

Matthias Grenié

Postdoctoral Researcher

Curriculum Vitae
April 2023

📍 German Centre for Integrative Biodiversity Research (iDiv), Halle-Jena-Leipzig
🏠 rekyt.github.io
☎ +49 341 9733176
✉ matthias.grenie@idiv.de
🐦 @LeNematode
🔗 Rekyt
🔑 fz1_d7QAAAAJ
📄 Matthias-Grenie
🆔 0000-0002-4659-7522

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

Oct. 2020-present	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

2022-present	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 *Ecology Letters*, *Functional Ecology*, *Biological Reviews*, *PeerJ*, *Biological Conservation*, *New Phytologist*, *Journal of Applied Ecology*, and *Journal of Biogeography*

2022-now **Co-founder and active member of iCode**
 Coding club of iDiv. Group for exchanges about R and programming practices at iDiv

2022-now **Post-doctoral researchers representative (130 people)**
[iDiv Council](#), the main advisory council of iDiv

2021-now **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

2022-now **IMPACTS group** CESAB (French Biodiversity Synthesis Centre)
 ➤ Synthesis group on the temporal trends and drivers of terrestrial biodiversity in France. Group member. Co-head of data management

2017-now **Functional Rarity in Ecology and Evolution group (FREE)** CESAB
 ➤ Core member of the group as the developer of the `funrar` package that computes functional rarity indices. Author of several core papers for the group. Led 3 papers attached within the group

2021-now **Global Naturalized Alien Flora (GloNAF)** GloNAF
 ➤ Contributor to the regular meetings. Currently leading one article for the group

Funding

2023-now **Funded Project** Flexpool (internal iDiv) 10k€
 ➤ 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

2022-now **Funded Project** Flexpool (internal iDiv) 10k€
 ➤ Co-author and Co-PI of the project led by **Dr. Bettina Ohse** on the link between functional traits and demographic rates of trees

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

Accepted

1. Munoz, F., Klausmeier, C., . . . , **Grenié, M.**, Loiseau, N., Mahaut, L., Maire, A., Mouillot, D., Violle, C., & Kraft, N. (2023). The ecological causes of functional distinctiveness in communities. *Accepted in Ecology Letters*. <https://doi.org/10.22541/au.166488862.28762630/v1>

Published

1. 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*, n/a(n/a). <https://doi.org/10.1111/ele.14169>
2. **Grenié, M.**, & Gruson, H. (2023). Fundiversity: A modular R package to compute functional diversity indices. *Ecography*, n/a(n/a), e06585. <https://doi.org/10.1111/ecog.06585>
3. 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.
4. **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>
5. 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>
6. 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>
7. **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>
8. 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, 1), 5071. <https://doi.org/10.1038/s41467-020-18779-w>
9. 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>
10. 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>
11. **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>
12. 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>
13. **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>
14. 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>

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-creator)
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

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

Sep 2022 **A barrier to global plant invasion ecology: gaps in trait availability for alien species**
Neobiota 2022, Tartu, Estonia

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/romeo/>

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






UM: University of Montpellier; UL: University of Leipzig

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