François Leroy

Keywords: Macroecology, Numerical Ecology, Modeling, Machine Learning

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Website
GitHub (FrsLry)

Experience

2020-2024 Ongoing — **PhD. Modeling spatio-temporal biodiversity changes across scales**, *Faculty of Environmental Sciences, CZU, dept. of Spatial sciences*, Prague.
- Modeling biodiversity using machine learning, frequentists and bayesian methods
- Programming
- English communication skills (both oral and writing)
- Supervised by Dr. Petr Keil

2018–2020 — **Marine Sciences MSc**, *Sorbonne University*, Paris (France, graduated September 2020).
Numerical Ecology, modelling, geostatistics, GIS, oceanography, marine ecology, biogeochemistry, database management

2017–2018 — **3rd year of Bachelor of Science**, *South Brittany University*, Vannes (France).
Specialized in Coastal Ecosystems and Management, GIS

2015–2017 — **1st and 2nd year of Bachelor of Science**, *Rouen Normandy University*, Rouen (France).
Specialized in Botanic

Internships

2020 (6 months) — **Community modelling** , *DYNECO-LEBCO, IFREMER*, Brest (France).
- **Objective:** develop a simulation tool to assess dynamic communities accompanying biogenic reefs built by *Sabellaria alveolata* (Linnaeus, 1767)(honeycomb worm)
- Explore the community topology using qualitative modelling (Dambacher *et al.* 2002, Marzloff *et al.* 2016)
- Infer a Dynamic Bayesian Network (BN) from a large database (REEHAB project)

2019 (2 months) — **Numerical ecology study**, *UMR BOREA - MNHN - LOCEAN* , Paris (France).
- **Objective:** spatiotemporal recruitement variability of *Sicyopterus lagocephalus* (Pallas 1770)(Teleostei : Gobiidae : Sicydiinae), amphidromous species of the Indian Ocean
- Pelagic Larval Duration (PLD) determination by otolithometry
- Statistical analysis to observe spatial (rivers) and temporal (season/year) differences of those PLD
- Larval dispersion modelling using the Ichthyop lagrangian model in backward to assess larval provenance

2018 (2 months) — **Ecological study**, *Géoarchitecure Laboratory*, Vannes (France).
- **Objective:** use the opportunistic feature of the European shag to assess fish biodiversity
- Rejection pellets dissection and harvesting
- Fish identification using otoliths, data analysis

2017 (5 months) — **Mapping, Photogrammetry**, *Géosciences Océans Laboratory*, Vannes (France).
- **Objective:** study the coastal dynamic of a beach in order to distribute sediment at the most relevant place
- Three dimensional modelling of a beach to observe its evolution
- Production of DEM (*i.e.* Digital Elevation Model) to exploit in GIS software

Other experiences

2022 (1 months) — **Visiting Ohio State University**, *Jarzyna lab*, Colombus, Ohio.
- Collaborating with Dr. Marta Jarzyna on the spatial scaling of abundance-based biodiversity trends

2022 (1 week) — **HMSC course attendance**, *Jyväskylä summer school*, Jyväskylä , Finland.
- Summer school on Hirearchical Modeling of Species Community

2021 (1 semester) — **Machine Learning with R**, *Faculty of Mathematics and Physics*, Charles University, Prague.
- Going through all Machine Learning algorithms, from Support Vector Machines to Neural Networks

Computer skills

Basic Julia, Shell, MATLAB, HTML5, CSS

Intermediate Python, MySQL, Adobe Creative Cloud, Agisoft Metashape

Advanced R, Git, QGIS, ArcGIS, LaTeX

Teaching

2022 Teaching assistant in spatial ecology and macroecology (Github repository)

2021 Teaching assistant in GIS using ArcGIS

Talks

Conference *Vancouver, BC* 2022-06-05

Untangling biodiversity changes across a continuum of spatial scales, *International Biogeography Society conference*, Slides.

Content:

- Spatial scaling of species richness trends
- Birds of the Czech Republic
- Positive and stronger trend of species richness with increasing spatial scale
- Explained by spatial scaling of colonization, extinction and persistence

Conference *Online* 2021-10-23

Modeling biodiversity changes across a continuum of spatial scales, *International Biogeography Society conference (Early career)*, Slides.

Content:

- Using machine learning methods to model species richness trends across spatial scales
- Using models output to highlight the influence of spatio-temporal grains
- Taxon: birds
- Study extent: Czech Republic

Conference *Online* 2021-09-01

Spatio-temporal scaling of biodiversity trends, *GfÖ Virtual Annual Meeting*, Slides.

Content:

- Pilot results of my PhD
- Highlighting the spatial scaling of biodiversity trends
- Taxon: birds
- Study extent: Czech Republic

Seminar *Prague* 2020-07-01

Introduction to Reproducible Science: Version Control using Git, *CZU*, Slides.

Content:

- Why is reproducible science essential?
- What is a version control software?
- How to use git and github from the command line?
- How to share your work with Github?

Publications

François Leroy, Jiri Reif, David Storch, and Petr Keil. How has bird biodiversity changed over time? A review across spatio-temporal scales. *EcoEvoRxiv (preprint)*, 2022. URL: https://ecoevorxiv.org/jhr6v/, doi:10.32942/osf.io/jhr6v.

Vítězslav Moudrý, Kateřina Gdulová, Lukáš Gábor, Eliška Šárovcová, Vojtěch Barták, Francois Leroy, Olga Špatenková, Duccio Rocchini, and Jiří Prošek. Effects of environmental conditions on ICESat-2 terrain and canopy heights retrievals in Central European mountains. *Remote Sensing of Environment*, 279:113112, September 2022. URL: https://www.sciencedirect.com/science/article/pii/S0034425722002267, doi:10.1016/j.rse.2022.113112.