

Matthias Grenié

Assistant Professor

Curriculum Vitae

May 2025

📍 Université Grenoble Alpes (UGA), Laboratoire d'Écologie Alpine (LECA)
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Academic Education

2016-2020	PhD in Ecology Montpellier, France ➤ Supervised by Pr. François Munoz and Dr. Cyrille Violle Title: 'Outside the norm: deviation from ecological optimality and functional originality'	École Doctorale 584 GAIA, Univ. Montpellier
2013-2015	MSc. in General Biology Lyon, France	École Normale Supérieure de Lyon
2012-2013	Bsc. in General Biology Lyon, France	École Normale Supérieure de Lyon
2010-2012	Prep. Classes for 'Grandes Écoles' Paris, France ➤ Biology, Geology, Mathematics, Physics, and Chemistry	Lycée Saint-Louis

Academic Experience

Sept. 2023-present	Assistant Professor Grenoble, France ➤ Appointed at the Pharmacy Faculty to teach Applied Statistics	Université Grenoble Alpes (UGA), Laboratoire d'Écologie Alpine (LECA)
Oct. 2020-Aug. 2023	Postdoctoral Researcher Leipzig, Germany ➤ Supervised by Dr. Marten Winter on the functional biogeography of alien plants	German Center for Integrative Biodiversity Research (iDiv) / Leipzig University
2016-2020	PhD Student Montpellier, France ➤ Supervisors: Pr. François Munoz and Dr. Cyrille Violle . Independent PhD funding	Univ. Montpellier / CEFE
Feb. 2015-June 2015	Master Intern Kourou, French Guiana, France ➤ Supervisor: Dr. Bruno Hérault on intraspecific variability in tropical trees growth in function of functional traits	EcoFOG
Sept. 2014-Dec. 2014	Master Intern Montpellier, France ➤ Supervisor: Dr. Ophélie Ronce on matrix population models	ISEM, University of Montpellier
Feb. 2014-July 2014	Master Intern Bloomington, IN, USA ➤ Supervised by Dr. Jean-François Goût in Michael Lynch's lab on trait motifs in the <i>Paramecium</i> complex	Indiana University
June 2013-Aug. 2013	Bachelor Intern Paris, France ➤ Supervisors: Dr. Éric Baptiste and Prof. Philippe Lopez on sequence similarity networks of the metabolic pathways of <i>Chlamydomonas reinhardtii</i> in function of their origin	Université Pierre et Marie Curie Paris 6

Scientific Supervision

Sept. 2023-present	Member of the PhD Advisory Committee of Marianne Tzivanopoulos
2022-2023	Member of the PhD Advisory Committee of Rachel Souza Ferreira
Apr. 2019 - June 2019	Co-supervised First year Master's Student Nathan Mazet Internship on global dietary strategies for birds, main supervisor: Pr. Jean-Yves Barnagaud
Apr. 2018 - May 2018	Supervised First year Master's Student Charlotte Guérineau Internship on functional rarity of diverse taxonomic groups (birds, plants, fishes, and soil bacteria) over France

Scientific Service

2022-now	Software reviewer for rOpenSci For the npi package
2017-now	Reviewer for Scientific Journals (see Publons profile) For <i>Ecology Letters</i> , <i>Functional Ecology</i> , <i>Biological Reviews</i> , <i>PeerJ</i> , <i>Biological Conservation</i> , <i>New Phytologist</i> , <i>Journal of Applied Ecology</i> , and <i>Journal of Biogeography</i>
2022-2023	Co-founder and active member of iCode Coding club of iDiv. Group for exchanges about R and programming practices at iDiv
2022-2023	Post-doctoral researchers representative (130 people) iDiv Council , the main advisory council of iDiv
2021-2023	Organizer of the biweekly sDiv lab meetings sDiv team
2018-2020	Representative of PhD students (70 people) CEFE lab council, the main governing body of the lab
2018	Co-organizer of half-day workshop on Open Access Practices An event on how to make your articles accessible, organized for ~50 people of the CEFE in Montpellier
2017	Co-organizer of Junior Conference 'Models in Ecology and Evolution' A junior conference organized yearly in Montpellier with ~100 people attending from Masters to Post-docs
2016-2020	Founder and main coordinator of the CEFE R User Group Monthly meeting for people who are using R at CEFE with presentations and practical examples

Scientific Projects

2024-now	sFragment sDiv group ➤ early career researchers' sDiv synthesis group to test the relationship between fragmentation and functional diversity of birds and trees. Group member as expert on functional traits	sDiv
2022-now	IMPACTS group ➤ Synthesis group on the temporal trends and drivers of terrestrial biodiversity in France. Group member. Co-head of data management	CESAB (French Biodiversity Synthesis Centre)
2017-now	Functional Rarity in Ecology and Evolution group (FREE) ➤ Core member of the group as the developer of the <code>funrar</code> package that computes functional rarity indices. Author of several core papers for the group. Led 3 papers attached within the group	CESAB
2021-now	Global Naturalized Alien Flora (GloNAF) ➤ Contributor to the regular meetings. Currently leading one article for the group	GloNAF

Funding

2023-now	Funded Project ➤ Co-author and Co-PI of the project led by Dr. Qiang Yang on the impact of naturalized plant species on plant-pollinator networks across elevational gradients	Flexpool (internal iDiv) 10k€
2022-now	Funded Project ➤ Co-author and Co-PI of the project led by Dr. Bettina Ohse on the link between functional traits and demographic rates of trees	Flexpool (internal iDiv) 10k€

Sept. 2016

Doctoral Scholarship

École Normale Supérieure de Lyon

► Specific Doctoral Scholarship for Students of the ENS de Lyon

Scientific Contributions

📄 15 publications (5 as first author). 🗣️ 457 citations (Google Scholar). 📊 h-index 10 (Google Scholar). 📦 6 R packages

Publications**Published**

1. Staude, I. R., **Grenié, M.**, Thomas, C. D., Kühn, I., Zizka, A., Golivets, M., Ledger, S. E. H., & Méndez, L. (2025). Many non-native plant species are threatened in parts of their native range. *New Phytologist*, n/a(n/a). <https://doi.org/10.1111/nph.70193>
2. Pili, A. N., Leroy, B., Measey, J. G., Farquhar, J. E., Toomes, A., Cassey, P., Chekunov, S., **Grenié, M.**, van Winkel, D., Maria, L., Diesmos, M. L. L., ... Chapple, D. G. (2024). Forecasting potential invaders to prevent future biological invasions worldwide. *Global Change Biology*, 30(7), e17399. <https://doi.org/10.1111/gcb.17399>
3. Cutts, V., Hanz, D. M., Barajas-Barbosa, M. P., Schrod, F., Steinbauer, M. J., Beierkuhnlein, C., Denelle, P., Fernández-Palacios, J. M., Gaüzère, P., **Grenié, M.**, Irl, S. D. H., ... Algar, A. C. (2023). Links to rare climates do not translate into distinct traits for island endemics. *Ecology Letters*, 26(4), 504–515. <https://doi.org/10.1111/ele.14169>
4. **Grenié, M.**, & Gruson, H. (2023). Fundiversity: A modular R package to compute functional diversity indices. *Ecography*, 2023(3), e06585. <https://doi.org/10.1111/ecog.06585>
5. Munoz, F., Klausmeier, C. A., Gaüzère, P., Kandlikar, G., Litchman, E., Mouquet, N., Ostling, A., Thuiller, W., Algar, A. C., Auber, A., **Grenié, M.**, ... Kraft, N. J. B. (2023). The ecological causes of functional distinctiveness in communities. *Ecology Letters*, 26(8), 1452–1465. <https://doi.org/10.1111/ele.14265>
6. Schellenberger Costa, D., Boehnis, G., Freiberg, M., Govaerts, R., **Grenié, M.**, Hassler, M., Kattge, J., Muellner-Riehl, A. N., Rojas Andrés, B. M., Winter, M., Watson, M., ... Wirth, C. (2023). The big four of plant taxonomy – a comparison of global checklists of vascular plant names. *New Phytologist*, 240(4), 1687–1702. <https://doi.org/10.1111/nph.18961>
7. Gaüzère, P., Denelle, P., Fournier, B., **Grenié, M.**, Delalandre, L., Münkemüller, T., Munoz, F., Violle, C., & Thuiller, W. (2022). The functional trait distinctiveness of plant species is scale dependent. *Ecography*, in press.
8. **Grenié, M.**, Berti, E., Carvajal-Quintero, J., Dädlow, G. M. L., Sagouis, A., & Winter, M. (2022). Harmonizing taxon names in biodiversity data: A review of tools, databases and best practices. *Methods in Ecology and Evolution*, 2041–210X.13802. <https://doi.org/10.1111/2041-210X.13802>
9. Jurburg, S. D., Buscot, F., Chatzinotas, A., Chaudhari, N. M., Clark, A. T., Garbowski, M., **Grenié, M.**, Hom, E. F. Y., Karakoç, C., Marr, S., Neumann, S., ... Heintz-Buschart, A. (2022). The community ecology perspective of omics data. *Microbiome*, 10(1), 225. <https://doi.org/10.1186/s40168-022-01423-8>
10. Mouillot, D., Loiseau, N., **Grenié, M.**, Algar, A. C., Allegra, M., Cadotte, M. W., Casajus, N., Denelle, P., Guéguen, M., Maire, A., Maitner, B., ... Auber, A. (2021). The dimensionality and structure of species trait spaces. *Ecology Letters*, 24(9), 1988–2009. <https://doi.org/10.1111/ele.13778>
11. **Grenié, M.**, Violle, C., & Munoz, F. (2020). Is prediction of species richness from stacked species distribution models biased by habitat saturation? *Ecological Indicators*, 111, 105970. <https://doi.org/10.1016/j.ecolind.2019.105970>
12. Loiseau, N., Mouquet, N., Casajus, N., **Grenié, M.**, Guéguen, M., Maitner, B., Mouillot, D., Ostling, A., Renaud, J., Tucker, C., Velez, L., ... Violle, C. (2020). Global distribution and conservation status of ecologically rare mammal and bird species. *Nature Communications*, 11(1), 5071. <https://doi.org/10.1038/s41467-020-18779-w>
13. Barnagaud, J.-Y., Mazet, N., Munoz, F., **Grenié, M.**, Denelle, P., Sobral, M., Kissling, W. D., Sekercioglu, Ç. H., & Violle, C. (2019). Functional biogeography of dietary strategies in birds. *Global Ecology and Biogeography*, 28(7), 1004–1017. <https://doi.org/10.1111/geb.12910>

14. Joffard, N., Massol, F., **Grenié, M.**, Montgelard, C., & Schatz, B. (2019). Effect of pollination strategy, phylogeny and distribution on pollination niches of Euro-Mediterranean orchids. *Journal of Ecology*, 107(1), 478–490. <https://doi.org/10.1111/1365-2745.13013>
15. **Grenié, M.**, Mouillot, D., Villéger, S., Denelle, P., Tucker, C. M., Munoz, F., & Violle, C. (2018). Functional rarity of coral reef fishes at the global scale: Hotspots and challenges for conservation. *Biological Conservation*, 226, 288–299. <https://doi.org/10.1016/j.biocon.2018.08.011>
16. Munoz, F., **Grenié, M.**, Denelle, P., Taudière, A., Laroche, F., Tucker, C., & Violle, C. (2018). Ecolottery: Simulating and assessing community assembly with environmental filtering and neutral dynamics in R. *Methods in Ecology and Evolution*, 9(3), 693–703. <https://doi.org/10.1111/2041-210X.12918>
17. **Grenié, M.**, Denelle, P., Tucker, C. M., Munoz, F., & Violle, C. (2017). Funrar: An R package to characterize functional rarity. *Diversity and Distributions*, 23(12), 1365–1371. <https://doi.org/10.1111/ddi.12629>
18. Violle, C., Thuiller, W., Mouquet, N., Munoz, F., Kraft, N. J. B., Cadotte, M. W., Livingstone, S. W., **Grenié, M.**, & Mouillot, D. (2017). A Common Toolbox to Understand, Monitor or Manage Rarity? A Response to Carmona et al. *Trends in Ecology & Evolution*, 32(12), 891–893. <https://doi.org/10.1016/j.tree.2017.10.001>

Preprints

1. **Grenié, M.**, Bruelheide, H., Dawson, W., Essl, F., Kleunen, M. van, Kühn, I., Kreft, H., Pyšek, P., Weigelt, P., & Winter, M. (2024). *Gaps in global alien plant trait data and how to fill them*.

R packages

- **funrar** (creator and maintainer)
Compute functional rarity indices, major tool for the work of the FREE CESAB group
[published paper](#) – [CRAN](#) – [GitHub](#)
- **ecolottery** (co-creatore)
efficient simulation of community assembly processes, including both neutral and niche processes
[published paper](#) – [CRAN](#) – [GitHub](#)
- **fundiversity** (co-creator and maintainer)
compute functional diversity indices in an efficient way, modular, with modern computation features out-of-the-box (parallelization, memoization)
[published paper](#) – [CRAN](#) – [GitHub](#)
- **funbiogeo** (co-creator and maintainer)
ease functional biogeography analyses, developed within FREE CESAB group
[GitHub](#)
- **rtaxref** (creator and maintainer)
access the data of the French Taxonomic Reference (TAXREF) API
[GitHub](#)
- Significant contributions to other R packages: **taxize** (extract and standardize taxonomic data), **ggfortify** (simplified and automated plotting), et **traitdataform** (metadata writing help for functional traits)

Conference Proceedings

1. **Grenié, M.**, Berti, E., Carvajal-Quintero, J., Winter, M., & Sagouis, A. (2021). Matching Species Names Across Biodiversity Databases: Sources, tools, pitfalls and best practices for taxonomic harmonization. *Biodiversity Information Science and Standards*, 5, e75359. <https://doi.org/10.3897/biss.5.75359>

Invited Talks

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| Dec. 2021 | Seminar of Holger Kreft's lab on 'Navigating the landscape of taxonomic harmonization'
University of Göttingen, Germany |
| May 2022 | Invited talk to the 3rd meeting of Data to Knowledge in Agronomy and Biodiversity (D2KAB) on 'Taxonomic Databases of Plants and Animals'
Paris/remotely |

Conference Talks

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| Sep 2022 | A barrier to global plant invasion ecology: gaps in trait availability for alien species
Neobiota 2022, Tartu, Estonia |
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Jul 2022	A barrier to global plant invasion ecology: gaps in trait availability for alien species BES Macro 2022, Online
Apr 2022	A barrier to global plant invasion ecology: gaps in trait availability for alien species iDiv Conference 2022, Leipzig, Germany
Aug 2021	Navigating the landscape of taxonomic harmonization: data, tools, and best practices GfÖ conference (German Speaking Ecological Society Meeting) 2021
Jul 2021	Navigating the landscape of taxonomic harmonization: data, tools, and best practices BES Macro 2021, Online
Oct 2018	Functional rarity of coral reef fishes at the global scale: Hotspots and challenges for conservation French Ecological Society Meeting (SFÉcologie) 2018, Rennes, France
Jul 2018	Predicting Species Richness with unicorns or why should we discuss the use of thresholds? BES Macro (British Ecological Society Macroecology Special Interest Group Meeting) 2018, Saint-Andrews, Scotland
Feb 2017	Functional rarity of coral reef fishes across space (Best Presentation Award) Young Natural History Scientists' Meeting, Paris, France
Sep 2016	A case study of Functional Rarity: worldwide coral reef fishes EcoSummit 2016, Montpellier, France

Blog posts

1. **Grenié, M.** (2022, December 6). How to Save Ggplot2 Plots in a targets Workflow? Retrieved February 3, 2023, from <https://ropensci.org/blog/2022/12/06/save-ggplot2-targets/>
2. Salmon, M., **Grenié, M.**, & Gruson, H. (2022, June 16). Why You Should (or Shouldn't) Build an API Client. Retrieved February 16, 2023, from <https://ropensci.org/blog/2022/06/16/publicize-api-client-yes-no/>
3. **Grenié, M.**, Berti, E., Carvajal-Quintero, J., Dädlow, G. M. L., Sagouis, A., & Winter, M. (2022, March 2). Best practices for taxonomic harmonization, an overlooked yet crucial step in biodiversity analyses. Retrieved May 27, 2022, from <https://methodsblog.com/2022/03/02/best-practices-for-taxonomic-harmonization-an-overlooked-yet-crucial-step-in-biodiversity-analyses/>
4. **Grenié, M.**, & Gruson, H. (2020, July 15). Community Captioning of rOpenSci Community Calls. Retrieved May 27, 2022, from <https://ropensci.org/blog/2020/07/15/subtitles/>
5. **Grenié, M.**, & Gruson, H. (2019, June 4). Access Publisher Copyright & Self-Archiving Policies via the 'SHERPA/RoMEO' API. Retrieved May 27, 2022, from <https://ropensci.org/blog/2019/06/04/rromeo/>

Teaching Experience

I taught ~130 hours on Ecology, Biodiversity Statistics, and R programming from 2nd year of Bachelor to PhD students (details below).

I am a certified [Carpentries](#) instructor, focusing on **R programming** and **Data Visualization**.

At CEFE and iDiv, I've (co-)founded R User Groups to form a community practice

I've organized regular 1h meet-ups on various R topics.

Teaching detail

Course Name	Class Type	Year(s)	Level	Total time
Descriptive Statistics with R (UM)	Pract. Sess.	2016/2017	Bachelor's (2nd yr)	50h
Functional Biogeography with R (UM, material)	Pract. Sess.	2017/2018	Master's (2nd yr)	8h
Practical session in Functional Ecology (UM)	Pract. Sess.	2018	Bachelor's (3rd yr)	15h
Guest Lecture on Biodiversity Facets (UL)	Lecture	2021/2022	Master's (1st yr)	6h
Biodiversity Facets with R (UL, material)	Pract. Sess.	2021/2022	Master's (1st yr)	12h
Group project on Biodiversity Facets (UL)	Student Project	2021	Master's (1st yr)	20h
Introduction to git and GitHub (UL/iDiv, material)	Pract. Sess.	2022	Masters, PhD students, and postdocs	10h
Workshop on Functional Diversity and Rarity, (@CESAB, material)	Lecture and Pract. Sess.	2022	Masters, PhD students, postdocs, & reseachers	4h
Guest Lecture on Taxonomic Harmonization @NFDI4Biodiversity Winter School on Data Management in Ecology and Evolution	Lecture	2022	Masters, PhD students, and postdocs	2h

Skills

Languages

French [native speaker]; English [C2, fluent speaker and scientific English]; Spanish [B1-B2, daily life]; German [A2-B1]; Chinese [A2-B1]; Japanese [A2]

Programming languages

-  **R** • Best software development practices (unit tests with `testthat`, pkgdown web site, continuous integration/continuous deployment, CRAN submission) • data visualization (advanced `ggplot2` and extensions) • spatial data wrangling [`terra` rasters, `sf` vectors, PostGIS database, and interactions]
-  **Python** • Object Oriented Programming • data wrangling with `pandas`
-  **SQL** database interactions • high performance queries • interaction with R • spatial database PostgreSQL/PostGIS
-  **High Performance Cluster** job submission on SLURM/SGE • array jobs and complex queries
- **git** version control • git flow method • collaborative development with  GitHub
- Basic knowledge of **Julia**

Statistics and Modelling

- Null models and permutation models for biodiversity
- Generalized Linear Mixed Models
- *Machine Learning/Artificial Intelligence: Random Forest, Support Vector Machine*
- Stage-structured population models, Lotka-Volterra models through Mathematica