

Emanuele Giacomuzzo

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Research interests

Ecosystem size and spatial resource flows are critical factors shaping species diversity and ecosystem function. However, the interaction between these drivers remains underexplored. My PhD research focuses on understanding how patch size and resource flows influence biodiversity and ecosystem function within spatially connected meta-ecosystems. Through a series of controlled microcosm experiments, I explore how ecosystem size asymmetry and resource flow dynamics mediate cross-ecosystem interactions. This work provides insights into biodiversity and function across scales.

List of publications

- Giacomuzzo, E., Peller, T., Gounand, I., & Altermatt, F. (2024). Ecosystem size mediates the effects of resource flows on biodiversity and ecosystem function at different scales. *ESS Open Archive eprints*, 1, 00153906.
- Giacomuzzo, E., & Jordán, F. (2021). Food web aggregation: effects on key positions. *Oikos*, 130(12), 2170-2181.

Education & Research Experience

Doctor of Philosophy (PhD) in Ecology

10/2021 – 09/2025

Swiss Federal Institute of Aquatic Science and Technology (Eawag) & University of Zürich, Switzerland

- **Thesis title:** The Role of Patch Size in Driving Meta-Ecosystem Biodiversity and Function
- **Supervisor:** Prof Florian Altermatt (Eawag & University of Zürich, Switzerland)
- **Committee members:** Dr Isabelle Gounand (iEES-Paris, France), Prof Jordi Bascompte (University of Zürich, Switzerland)
- **Key achievements:** Designed and conducted five large-scale microcosm experiments (up to 192 replicates) to investigate how patch size mediates the effects of resource flow on biodiversity and ecosystem function. I developed custom R scripts for data analysis, visualization, and integration of mixed-effect models, compiling results into dynamic, reproducible R Markdown reports to streamline data sharing and reporting processes. This project is part of an ongoing collaboration with Dr Isabelle Gounand (iEES-Paris, France). I presented findings at international conferences, Biology24 (Switzerland) and the BES Annual Meeting 2023 (UK), and my presentation has been accepted for the BES Annual Meeting 2024 (UK), scheduled for December.
- **Additional activities:** I ran a storytelling club where scientists can practice what makes for a good narrative in scientific writing. The club is based on the And, But, Therefore framework (ABT) developed by Dr Randy Olson.

Food Web Ecology Intern

9/2020 – 5/2021

Balaton Limnological Institute, Hungary

- **Supervisor:** Prof Ferenc Jordán (Balaton Limnological Institute, Hungary)
- **Key achievements:** During my internship, I conducted research focusing on the effects of food web aggregation on keystone species. The identity of keystone species depends on their interactions with other species, but there are multiple ways to describe a species interaction network, which can lead to varying results depending on the method of network construction. I compared different approaches to constructing food webs and demonstrated that these methods can yield different conclusions regarding which species are keystone. This work led to the publication: of Giacomuzzo, E., & Jordán, F. (2021). Food web aggregation: effects on key positions. *Oikos*, 130(12), 2170-2181.

Volunteer Research Assistant

10/2019 – 1/2020

University of California, Santa Barbara & Santa Barbara Museum of Natural History, USA

- Identified invertebrates for the reconstruction of empirical food webs from Palmyra Atoll (USA) in the lab of Prof Hillary Young (supervisor: Dr John McLaughlin)
- Educated the public about Snowy Plover (*Charadrius nivosus*) conservation at Coal Oil Point Natural Reserve (supervisor: Jessica Nielsen)

- Organised and databased the zoological collection of the Cheadle Center for Biodiversity and Ecological Restoration (CCBER) (supervisor: Dr Katja Seltsmann)
- Curated the entomological collection of Santa Barbara Museum of Natural History by pinning and point mounting specimens (supervisor: Dr Matthew Gimmel)

Master of Science (MSc) in Wildlife Biology & Conservation

9/2018 - 10/2019

Edinburgh Napier University, UK

- **Thesis Title:** Habitat Preferences, Home Range, Diet and Primate Community of the Black-Crested Leaf Monkey (*Presbytis melalophos*) in West Sumatra (Indonesia)
- **Supervisors:** Dr Jason Gilchrist (Edinburgh Napier University, UK) and Dr Rizaldi (Andalas University, Indonesia)
- **Key achievements:** organised field-work with a team of almost ten students, conducted vegetation surveys (estimating tree dominance, tree density, tree composition, diameter at breast height, tree height & first branch height, canopy gaps percentage, maximum slope, and storing vegetation samples), learned how to use GIS, learned how to estimate home range using Minimum Convex Polygon (MCP), learned how to use R for data analysis and visualisation.

Exchange Student

9/2016 – 1/2017

Vrije Universiteit Amsterdam, Netherlands

Bachelor of Science (BSc) in Biological Sciences

9/2014 - 7/2018

University of Florence, Italy

- **Thesis Title:** Analysis of Ant Communities (Hymenoptera: Formicidae) Across an Altitudinal Gradient
- **Supervisors:** Prof Giacomo Santini (University of Florence, Italy), Prof Guido Chelazzi (University of Florence, Italy)
- **Additional activities:** Student representative of the School of Biology

Fundings acquired

- PhD Travel Money (CHF 979.90 ~ \$1103,17) 07/2024
I was awarded funding through the University of Zürich to travel and present my research at the BES annual meeting 2024 (Liverpool, UK) in December 2024.
- AQUACOSM and AQUACOSM plus transnational access fundings 06/2021-08/2021
I received funding to cover transportation, accommodation, meals, and access to the mesocosm facility for two one-month training programs focused on conducting mesocosm experiments. During this period, I was hosted by Prof Maria Stockenreiter and Prof Herwig Stibor at the Seon Limnological Statio (Ludwig Maximilian University of Munich). While there, as part of the AQUACOSM plus traineeship, I led a research project examining how brownification influences the predatory behaviour of *Notonecta*, a visually hunting freshwater insect predator, and its cascading effects on trophic cascades. As part of the AQUACOSM, I contributed to a project led by Dr Katalin Patonai, which focused on evaluating the forecasting capabilities of simple food web models in aquatic environments.

Conferences & Seminars Presentations

- Giacomuzzo, E., Peller, T., Gounand, I., & Altermatt, F. (2024, December). *Ecosystem size tunes the effects of the spatial feedback between autotrophic and heterotrophic ecosystems on ecosystem function* [Poster presentation]. BES Annual Meeting 2024, Liverpool, UK.
- Giacomuzzo, E., Peller, T., Gounand, I., & Altermatt, F. (2024, May). *Size matters again: how spatial feedbacks can depend on patch size* [Oral presentation]. Eawag PhD Symposium, Zürich, Switzerland.
- Giacomuzzo, E., Peller, T., Gounand, I., & Altermatt, F. (2024, January). *Patch size influences biodiversity through resource flows* [Oral presentation]. Biology24, Zürich, Switzerland.
- Giacomuzzo, E., Peller, T., Gounand, I., & Altermatt, F. (2023, December). *Patch size mediates the effects of resource flow on biodiversity at different scales* [Oral presentation]. BES Annual Meeting 2023, Belfast, UK.

- Giacomuzzo, E., Peller, T., Gounand, I., & Altermatt, F. (2023, September). *Does (Ecosystem) size matter? With regards to how resource flow influences biodiversity* [Oral presentation]. Zürich Interaction Seminar, Zürich, Switzerland.
- Giacomuzzo, E., Peller, T., Gounand, I., & Altermatt, F. (2023, September). *Does size matter? With regards to all types of ecosystem connections* [Oral presentation]. Eawag PhD Symposium, Zürich, Switzerland.
- Giacomuzzo, E., Peller, T., Gounand, I., & Altermatt, F. (2022, September). *Size matters: how meta-ecosystem function is driven by patch size* [Oral presentation]. Eawag PhD Symposium, Zürich, Switzerland.

Teaching & Advising Experience

- **Supervisor for Bachelor Students in Aquatic Ecology Research** **09-11/2022 & 09-11/2023**
Aquatic Ecology block course (ETH & University of Zürich)
 I served as the primary supervisor for two bachelor students learning the fundamentals of conducting research in aquatic ecology. I guided them through the process of performing a microcosm experiment, teaching them how to formulate research questions, develop hypotheses, and organise raw data into a structured dataset using R. Additionally, I introduced them to R Markdown for analysis, data visualisation, and manuscript writing. I also emphasised the importance of critical thinking when interpreting experimental results and provided support in preparing their presentations. Finally, I assisted with grading their final reports.
- **Secondary Supervisor for Bachelor Students in Aquatic Ecology Research** **09/2024-11/2024**
Aquatic Ecology block course (ETH & University of Zürich)
 I assisted Dr Tianna Peller in designing a microcosm experiment for two bachelor students studying aquatic ecology research and supported the students with data analysis.
- **Teaching Assistant** **04/2024-07/2024**
Biodiversity and Habitats of Switzerland (University of Zürich)
 Assisted Prof. Florian Altermatt by providing support to students with practical assignments related to bird and plant identification. I helped with supervising and grading the final exams.
- **Teaching Assistant** **11/2022**
Freshwater Environmental and Ecosystem Modelling (University of Zürich)
 Acted as a teaching assistant of Dr Luca Carraro, offering support to students going through assignments on modelling freshwater dynamics with R.

Peer review

- Reviewed article submitted to *Oecologia* (Springer) 01/2024
- Reviewed article submitted to *Community Ecology* (Springer) 10/2021

Organised symposia

- Eawag PhD Symposium, September 2023. Organised symposium which brought together PhD students in ecology and keynote speakers from fundamental science (Prof Helmut Hillebrand, University of Oldenburg), applied science (Dr Ester Eckert, Water Research Institute Verbania), and industry (Oliver Schelske, Swiss Re). Managed speaker invitations, logistics, and accommodations, curated the program, and coordinated all event aspects, including venue, catering, and departmental communication. Co-organised in equal measure with Sarah Levasseur (Eawag).

List of released packages

- Emanuele Giacomuzzo (2021). Food Web Analysis Toolbox (https://github.com/Emanuele-Giacomuzzo/toolbox_webanalysis/releases/tag/1.1.0), GitHub.

References

- Prof Florian Altermatt (Eawag & University of Zürich, Switzerland, florian.altermatt@eawag.ch)
- Dr Isabelle Gounand (iEES-Paris, France, isabelle.gounand@cnrs.fr)