University of Melbourne, Melbourne, VIC, Australia
- 2015 Tutor, **Monitoring Environmental Impacts**, School of Engineering, University of Melbourne, Melbourne, VIC, Australia
- 2015 Demonstrator, **Ecology**, School of BioSciences, University of Melbourne, Melbourne, VIC, Australia
- 2015 Tutor and demonstrator, **Ecology in Changing Environments**, School of BioSciences, University of Melbourne, Melbourne, VIC, Australia
- 2012 Teaching Assistant, **Introduction to Geology**, Earth and Environmental Science, University of Pennsylvania, Philadelphia, PA, USA

PROFESSIONAL SERVICE

- 2024- Technical development lead for forecast hub infrastructure, **Australian Consortium of Epidemic Forecasting and Analytics**
- 2024 Organising committee member, **Malaria Modellers Australia 2024 conference**
- 2019- Associate Editor, **Methods in Ecology and Evolution Journal**
- 2018-2022 Committee member, **Quantitative Ecology Research Chapter of The Ecological Society of Australia**
- 2021-2022 Biosecurity Commons Expert Panel member, Open Science expert
- 2021-2022 Advisory panel member for 1 Masters student, 1 PhD student
- 2020 Organising committee member, **International Statistical Ecology Conference, Sydney Australia June 2020**
- 2020 Steering committee, **Society for Open, Reliable, and Transparent Ecology and Evolutionary biology**
- 2018 Steering committee, **Melbourne Open Research Network**
- 2018 Organising committee member, **rOpenSci Oz Unconference 2018**

PRESENTATIONS

Invited talks

Reusable research code for reliable decision-making, Modelling for Decision Making special session, Women in Mathematics Special Interest Group Conference 2024, Sydney, NSW, Australia, 1 – 2 Oct, 2024

An introduction to version control with git and GitHub: future proofing for collaborative projects, LifeCourse Research Development Program, Murdoch Children's Research Institute, Melbourne, VIC, Australia, 26 Apr 2021

Gold star reproducibility: straightforward containerisation with open-source tools, R-Ladies Montpellier, 3 Jul 2019, R-Ladies Sydney & University of New South Wales, 28 Aug 2019, R-Ladies Melbourne, 24 Sep 2019

Replication in ecology, From replication crisis to credibility revolution workshop, Melbourne, VIC, Australia, 14 Nov 2018

Applying functional trait ecology to a meta-analysis of wetland restoration success, Society of Wetland Scientists Conference, Providence, RI, USA, 31 May – 4 Jun 2015

Oral presentations

Improving predictive performance of trait-SDMs by parameterising variation in trait-environment relationships across environmental gradients, International Statistical Ecology Conference, online, Cape Town, South Africa, 27 Jun – 1 Jul, 2022 & Ecological Society of Australia, Wollongong NSW Australia, 28 Nov – 2 Dec, 2022

Hierarchical trait-based point process model for distributions of presence-only data, Ecological Society of Australia, online, 22 – 26 Nov 2021

Integrating citizen science records, abundance estimates, and scat survey data in a species distribution model, International Statistical Ecology Conference, online, 22 – 26 Jun 2020

Open-access software for research: beyond data analysis, UseR! 2019 Conference, Toulouse, France 11 Jul 2019 & Victorian Biodiversity Conference, Melbourne, VIC, Australia, 7 – 8 Feb 2019

Zoon R package for reproducible and shareable species distribution modelling, UseR! 2018 Conference, Brisbane, QLD, Australia, 11 – 13 Jul 2018

Decomposition of wetland plants: a non-linear hierarchical Bayesian approach, Victorian Biodiversity Conference, Melbourne, VIC, Australia, 6 – 7 Feb 2018

A meta-analysis of functional restoration in global wetlands, British Ecological Society conference, Liverpool, United Kingdom, 11 – 14 Dec 2016

Drivers of carbon storage and sequestration rates in freshwater wetlands, Southeastern Australia, International Society of Limnology conference, Torino, Italy, 31 July – 5 Aug 2016

Poster presentations

Decomposition of wetland plants: a non-linear hierarchical Bayesian approach, Bayes on the Beach conference, Surfer's Paradise, QLD, Australia, 13 – 15 Nov 2017

REFERENCES

Professor Nicholas Golding

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The University of Melbourne
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University of New South Wales
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