

# Joe Wan

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## Training

- 10/2023– **Postdoctoral Scholar, Institute of Ecology and Evolutionary Biology, National Taiwan University**  
Supervisor: Po-Ju Ke
- 09/2018–04/2023 **Doctorate, Department of Environmental Systems Science, ETH Zürich**  
Advisor: Thomas Crowther  
*Thesis: Uniting community and ecosystem ecology to understand the global carbon cycle*
- 02/2018–08/2018 **Research Assistant (plant pathogen ecology) Department of Biology, Stanford University**  
Supervisor: Erin Mordecai
- 07/2016–09/2017 **Lab Technician (microbial ecology) Department of Biology, Stanford University**  
Supervisor: Kabir Peay
- 09/2012–06/2016 **Bachelor of Science in Computer Science and Biology, Stanford University (with Honors in Computer Science; with Distinction)**  
*Honors Thesis: Learning evolutionary and functional aspects of plant–fungal mutualism from public genomic data*

## Publications

*as first author or equal contribution (\*):*

- J. Wan\*, P.-J. Ke\*, I. Hordijk, L. Bialic-Murphy, and T. W. Crowther (2024). “Functional coexistence theory: a mechanistic framework linking biodiversity to ecosystem function”. *bioRxiv*. DOI: 10.1101/2024.05.05.591902. preprint.
- P.-J. Ke\* and J. Wan\* (2023). “A general approach for quantifying microbial effects on plant competition”. *Plant and Soil* 485.1. DOI: 10.1007/s11104-022-05744-3.
- J. Wan and T. W. Crowther (2022). “Uniting the scales of microbial biogeochemistry with trait-based modelling”. *Functional Ecology* 36.6. DOI: 10.1111/1365-2435.14035.
- P.-J. Ke\* and J. Wan\* (2020). “Effects of soil microbes on plant competition: a perspective from modern coexistence theory”. *Ecological Monographs* 90.1. DOI: 10.1002/ecm.1391.
- G. R. Smith\* and J. Wan\* (2019). “Resource-ratio theory predicts mycorrhizal control of litter decomposition”. *New Phytologist* 223.3. DOI: 10.1111/nph.15884.

**J. Wan**, M. Qu, X. Hao, R. Motha, and J. Qu (2015). "Assessing the impact of year 2012 drought on corn yield in the US Corn Belt using precipitation data". *Journal of Earth Science and Engineering* 5. DOI: 10.17265/2159-581X/2015.06.001.

**manuscripts in preparation:**

**J. Wan** and I. Hordijk (in prep.). "Even better? Incorporating community structure into biodiversity–function research".

**J. Wan** and P.-J. Ke (in prep.). "Nonadditive competition decouples coexistence and community structure".

**J. Wan** and P.-J. Ke (in prep.). "A lingua franca for coexistence frameworks".

**other publications:**

C. E. Willing, **J. Wan**, J. J. Yeaman, A. M. Cessna, and K. G. Peay (2024). "Arbuscular mycorrhizal fungi equalize differences in plant fitness and facilitate plant species coexistence through niche differentiation". *Nature Ecology & Evolution*. DOI: 10.1038/s41559-024-02526-1.

M. E. Van Nuland, P.-J. Ke, **J. Wan**, and K. G. Peay (2023). "Mycorrhizal nutrient acquisition strategies shape tree competition and coexistence dynamics". *Journal of Ecology* 111.3. DOI: 10.1111/1365-2745.14040.

J. Maschler, L. Bialic-Murphy, **J. Wan**, L. C. Andresen, C. M. Zohner, P. B. Reich, A. Lüscher, M. K. Schneider, C. Müller, G. Moser, J. S. Dukes, I. K. Schmidt, M. C. Bilton, K. Zhu, and T. W. Crowther (2022). "Links across ecological scales: Plant biomass responses to elevated CO<sub>2</sub>". *Global Change Biology* 28.21. DOI: 10.1111/gcb.16351.

T. Větrovský, P. Kohout, M. Kopecký, A. Machac, M. Man, B. D. Bahnmann, V. Brabcová, J. Choi, L. Meszárošová, Z. R. Human, C. Lepinay, S. Lladó, R. López-Mondéjar, T. Martinović, T. Mašínová, D. Morais, D. Navrátilová, I. Odriozola, M. Štursová, K. Švec, V. Tláskal, M. Urbanová, **J. Wan**, L. Žifčáková, A. Howe, J. Ladau, K. G. Peay, D. Storch, J. Wild, and P. Baldrian (2019). "A meta-analysis of global fungal distribution reveals climate-driven patterns". *Nature Communications* 10.1 (1). DOI: 10.1038/s41467-019-13164-8.

T. W. Crowther, J. van den Hoogen, **J. Wan**, M. A. Mayes, A. D. Keiser, L. Mo, C. Averill, and D. S. Maynard (2019). "The global soil community and its influence on biogeochemistry". *Science* 365.6455. DOI: 10.1126/science.aav0550.

M. Duhamel, **J. Wan**, L. M. Bogar, R. M. Segnitz, N. C. Duncritts, and K. G. Peay (2019). "Plant selection initiates alternative successional trajectories in the soil microbial community after disturbance". *Ecological Monographs* 89.3. DOI: 10.1002/ecm.1367.

N. Weber, D. Liou, J. Dommer, P. MacMenamin, M. Quiñones, I. Misner, A. J. Oler, **J. Wan**, L. Kim, M. Coakley McCarthy, S. Ezeji, K. Noble, and D. E. Hurt (2018). "Nephele: a cloud platform for simplified, standardized and reproducible microbiome data analysis". *Bioinformatics* 34.8. DOI: 10.1093/bioinformatics/btx617.

A. Schuler, V. Liu, **J. Wan**, A. Callahan, M. Udell, D. E. Stark, and N. H. Shah (2016). "Discovering patient phenotypes using generalized low rank models". *Biocomputing 2016: Proceedings of the Pacific Symposium*. World Scientific. DOI: 10.1142/9789814749411\_0014.

M. Qu, J. Wan, and X. Hao (2014). "Analysis of diurnal air temperature range change in the continental United States". *Weather and Climate Extremes* 4. DOI: 10.1016/j.wace.2014.05.002.

## Funding

2024 National Science and Technology Council Postdoctoral Funding (NSTC 113-2811-B-002-118)  
*Nonlinear and multispecies dynamics in the plant soil feedback system*

2023 National Taiwan University Directives for Postdoctoral Researcher Subsidies (113L4000-1)  
*Understanding frequency dependence in temporal plant soil feedback*

## Language Proficiency

English *native language*

Chinese *fluent*

German *fluent (conversational)*

## Peer Review

*American Naturalist, Ecology, Ecology Letters, Environmental Microbiology, ISME Communications, Journal of Ecology, Nature Communications, New Phytologist, Oikos, PNAS, Theoretical Ecology*

## Teaching, Mentorship, and Service

2024 **Community Ecology** (National Taiwan University, EEB5103)  
Guest Lecture: *Biodiversity–Ecosystem Function*

2018, 2019, 2020 **Ecology and Evolution: Term Paper** (ETH Zürich, 701-1460-00L)  
**Ecology and Evolution: Seminar** (ETH Zürich, 701-1460-00L)  
Mentored Papers and Presentations: *Do plants share resources through networks of mutualist fungi?, Do more diverse natural communities protect people from disease?, A new ecology of positive species interactions*

2019–2020 **M.Sc. Research Project** (ETH Zürich, 551-1801-00L)  
Student: Simon Hepner (*Volatile production mediates higher-order interactions in wood decay fungi*)

2020 **Architectural Design V-IX** (ETH Zürich, 052-1120-20L)  
Guest Lecture: *How to think like an ecologist*

2018–2019 **Organizer, Zurich Interaction Seminar**, ETH Zürich & UZH

2018 **Committee on Doctoral Supervision**, ETH Zürich

2017 **Bioinformatics Seminars**, Stanford Ecology & Evolution  
Topics: *Basic Git for Versioning Scientific Analyses, Unix Command Line for the Molecular Ecologist, Introduction to Metabarcoding, Introduction to Genome Assembly*