

Prof. dr. Frederik De Laender

bioscience engineer

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Education and appointments

2021–...	Visiting professor, Catholic University of Louvain-la-Neuve
2015–...	Associate professor (tenured), University of Namur
2013–2017	Visiting professor, Ghent University
2013–2015	Assistant professor (tenure track), University of Namur
2009–2013	BOF and FWO Postdoctoral research fellow, Ghent University
2007–2009	Postdoctoral researcher at the Dutch institute of Ecology (NIOO-KNAW, the Netherlands), ecosystem studies division
2003–2007	<i>Ph.D.</i> , Bioscience engineering, environmental technology, Ghent University
1998–2003	<i>M.Sc.</i> , Bioscience engineering, Ghent University

Skills

I have a broad expertise in **community ecology**, **environmental change biology**, and **theoretical ecology**. I have a deep knowledge of all concepts and ideas published over the last 30 years in all of these research fields. My tools are **mathematical modeling**, **experiments** with micro-organisms, and (meta-) **analysis** of literature data. I therefore have solid **programming** skills (R, Python, Matlab), a more than decent knowledge of **linear algebra and system dynamics**, am knowledgeable with most contemporary **statistical** techniques (e.g. clustering, mixed models), and know how to direct and organise complex experimental designs with algae (diatoms, green algae, cyanobacteria) and fungi. Despite being an academic for ten years, I am still involved in the **detailed technical aspects** of all projects: I write computer code, do mathematical analyses, draft experimental protocols, analyse data, and lead manuscripts as a first author. I therefore substantially contribute to each project my team is participating to.

Publications

I have published over 110 articles in peer-reviewed journals. A complete list is [on my google scholar site](#). My articles increasingly feature in more general outlets such as *Ecology Letters*, *Nature Communications*, *Nature Climate Change*, *Nature Ecology and Evolution*, *Trends in Ecology and Evolution*, *Biological Reviews*, *Proceedings of the Royal Society B*, *Ecology*, and *eLife*.

Research supervision

Since 2013, I have supervised: **22** undergraduate (Alexis Orban, Estelle Lechat, Sophie Eischen, Ruth Nies, Johanna Hernandez, Maxime Lothier, Benoit Ficart, Danut Chhorn, Charles Leriche, Robin Réveillon, Germain Agazzi, Nicola Mauro, Jannika Elfert, Lisa Buche, Noémie Miserque, Razevason Mahatsangy, Elif Kardas, Antoine Pouillon, Camille Carpentier, Nelson Desjardin, Raphael Hacquin, Zequiri Meritan, Benjamin Dujardin, Carol-Ann Schmit, GUPIE Ako Stephane, Kamani Kouam Nouria) and **21** *Ph.D* students (Laura Willam, Shangsheng Sun, Chaoyue Cheng, Germain Agazzi, Arunima Sikder, Camille Carpentier, H el ene Voahanginirina, Maria Druet, Tessa de Bruin, Zhao Qinghua, Mark Holmes, Daniel Oluwafemi Olusoji, Jurg Spaak, Sanne Van den Berg, Wouter Reyns, Jonathan De Raedt, Jan Baert, Karel Viaene, Christoph Mensens, Lisette de Hoop, Pham Viet Anh), and **9** postdocs (Yun Li, Bidesh Bera, Yun Li, Thomas Parmentier, L ea Beaumelle, Jurg Spaak, Zhao Quinhua, Javier Jarillo, Jan Baert, Devdutt Kulkarni)

Teaching

At the moment, I am involved in 10 courses; 4 are *B.Sc.*-level (in French) and 6 are *M.Sc.*-level (in English and in collaboration with UCLouvain). The *B.Sc.* courses deal with *Biodiversity*, *Applied ecology*, *Data management*, and *Statistics*. The *M.Sc.* courses deal with *Bioindicators*, *Biodiversity and Ecosystem Function*, *Biodiversity of aquatic ecosystems*, *Ecosystem stability*, *Generalized and mixed models*, and *Aquatic field work*. I am also responsible for the organisation of the *internships* in the final year of the masters training program.

Organisation of scientific meetings

- 2020: Workshop organiser in the context of my NARC fellowship on integrating environmental complexity into stability research. 16 participants (Ian Donohue and Jean-François Arnoldi (trinity college Dublin), Viktoriia Radchuk (Leibniz Institute for Zoo and Wildlife Research), Timoteo Carletti (UNamur), Vasilis Dakos (ISEM), Frank Pennenkamp (University of Zürich), Jose Montoya (CNRS), Sofia Van Moorsel (McGill), Elisa Thébault (CNRS/University of Sorbonne), Anita Narwani (Eawag), György Barabàs (University of Linköping), Géza Meszéna (Eötvös University)).
- 2015: Session organiser at the 100rd Annual Meeting of the Ecological Society of America (ESA), Baltimore USA, on integrating environmental change and biodiversity-ecosystem function research. About 2000 participants to the meeting; about 50 attended the session.
- 2014: Workshop organiser at the German Centre for Integrative Biodiversity Research (iDiv), on using environmental stressors in community ecology (sEcoToxDiv). 15 participants.
- 2013, 2017: Member of the scientific committee of the annual meetings of the Society of Environmental Toxicology and Chemistry (SETAC) in Glasgow (2013) and Brussels (2017). The role of the committee was to compose the scientific program. There were about 2000 participants at both events.
- 2010, 2013: Member of the organizing committee of the 16th *Ph.D* symposium on applied biological sciences, Ghent University, Belgium.

Institutional responsibilities

- 09/2024 - ...: Director of the Research Unit in Environmental and Evolutionary Biology (URBE), UNamur.
- 2020 - ...: Secretary of the Master in Biology program from UNamur and UCLouvain
- 2020 - ...: President of master thesis and internship defenses
- 2020 - ...: Member of the doctoral school on complex systems, ULB, UCLouvain, UMONS, ULiège, UNamur.
- 2017 - 2020: Secretary of the Bachelor in Biology program at UNamur
- 2017 - ...: Member of education commission of the UNamur Bachelor program
- 2017 - ...: Member of the scientific board of the Namur Institute for Complex Systems (NaXys)
- 2017 - ...: Member of the Namur Institute of Life, Earth, and the Environment (ILEE)
- 2017 - 2018: Member of the Unit of the promotion of research (UAR)
- 2017 - ...: Contribution to information sessions for high-school students (SIEP, JPO)
- 2015 - ...: Reviewer for institutional post-doc project proposals (MOVE-IN LOUVAIN) and ARC proposals
- 2015-...: President, secretary, and member of hiring committees for Professor positions at UNamur.
- 2022-...: President and member of tenure and promotion committees for Professor positions at UNamur.
- 2015-...: Reviewer for concerted research actions (ARC) at UNamur and UCLouvain

Commissions of trust

- 2025: Member of the HDR committee of Aude Beauger at the University of Clermont Auvergne, France
- 2024: Committee member of the Belgian American Educational Foundation (BAEF)
- 2020 – 2023: Referee for the Rutherford Discovery Fellowship applications
- 2020: Member of the HDR committee of Jose Montoya at the CNRS, France
- 2019: Evaluator of NSF projects (Switzerland)
- 2019 – now: Recommender for PCI Ecology
- 2018 – now: Associate editor for the Journal of Ecology (British Ecological Society)
- 2017, 2024: Member of two evaluation boards of the “DfG Priority Program”, Germany
- 2016 – 2021, 2023 - ...: Member of the scientific committee of the FRIA-FNRS *Ph.D* projects
- 2026: Member of the scientific committee INT SEN-4 of the FNRS
- 2016: Member of the thinkers program on “Flanders wise with water”, organised by KVAB (Royal Flemish Academy of Belgium for Science and the Arts)
- 2014: Member of the working group on “Computer Science at School”, organised by KVAB (Royal Flemish Academy of Belgium for Science and the Arts)
- 2014, 2015: Referee for the “Agence National de Recherche”, France
- 2013 - now: Member of the scientific council of the Botanic Garden Meise
- 2013 - 2017: Member of the high council of nature conservation of Wallonia
- 2013, 2018, 2019: Referee for an Urgency Grant proposal from the Natural Environment Research Council (NERC), UK
- 2013 - now: President of 8 *Ph.D* thesis jury’s (Nathalie Leroux, Michiel Lathouwers, Agbohessou Pamphile, Truong Quynh Nhu, Sebastien Baekelandt, Nguyen Thi Mai, Adrien Latli, Nicolas Debortoli); member of 16 other *Ph.D* jury’s at the Universities of Bordeaux, Toulouse, Zurich (ETH), Ghent, Nijmegen, Brussels (VUB), Linkoping (Sweden), Sevilla, KULeuven (Maxime Fajgenblat, Wissam Barhdadi, Nils Svendsen, Joren Snoeks, Rodrigo Rodriguez Granjel, Coralie Picoche, Josef Koch, Jonathan Arevall, Renske Hoonder, Soraya Alvarez, Simone Fontana, Dimitri Van de Perre, David Deruytter, Jennifer Hochmuth, Nuri Nurlaila Setiawan, Bram Sercu).
- 2011: External expert for the European Commission for the Scientific Committee on Health and Environmental Risks (SCHER)
- 2009: Science Review Board Member for the USEPA on “The Ecological Significance of Atrazine Effects on Primary Producers in Surface Water Streams in the Corn and Sorghum Growing Region of the United States (Part II)”
- 2007-now: Referee for (a.o.) Ecology Letters, Scientific Reports, Nature Communications, Environmental Science & Technology, Global Change Biology, Journal of Applied Ecology, Science Advances, Limnology & Oceanography, Ecological Modelling, Proceedings B.

Collaborators

I have a broad international network composed of skilled experts in various aspects of theoretical and experimental community ecology and environmental change. The following people are collaborating with me, or have done so in the recent past: Viktoriia Radchuk (dept. of Ecological Dynamics, Leibniz Institute for Zoo and Wildlife Research, Berlin), Timoteo Carletti (dept. of Mathematics, UNamur), Vasilis Dakos (ISEM, Montpellier), Richard Bardgett (University of Manchester), Frank Pennenkamp (dept. of Evolutionary Biology and Environmental Studies, University of Zürich), Anita Narwani (Aquatic Ecology dept., Eawag, Zürich), Sofia Van Moorsel (University of Zürich), Elisa Thébault (Ecologie et évolution des réseaux d'interactions (EERI), CNRS/University of Sorbonne, Paris), Jose Montoya and Jean François Arnoldi (Centre for Biodiversity Theory and Modelling, CNRS, Moulis), Javier Jarillo and Francisco Cao (Complutense University, Madrid), Oscar Godoy (University of Cádiz, Spain), György Barabás (dept. of Physics, Chemistry and Biology (IFM), University of Linköping), Géza Meszéna (Department of Biological Physics, Institute of Physics, Eötvös University, Budapest), Andrew Gonzales (McGill University, Montréal), Chuliang Song (University of California), Stefano Allesina (University of Chicago), Samantha Rumschlag and Michael Mahon (EPA, USA), Masato Yamamichi (School of Biological Sciences, University of Queensland), Nicolas Schtickzelle and Stephan Declerck (ELI, UCLouvain), François Rineau (Ecotron, University of Hasselt), Dries Bonte (Biology dept., Ghent University), Shaopeng Wang (Peking University), Ted Dallas (University of South Carolina), Stephan Munch (University of California), George Sugihara (University of California), Jason Rohr and Zhao Quinghua (University of Notre Dame), Adam Clarck (University of Graz), Andrew Letten (The University of Queensland), Ralf Schaefer (University Duisburg-Essen), Samuel Ross (OIST), and Owen Petchey (University of Zürich).

Recent research stays

- March 2024: Okinawa Institute of Science and Technology (OIST, Japan). Host: S. Ross.
- April 2023: CNRS Moulis. Host: J-F Arnoldi
- May 2023: University of Chicago. Host: S. Allesina.
- June 2023: McGill University. Host: A. Gonzales.

Honours and awards

- 2018: Selected for the second round of the European Research Council Consolidator grants.
- 2018: Fellow of the Namur Research College for scientific excellence in research.
- 2013: Member of the Young Academy of Science and Arts in Flanders, Belgium: jongeacademie.be. Co-authors of two publications [Teaching informatics in secondary schools](#), [Water: Flanders should wise up \(international event\)](#)
- Invitations to workshops at the Powell Centre (USGS, US), the German Center for Biodiversity research (iDiv, Germany), the Okinawa Institute of Science and Technology (OIST, Japan), the Université Gustave Eiffel (France), the university of Koblenz-Landau (Germany), CNRS (France).

Ongoing projects

- 2025-2029: Joint effects of biodiversity and stressor diversity on algal communities (*Ph.D* scholarship of Laura Willam). Funding by FNRS *Ph.D* FRIA. 180000 €. **Promoter.**
- 2025-2030: SHIFT: How does a shift in forest tree species composition affect soil organic carbon storage in ancient forests of Wallonia: site conditions, biotic interactions, and reversibility. Funding by the Brussels-Wallonia Federation. 212000 €. **Promoter.**
- 2024-2025: A meta-analysis of trophic structure along gradients of eutrophication and temperature (Postdoc of Yun Li). Funding by CSC (China). 25000 €. **Promoter.**
- 2023-2025: Predicting effects of temperature and pollution on coexistence using disordered systems theory. Funding by UNamur. 50000 €. **Project Leader**
- 2022-2026: Acclimation and strain selection in algal communities (*Ph.D* scholarship of Arunima Sikder). Funding by Ceruna *Ph.D* program UNamur. 180000 €. **Promoter.**

- 2022-2026: Heat waves in fungi communities of heatland soil ecosystems (*Ph.D* scholarship of Maria Druet). Funding by the joint *Ph.D* program UHasselt and UNamur. 180000 €. **Promoter.**
- 2022-2024: Modeling the stability of myrmecophile metacommunities (postdoc T. Parmentier). Funding by FWO. 160000 €. **Co-promoter.**
- 2018-2024: Does intraspecific variability modulate the impact of environmental change on biodiversity and ecosystem function (DIVERCE)? Funding by the Brussels-Wallonia Federation. 700000 €. **Project leader.**

Past projects

- 2022-2023: Pairwise interactions and community stability. Funding by UNamur. 12000 €. **Participant.**
- 2019-2022: Getreal: Spatial and seasonal variability in community sensitivity to chemical stressors. Funding by Cefic-LRI. 140000 €. **Participant**
- 2018: Ecological relevance of metal risk assessment. Funding by the International Zinc Association. 20000 €. **Project leader.**
- 2017-2022: ‘Renforcement des capacités en gestion Intégrée des ressources en eau de la région Sava’. Funding by ARES-CCD. 120000 €. **Participant**
- 2017-2021: Developing statistical methods to understand temperature effects on intraspecific biodiversity dynamics (*Ph.D* of Daniel Oluwafemi Olusoji). Funding by the joint *Ph.D* program UHasselt and UNamur. 160000 €. **Promoter.**
- 2017-2020: Myrmecophile metacommunities: integrating dispersal and food web interactions into spatial food-web networks (postdoc T. Parmentier). Funding by FNRS. 240000 €. **Promoter.**
- 2017-2020: DIADeM - Développement d’une approche intégrée pour le diagnostic de la qualité des eaux de la Meuse. Funding by EU Interreg and SPW. 530000 €. **Participant**
- 2017-2019: How do multiple environmental change drivers shape biodiversity-ecosystem functioning relationships? (postdoc L. Beaumelle). Funding by the German center for biodiversity research (iDiv). 100000 €. **Co-promoter**
- 2016-2020: Coexistence, stress, and aquatic ecosystem functioning. Funding by FNRS. 260000 €. **Project leader**
- 2015-2020: ESMU - Scenario-specific ecological risk assessment. Funding by Unilever. 140000 €. **Participant**
- 2015-2019: Predicting the effects of climate change on C sequestration by healthlands : the role of multi-trophic interactions between soil organisms (*Ph.D* Wouter Reys). Funding by the joint *Ph.D* program UHasselt and UNamur. 160000 €. **Promoter.**
- 2014-2016: The combined effects of food web interactions and chemicals on aquatic biodiversity (postdoc D. Kulka-rni). Institutional funding UNamur. 90000 €. **Promoter**
- 2014-2018: The combined effect of dispersal and chemical stress on the composition, diversity and productivity of marine micro-algae communities (*Ph.D* Jonathan De Raedt). Funding by FWO. 120000 €. **Co-promoter**
- 2014-2015: “Ecotoxicology for B-EF research: designing novel multi-trophic B-EF experiments”. Funding for a workshop by the German Centre for Integrative Biodiversity Research (iDiv). 30000 €. **Project leader**
- 2014: Testing the Symbioses Model. Funding by the Norwegian Research Council. 20000 €. **Project leader**
- 2013-2017: Biodiversity and ecosystem function in a stressed world (*Ph.D* Jan Baert). Funding by FWO. 120000 €. **Co-promoter**
- 2013-2016: Chimera: An integrated modelling tool for ecological risk assessment. Funding by Cefic LRI. 120000 € **Project leader**
- 2013: BEF in food webs. Postdoc project (V. Radchuk). Funding by the German center for biodiversity research (iDiv). 100000 €. **Co-promoter**
- 2012-2016: Oil spill effects in the Arctic: a modelling approach (*Ph.D* Lisette De Hoop). Funding by Statoil (Norway). 120000 €. **Co-promoter**

Invited talks in the last 5 years

- 2025: Is environmental change research a mess? Okinawa Institute of Science and Technology (OIST, Japan). Online talk.
- 2025: Ecological modeling of communities. Ghent University (Belgium).
- 2024: Patch occupancy of metacommunities. Institute of Advanced Study (IAS), University of Amsterdam (the Netherlands)
- 2024: Ecological networks and complex systems. Université Gustave Eiffel (France)
- 2024: Patch occupancy of metacommunities. Applied mathematics department at UGent, faculty of bioscience engineering.
- 2023: Communities and environmental change: dynamical and topological aspects. CNRS, Moulis (France) and McGill University (Canada)