Curriculum vitae Jürg W. Spaak

Personal information

Name:	Jürg Spaak
Adress	Zeppelinstrasse 10, 76829 Landau, Germany
E-Mail	j.w.spaak@gmail.com
Date of birth	22nd of June 1991, Uster, Switzerland
Nationality	Swiss
Marital status	Married
Children	Nora Spaak, 10th November 2015
	Johanna Spaak, 2nd June 2017
	Arthur Spaak, 4th April 2020
	Anja Spaak, 13th April 2022
Orcid-Id	0000-0001-5157-9188
Google Scholar:	https://scholar.google.ch/citations?user=hOyLv_8AAAAJ&h
Website	jwspaak.com
Languages	German (mother language), English, Dutch, French, Russian (beginner)
Programming	Phyton, R, slurm, Latex

Research Interests

I focus on species coexistence in multispecies communities. What are the determinants of species coexistence? Which mechanisms are central? I hereby focus on multispecies communities and multitrophic networks and try to obtain general answers (i.e. not what is possibly important, but what is probably important). I investigate these networks using computer simulations and mathematics. While the results are mainly theoretical, I base my models on empirical data including uncertainties and probabilistic approaches.

Education

PhD in ecology at the University of Namur, Belgium | 10/2016-11/2020
Supervisor: Frederik de Laender (google scholar)
Study of modern coexistence theory. Solving numerically and analytically differential equations of community models. Performing and analysing microcosm experiments with phytoplankton.

Master in mathematics at the ETH Zurich, Switzerland | 09/2013-02/2016
Specialising in theoretical mathematics (final grade 5.44/6)

Bachelor in mathematics at the ETH Zurich, Switzerland | 09/2010-07/2015
General mathematical education (final grade 5.17/6)

Landau, 04.02.2025

Professional Positions

Professor ad interim, RPTU Landau | 04/2024-Today
Non-Tenure Track, Supervision of 2 Post-doctoral researcher, 3 PhD Student and 1 Technician
Development of own research agenda and acquisition of 3rd party funding

Postdoctoral researcher, RPTU Landau | 10/2022-03/2024
Non-Tenure Track Habilitation position

SNF early PostDoc mobility, independent researcher, Cornell University (Group Stephen Ellner) | 03/2021-09/2022
Applying modern coexistence theory to an aquatic foodweb

Postdoctoral researcher, University of Namur | 12/2020-02/2021

PhD Candidate (advisor Frederik De Laender) | 10/2016-11/2020

High school teacher in Mathematics, Wetzikon, Switzerland | 08/2015-05/2016
Teaching and evaluating independently high school students. Developing curriculum

Teaching assistant at the ETH Zurich | 09/2012-05/2015
Organising classes, correcting and grading homework

Prizes and awards

2023, Short Listed for Early Career Researcher Award, Ecology Letters, Building modern coexistence theory from the ground up: The role of community assembly
2021, Editors Choice Award for Paper in Oikos, Mapping species niche and fitness differences for communities with multiple interaction types
2010, Bronze medal at International Mathematical Olympiad, Kazakhstan
2010, Silver medal at Swiss Mathematical Olympiad
2010, Bronze medal at BeNeLux Mathematical Olympiad
2009, Honourable mention at International Mathematical Olympiad, Germany
2009, Silver medal at Swiss Mathematical Olympiad
2009, Silver medal at Swiss Biological Olympiad
2008, Honourable mention at European Mathematical Olympiad
2008, Finalist at Swiss Mathematical Olympiad

Teaching experience

Course responsible (2022-today, Ecological Modelling I and II, Effect Modelling, Exposure Modelling)
Co-organized two field courses (aquatic ecology), (2018, 2019, ~30 Master students)
Highschool teacher (2015-2016)

Landau, 04.02.2025

Teaching Assistant at ETH (2012-2015)
Instructor at Swiss Biological Olympiad (2010-2012)

Supervision of students

*: The results of this project are published in a peer-reviewed paper
2024-today:
PhD thesis: Gonzalo López Zanutto, Modern exclusion theory: What hinders species coexistence?
PhD thesis: Bipul Pouydal, How do multiple stressors affect multi-trophic communities
Bachelor thesis: Lennard König, Meta-analysis on trait-tradeoffs in two-trophic communities
Master thesis: Anastasia Manjavidze: How do heavy-metals affect body size of aquatic species
2023-today:
PhD thesis: Tobias Elsässer, Kombination eines räumlich expliziten Fließgewässernetzmodells mit einem Nahrungsmittelnetzmodell
2019-2020
Master thesis: Lisa Buche, Review of existing niche and fitness differences*
Current Position: PhD student at University of Queensland
Master project: Lisa Buche, Review of existing niche and fitness differences*
Master thesis: Remi Millet, The effects of linearization on niche and fitness differences*
Current Position: Masters student at SeaTech Ecole d'ingénieurs
2018
Bachelor Thesis: Stan Roelens, The influence of pollutants on aquatic ecosystems
Current Position: Biotechnology and drone technician
2017
Master Thesis: Elif Kardas, Evaluating the effects of pharmaceuticals on phytoplankton coexistence using computational and experimental methods
Current Position: PhD student at Universidad de Puerto Rico

References:

Frederik de Laender, Professor at the university of Namur, PhD Supervisor, frederik.delaender@unamur.be, expert in coexistence theory, biodiversity ecosystem functioning, theory

Francesco Pomati group leader at EAWAG, Switzerland, member of the PhD committee, Francesco.Pomati@eawag.ch, expert in Phytoplankton, lakes, biodiversity, community dynamics,

Lisa Buche, Ph.D. candidate at University of Queensland, Reference for my supervisor skills, buchel9844@gmail.com

Steven P. Ellner, Professor at Cornell University, Post-doc supervisor, spe2@cornell.edu, expert in coexistence theory, theoretical ecology, spatial coexistence

Grants and Fellowships:

2024 DFG Sachbeihilfe, Germany, PhD funding, 220'173 Euro
2023 DFG Graduierten Kollegium (co-applicant), PhD funding, 196'500 Euro

Landau, 04.02.2025

2023 RPTU internal grant, Anschubsfinanzierung 11‘587 Euro
2023 RPTU internal grant, Anschubsfinanzierung 3000 Euro
2022 RPTU internal grant, Anschubfinanzierung 4000 Euro
2020 SNF early Post-doc mobility fellowship, 149’075 CHF

Submitted grants:
2024 DFG Sachbeihilfe, Germany, PhD funding (209‘861 Euro)
2024 DFG Sachbeihilfe, Germany, PhD funding (208‘785 Euro)
2024 DFG central research council (co-applicant), PhD funding (ca 250’000 Euro)

Publications:

Published and accepted:

22. Higher-order species interactions cause time-dependent niche and fitness differences: Experimental evidence in plant-feeding arthropods, Agnieszka Majer, Anna Skoracka, **Jurg Spaak***, Lechosław Kuczyński*, 2024, Ecology Letters, *joint last author ship

21. Trophic tug-of-war: Coexistence mechanisms within and across trophic levels
C Song*, **Jurg W. Spaak***, 2024, Ecology Letters
*joint first and last authorship

20. Towards mechanistic integration of the causes and consequences of biodiversity
Shaopeng Wang, Pubin Hong, Peter B. Adler, Eric Allan, Yann Hautier, Bernhard Schmid, **Jurg W. Spaak** Yanhao Feng, 2024, Trends in Ecology and Evolution

19. The spatiotemporal profile and adaptation determine the joint effects and interactions of multiple stressors, L Streib, **JW Spaak**, M Kloft, RB Schäfer, 2024 Environmental Sciences Europe

18. Modeling cumulative effects of acute exposure to toxicants on the life cycle of Chironomidae using Bti as a case study, A Manfrin, Galm Mazacotte, **Jurg W. Spaak**, S.E. Osakpolor, […], R Schulz, 2024 Ecological Modelling

17. Building modern coexistence theory from the ground up: The role of community assembly , **Jurg W. Spaak**, Sebastian Schreiber, 2023 Ecology Letters

16. Continuous assembly required: Perpetual species turnover in two-trophic-level ecosystems
Jurg W. Spaak, Peter B. Adler, Stephen P. Ellner, 2023 Ecosphere

15. Chemical Mixtures and Multiple Stressors: Same but Different? Ralf B. Schäfer, Michelle Jackson, Noel Juvigny-Khenafou, Stephen E. Osakpolor, Leo Posthuma, Anke Schneeweiss, **Jurg Spaak**, Rolf Vinebrooke, 2023 Environmental Toxicology and Chemistry

14. Applying modern coexistence theory to a mechanistic aquatic food web model, **Jurg W. Spaak**, Peter Adler, Steven Ellner, 2023 The American Naturalist

13. The effects of non-linear competitive interactions on quantifying niche and fitness differences, **Jurg W. Spaak**, Remi Millet, Andrew Letten, Po-Ju Ke, Frederik De Laender, 2023 Theoretical Ecology

12. Different measures of niche and fitness differences tell different tales. **Jurg W. Spaak**, Po-Ju Ke, Andrew D. Letten, Frederik De Laender, 2022, OIKOS

11. Measuring individual-level trait diversity: a critical assessment of methods, Oluwafemi D. Olusoji, György Barabás, **Jurg W. Spaak**, Simone Fontana, Thomas Neyens, Frederik De Laender, Marc Aerts, 2022, OIKOS

10. Niche differences, not fitness differences, explain predicted coexistence across ecological groups, Lisa Buche*, **Jurg W. Spaak***, Javier Jarillo, Frederik De Laender, 2022, Journal of Ecology
*this is a joint First-authorship with supervised master student

9. Fitness differences, not niche differences, limit species richness, **Jurg W. Spaak**, Camille Carpentier, Frederik De Laender, 2021 Ecology letters

8. Mapping species niche and fitness differences for communities with multiple interaction types, **Jurg W. Spaak**, Oscar Godoy, Frederik De Laender, 2021 OIKOS

7. Stressor richness intensifies productivity loss but mitigates biodiversity loss, Mark Holmes, **Jurg W. Spaak**, Frederik De Laender, 2021 Ecology and Evolution

6. cyanoFilter: An R package to identify phytoplankton populations from flow cytometry data using cell pigmentation and granularity , Oluwafemi D. Olusoji, **Jurg W. Spaak**, Frederik De Laender, Thomas Neyens and Marc Aerts, 2021 Ecological modelling

5. Effects of pigment richness and size variation on coexistence, richness and function in light limited phytoplankton, **J.W. Spaak**, F. De Laender, 2021 Journal of Ecology

4. Reinterpreting the relationship between number of species and number of links connects community structure and stability, Camille Carpentier, **Jurg W. Spaak**, Gyuri Barabas, Frederik De Laender, 2021 Nature ecology and Evolution

3. Intuitive and broadly applicable definitions of niche and fitness differences, **Jurg W. Spaak**, Frederik De Laender, 2020 Ecology Letters

2. Food Web Uncertainties Influence Predictions of Climate Change Effects on Soil Carbon Sequestration in Heathlands, Wouter Reyns, Francois Rineau, **Jürg W Spaak**, Oscar Franken, Matty P Berg, Fons Van Der Plas, Richard D Bardgett, Natalie Beenaerts, Frederik De Laender, 2019 Microbial Ecology

1. Shifts of community composition and population density substantially affect ecosystem function despite invariant richness, **Jurg W Spaak**, Jan M Baert, Donald J Baird, Nico Eisenhauer, Lorraine Maltby, Francesco Pomati, Viktoriia Radchuk, Jason R Rohr, Paul J Van den Brink, Frederik De Laender, 2017 Ecology Letters

Thesis:

Reinterpretation of niche and fitness differences improves our understanding of species coexistence
PhD thesis, 2020, University of Namur under the supervision of Frederik De Laender

Invited seminars:

2024 ICE Umea, Sweden, Sebastian Stiel
2023, IITE, online seminar, Gyuri Barabas
2023, University Potsdam, Germany, Ursula Gaedke
2021, MIT Boston, US, Sebastian Schreiber
2021, MIT Boston, US, Serguei Saavedra
2021, University of Wyoming, US, Laruen Shoemaker
2021, Dalhousie University, Canada, Zoe Finkel
2020, University of Cadiz, Spain, Oscar Godoy
2019, EAWAG, Switzerland, Anita Narwani
2018, ILEE Namur, Belgium
2017, Eawag, Switzerland, Francesco Pomati

Presentations at international conferences:

Understanding Modern Non-Coeixstence theory, **Jurg W. Spaak** and Sebastian Schreiber, 03/2023, International Initiative for theoretical Ecology seminar

Understanding Modern Non-Coeixstence theory, **Jurg W. Spaak** and Sebastian Schreiber, 01/2023, invited speaker at ASN symposium

Applying modern coexistence theory to aquatic foodwebs, **Jurg W. Spaak**, Peter Adler, Steve Ellner, 08/2021, ESA conference

Mapping the diversity of species interactions with niche and fitness differences, **Jurg W. Spaak**, Oscar Godoy, Frederik De Laender, 08/2020, ESA conference

A unified definition of niche and fitness differences, **Jurg W. Spaak**, Frederik De Laender, 08/2019 ESA conference

How multiple environmental changes affect species richness, Frederik De Laender, **Jurg W. Spaak**, 08/2019 ESA conference

Measuring intraspecific diversity: A critical assessment of methods, OD Olusoji, **J Spaak**, T Neyens, S Fontana, M Aerts, F De Laender, 08/2019 ESA conference

"cyanoFilter", An Automated Framework for identifying Synechococcus type cyanobacteria populations obtained via flow cytometry Olusoji O. D., De Laender F., **Spaak J**., Neyens T., Aerts M. Use R Conference 07/2019

"cyanoFilter, An Automated Framework for identifying picocyanobacteria populations obtained via flow cytometry" Olusoji O. D., Aerts M., De Laender F., Neyens T., **Spaak J**. Belgium statistical society annual meeting, 10/2018

"Using Fourier series to understand phytoplankton coexistence" **Jurg W. Spaak**, Frederik De Laender. Netherlands annual ecology meeting. 02/2018, Oral presentation

Reviews done for the following Journals:

Nature, Ecology letters, Trends in ecology and evolution, Nature communications, Methods in ecology and evolution, The American Naturalist, Hydrobiologia, Journal of Ecology, Journal of Theoretical Biology, Frontiers in Ecology and Evolution