François Leroy

Data Science, Machine Learning, Deep Learning, Statistical Modelling, Geospatial analyses, Remote sensing

466 W 2nd Av.
Columbus, OH 43201, USA
+420732642193
francois.libert.leroy@gmail.com
https://github.com/FrsLry

Experience

2024-Ongoing **Postdoctoral researcher - Using Artifical Inteligence to understand spatio-temporal changes of biodiversity**, *The Ohio State University, dept. of Evolution, Ecology and Organismal Biology*, Columbus, Ohio.

- Creating Hierarchical Neural Networks from a Bayesian framework
- Tailoring loss functions to infer distribution parameters
- Creating simulated data to test the model
- Hired for the project ABC Global Center, collaborating with computer scientists from MIT, McGill University, Mila institute (Montreal, Canada)

2020-2024 **PhD. - Spatial scaling and decomposition of macroecological changes**, *Faculty of Environmental Sciences, CZU, dept. of Spatial sciences*, Prague.

- Using big data to model biodiversity changes across spatial scales
- Using model optimisation and selection on various machine learning algorithms (Random Forest, BRT, XGBoost, linear models...)
- Available here

Projects

2020-2025

- Hierarchical models, mixed models using Bayesian inference for time-series analyses, Generalized Additive Models, Hidden Markov Models (article)
- Comparing model performance of Random Forest, Boosted Regression Trees, XGBoost and GLM using repeated cross-validation (article)
- Feature importance and partial dependence from CART-based algorithm to explain measurement error of NASA's ICESat-2 (article)
- Full publication list: here

Teaching

2021-2024

- Statistical ecology and macroecology
- Version Control using Git and Github
- GIS and spatial analysis

Education

2021 (1 semester) **Machine Learning**, *Faculty of Mathematics and Physics, UFAL, Charles Univesity*, Prague.
Studying all Machine Learning algorithms, from Support Vector Machines to Neural Networks

2020-2024 **PhD. - Spatial scaling and decomposition of macroecological changes**, Prague.

2018-2020 **Marine Sciences MSc**, *Sorbonne University*, Paris.
Numerical Ecology, modelling, geostatistics, GIS, oceanography, marine ecology, biogeochemistry, database management

2015-2018 **Bachelor of Science**, *South Brittany University*, Vannes (France).
Specialized in Coastal Ecosystems and Management, GIS

Modelling skills

Deep Learning Multilayer Perceptron, Convolutional/Recurrent/Hierarchical Neural Networks

Machine Learning Classification and Regression Tree based algorithms (RF, BRT, GBM, XGBoost), Support Vector Machines, K-Nearest Neighbors, Naive Bayes, Linear Models (GLM, Mixed Models, polynomial regressions...), Hierarchical modelling

Others Generalized Additive Models, Bayesian inference with MCMC algorithms, Bayesian Networks, Hidden Markov Models, Feature engineering, Spatially explicit models, Time series analysis, Multivariate analysis, Multiscale analysis, Clustering, Ordination, Model: optimisation (e.g. regularization), prediction, scalability

Programming skills

Advanced	Python, R, Git, QGIS, ArcGIS, LaTeX
Intermediate	Shell, MySQL
Basic	Julia, MATLAB, HTML5, CSS

Internships and others

2024 (1 semester) **Deep Learning**, *Faculty of Mathematics and Physics*, Charles University, Prague.
- Going through all Deep Learning algorithms

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

2020 (6 months) **Community Modelling**, *DYNECO-LEBCO, IFREMER*, Brest (France).
- Bayesian networks and qualitative modelling to assess the impact of environmental changes on the benthic communities

2019 (2 months) **Numerical Ecology**, *UMR BOREA - MNHN - LOCEAN*, Paris (France).
- Ordinations, ANOVA, and Lagrangian ocean analysis

2017 (5 months) **Cartography, Photogrammetry**, *Geosciences Ocean Laboratory*, Vannes (France).
- Study coastal dynamics by production of DEMs (Digital Elevation Models) for GIS analysis

HIghlighted Talks and Conferences

Invited speaker 2024-02-16 **Introduction to Reproducible Science: Version Control using Git and Github**, *Ecoinformatics IAVS*, Online, Slides.

Conference 2023-08-10 **Decomposing abundance change to recruitment and loss: analysis of the North-American avifauna**, *Ecological Society of America*, Portland, OR, Slides.

Conference 2022-06-05 **Untangling biodiversity changes across a continuum of spatial scales**, *International Biogeography Society conference*, Vancouver, BC, Slides.

Conference 2021-10-23 **Modeling biodiversity changes across a continuum of spatial scales**, *International Biogeography Society conference (Early career)*, Online, Slides.

Scientific Referees

Dr. **Marta Jarzyna**, Ohio State University, ☎+1 (978) 587-5938, jarzyna.1@osu.edu

Dr. **Petr Keil**, Czech University of Life Sicences, ☎+420 224382659, keil@fzp.czu.cz

Dr. **Martin Marzloff**, Ifremer, ☎+332 98224327, Martin.Marzloff@ifremer.fr

Dr. **Vítězslav Moudrý**, Czech University of Life Sicences, ☎+420 224382653, moudry@fzp.czu.cz