

Elisa Thouverai



Employment History

- January 01, 2024 – present  **Postdoc Position** *Department of Life Sciences, University of Trieste, Trieste, Italy*
- Development of a satellite-based monitoring system for crops and agricultural practices identification.
- November 1, 2020 – January 31, 2024  **PhD candidate** *BIOME Lab, Department of Biological, Geological and Environmental Sciences, Alma Mater Studiorum University of Bologna, via Irnerio 42, 40126 Bologna, Italy*
- Development of algorithms for the monitoring of heterogeneity and other key drivers of biodiversity in space and time from satellite;
- Supervision of master's theses and tutoring activities with a focus on biodiversity, remote sensing, and machine learning;
- Active participation in international conferences with oral presentations and posters;
- Organization of conferences and workshops.
- October 1, 2023 – December 31, 2023  **Trainee** *Department of Spatial Sciences, Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Kamýcká 129, 165 00 Praha-Suchdol, Czech Republic*
- Development of a new method for creating maps depicting spatiotemporal heterogeneity patterns.
- March 1, 2019 – July 20, 2020  **Trainee** *Department of Life Sciences, University of Trieste, via Giorgieri 10, 34127 Trieste, Italy*
- Creation of the R package Rarefy, encompassing functions for calculating taxonomic, phylogenetic, and functional rarefaction curves.
- April 1, 2019 – June 30, 2019  **Trainee** *Muséum national d'Histoire naturelle, lab CESCO, Paris, France*
- Study and development of algorithms for calculating metrics related to taxonomic, phylogenetic, and functional diversity.
- November, 2015 – December 2016  **Trainee** *Osteolab, Clinical Department of Medical, Surgical and Health Science, University of Trieste, Trieste, Italy*
- Conducted experiments testing the effects of the bioflavonoid biochanin A on tumor cells;
- Acquired valuable expertise in cell culture techniques, microscopy, and data analysis.

Education

- 2020 – 2024  **PhD cum Laude in Earth, Life and Environmental Sciences, cycle 36, Department of Biological, Geological and Environmental Sciences, Alma Mater Studiorum University of Bologna**
Thesis title: *Spatiotemporal algorithms for measuring ecosystem heterogeneity from space.*
Supervisor: *Prof. Duccio Rocchini*
- 2017 – 2020  **M.Sc. Global Change Ecology, University of Trieste**
Thesis title: *Development of a new R package (Rarefy) for the calculation of spatially explicit functional and phylogenetic rarefaction curves.*
Supervisors: *Prof. Giovanni Bacaro, Prof. Sandrine Pavoine, PhD Enrico Tordoni*
- 2014 – 2017  **B.S. Biology, University of Trieste**
Thesis title: *Effetti del bioflavonoide biochanina A sulla crescita tumorale in un modello di adenocarcinoma mammario ER-.*
Supervisor: *Prof. Vanessa Nicolin*
- 2009 – 2014  **Diploma Liceo Scientifico Tecnologico, Liceo Scientifico M. Grigoletti, Pordenone (Italy)**

Skills

- Languages  Mother tongue: Italian
Strong reading, writing and speaking competencies for English
- Coding  C, C++, Python, Perl, R, JavaScript, Latex
- Remote Sensing  Image Processing and Analysis (GIS, R, GEE)
- Driving Licence  B

Didactics

Seminars

- 31/05/2024  **Google Earth Engine using Javascript and rgee**
2 hours workshop
Cutting vEdge tools, cycle of practical seminars
Ecoinformatics group, IAVS
- 03/09/2023  **Introduction to the 'rgee' package in R**
8 hour workshop
65th IAVS, Coffs Harbour (AU)

Tutoring Activity

- 2022  **Introduction to Ecological Remote Sensing in R**, <https://www.physalia-courses.org/>
- 2021  **Biometria e Statistica (Modulo 2)**, Alma Mater Studiorum University of Bologna
-  **Telerilevamento Geo-Ecologico**, Alma Mater Studiorum University of Bologna

Thesis and Training Supervision

- 2024  **M.Sc. Thesis**
Title: "Maps for everyone - Machine learning methods to change colours for colour blindness"
Student: Emma Donini
Supervisor: Prof. Duccio Rocchini
- 2023  **M.Sc. Thesis**
Title: "Testing Rao's quadratic entropy index facing different sensors and scales"
Student: Giovanni Andrea Nocera
Supervisor: Prof. Duccio Rocchini
- 2022  **M.Sc. Thesis**
Title: "Biogeographical patterns of plant phylogenetic diversity at the European scale"
Student: Sofia Prandelli
Supervisor: Prof. Duccio Rocchini
-  **M.Sc. Thesis**
Title: "Temporal beta-diversity with rasterdiv R package: measuring temporal landscape heterogeneity with remote sensing data"
Student: Massimiliano Apruzzese
Supervisor: Prof. Duccio Rocchini
- 2021  **M.Sc. Thesis**
Title: "Helical graphs to track ecological changes"
Student: Emanuela Cosma
Supervisor: Prof. Duccio Rocchini
-  **M.Sc. Thesis**
Title: "Remotely sensed parametric Rao's Q profiles for monitoring ecosystem changes in space and time"
Student: Mariasole Galfrè
Supervisor: Prof. Duccio Rocchini
-  **M.Sc. Thesis**
Title: "rasterdiv: an R package for measuring heterogeneity from global to local scale"
Student: Elisa Marchetto
Supervisor: Prof. Duccio Rocchini
-  **M.Sc. Thesis**
Title: "Measuring the heterogeneity of an alpine area by the rasterdiv package"
Student: Filippo Messori
Supervisor: Prof. Duccio Rocchini

Congress Attendance

- 17-21/06/2024  **7th European Congress of Conservation Biology (ECCB)**
Bologna (IT)
Oral Communication: "Flourishing diversity along sacred paths: unveiling habitat conservation through remote sensing analysis in the Henro Pilgrimage, Shikoku, Japan"
- 20-22/09/2023  **4th International Conference on Community Ecology (Comec)**
Trieste (IT)
Oral Communication: "Mapping diversity: how do environmental heterogeneity patterns change in space and time?"
- 03-08/09/2023  **65th Annual Symposium of International Association for Vegetation Science (IAVS)**
Coffs Harbour (AU)
Oral Communication: "Mapping diversity: how do environmental heterogeneity patterns change in space and time?"
- 26-28/06/2023  **Horizon Europe EarthBridge 2023 Congress**
Bologna (IT)
Oral Communication: "Helical graphs to track ecological trends"
- 19-21/04/2023  **Challenging conservation: adattarsi al cambiamento I° conferenza di Biologia della Conservazione per ECR (SCB)**
Roma (IT)
Poster: "Mapping diversity: how do environmental heterogeneity patterns change in space and time?"
- 09-10/02/2023  **Conference for young botanists (CYBO)**
Bolzano (IT)
Poster: "Helical graphs to track ecological trends"
- 07-10/09/2022  **117th Congress of the Italian Botanic Society (SBI)**
Bologna (IT)
Listener
- 27/06/2022 – 01/07/2022  **64th Annual Symposium of International Association for Vegetation Science (IAVS)**
Madrid (SP)
Oral Communication: "Helical graphs to track ecological trends"
- 15-18/06/2022  **55th congress of the Italian Society of Vegetation Science (SISV)**
L'Aquila (IT)
Oral Communication: "Helical graphs to track ecological trends"

Completed Courses

- 8-25/03/2022  **Scientific writing and communication**
Prof Gabor L Lovei
Alma Mater Studiorum, University of Bologna
- 10/03/2022  **Excellence in Peer Review: How to be an effective peer reviewer**
- 8-12/02/2021  **Statistic course for PhD Student**
Alma Mater Studiorum, University of Bologna
- 12-15/01/2021  **Winter School: "ENVRI Community International Winter School on DATA FAIRness"**
LifeWatch ERIC

- 05/2014  **Sviluppo di applicazioni per smartphone e tablet**
ITST "J.F.KENNEDY", Pordenone
- 2013  **ECDL, European Computer Driving Licence**
- 19-26/03/2013  **Chemistry laboratory**
ITST "J.F.KENNEDY", Pordenone

Scientific related activity

- 17-22/06/2023  **Volunteer**
7th European Congress of Conservation Biology (ECCB)
Bologna (IT)
- 26-28/06/2023  **Member of the Local organizer committee**
Horizon Europe EarthBridge 2023 Congress
Bologna (IT)
- 07-10/09/2022  **Volunteer**
Società Botanica Italiana (SBI) Congress
Bologna (IT)

Research Publications

Journal Articles

- 1** V. Moudrý, P. Keil, A. F. Cord, L. Gábor, V. Lecours, A. Zarzo-Arias, V. Barták, M. Malavasi, D. Rocchini, M. Torresani, K. Gdulová, F. Grattarola, F. Leroy, E. Marchetto, **E. Thouverai**, J. Prošek, J. Wild, and P. Šímová, "Scale mismatches between predictor and response variables in species distribution modelling: A review of practices for appropriate grain selection," *Progress in Physical Geography: Earth and Environment*, vol. 0, no. 0, p. 03 091 333 231 156 362, 2023.  DOI: 10.1177/03091333231156362.
- 2** D. Rocchini, J. Nowosad, R. D'Introno, L. Chieffallo, G. Bacaro, R. C. Gatti, G. M. Foody, R. Furrer, L. Gábor, M. Malavasi, M. Marcantonio, E. Marchetto, V. Moudrý, C. Ricotta, P. Šímová, M. Torresani, and **E. Thouverai**, "Scientific maps should reach everyone: The cblindplot r package to let colour blind people visualise spatial patterns," *Ecological Informatics*, p. 102 045, 2023, ISSN: 1574-9541.  DOI: 10.1016/j.ecoinf.2023.102045.
- 3** **E. Thouverai**, M. Marcantonio, E. Cosma, F. Bottegoni, R. Cazzolla Gatti, L. Conti, M. Di Musciano, M. Malavasi, V. Moudrý, P. Šímová, R. Testolin, P. Zannini, and D. Rocchini, "Helical graphs to visualize the ndvi temporal variation of forest vegetation in an open source space," *Ecological Informatics*, vol. 74, p. 101 956, 2023, ISSN: 1574-9541.  DOI: 10.1016/j.ecoinf.2022.101956.
- 4** M. Torresani, D. Rocchini, A. Alberti, V. Moudrý, M. Heym, **E. Thouverai**, P. Kacic, and E. Tomelleri, "Lidar gedi derived tree canopy height heterogeneity reveals patterns of biodiversity in forest ecosystems," *Ecological Informatics*, vol. 76, p. 102 082, 2023, ISSN: 1574-9541.  DOI: <https://doi.org/10.1016/j.ecoinf.2023.102082>.
- 5** **E. Thouverai**, M. Marcantonio, J. Lenoir, M. Galfré, E. Marchetto, G. Bacaro, R. Cazzolla Gatti, D. Da Re, M. Di Musciano, R. Furrer, M. Malavasi, V. Moudrý, J. Nowosad, F. Pedrotti, R. Pelorosso, G. Pezzi, P. Šímová, C. Ricotta, S. Silvestri, E. Tordoni, M. Torresani, G. Vacchiano, P. Zannini, and D. Rocchini, "Integrals of life: Tracking ecosystem spatial heterogeneity from space through the area under the curve of the parametric rao's q index," *Ecological Complexity*, vol. 52, p. 101 029, 2022, ISSN: 1476-945X.  DOI: 10.1016/j.ecocom.2023.101029.

- 6 D. Rocchini, M. Marcantonio, D. Da Re, G. Bacaro, E. Feoli, G. M. Foody, R. Furrer, R. Harrigan, D. Kleijn, M. Iannacito, J. Lenoir, M. Lin, M. Malavasi, E. Marchetto, R. Meyer, M. V., D. Payne, F. Schneider, P. Šímová, A. Thornhill, **E. Thouverai**, S. Vicario, R. Wayne, and C. Ricotta, "From zero to infinity: Minimum to maximum diversity of the planet by spatio-parametric rao's quadratic entropy," *Global Ecology and Biogeography*, vol. 30, pp. 1153–1162, 2021. [DOI: 10.1111/geb.13270](https://doi.org/10.1111/geb.13270).
- 7 D. Rocchini, **E. Thouverai**, M. Marcantonio, M. Iannacito, D. Da Re, M. Torresani, G. Bacaro, M. Bazzichetto, A. Bernardi, G. Foody, R. Furrer, D. Kleijn, S. Larsen, J. Lenoir, M. Malavasi, E. Marchetto, F. Messori, A. Montagni, V. Moudrý, B. Naimi, C. Ricotta, M. Rossini, F. Santi, M. Santos, M. Schaepman, F. Schneider, L. Schuh, S. Silvestri, A. Šímová P.and Skidmore, C. Tattoni, E. Tordoni, S. Vicario, P. Zannini, and M. Wegmann, "Rasterdiv - an information theory tailored r package for measuring ecosystem heterogeneity from space: To the origin and back," *Methods in Ecology and Evolution*, vol. 12, pp. 1093–1102, 2021. [DOI: 10.1111/2041-210X.13583](https://doi.org/10.1111/2041-210X.13583).
- 8 **E. Thouverai**, M. Marcantonio, G. Bacaro, D. Da Re, M. Iannacito, C. Ricotta, C. Tattoni, S. Vicario, and D. Rocchini, "Measuring diversity from space: A global view of the free and open source rasterdiv r package under a coding perspective," *Community Ecology*, vol. 22, 2021. [DOI: 10.1007/s42974-021-00042-x](https://doi.org/10.1007/s42974-021-00042-x).

R Packages

- 1 D. Rocchini, G. A. Nocera, L. Chieffallo, and **E. Thouverai**, *Imagery: Modify and share images*, 2023. [URL: https://github.com/ducciorocchini/imageRy](https://github.com/ducciorocchini/imageRy).
- 2 **E. Thouverai**, D. Rocchini, and J. Nowosad, *Cblindplot: Recolors images to be colour blind friendly*, 2022. [URL: https://github.com/ducciorocchini/cblindplot](https://github.com/ducciorocchini/cblindplot).
- 3 M. Marcantonio, M. Iannacito, **E. Thouverai**, D. Da Re, C. Tattoni, G. Bacaro, S. Vicario, C. Ricotta, and D. Rocchini, *Rasterdiv: Diversity indices for numerical matrices*, 2021. [URL: https://CRAN.R-project.org/?q=rasterdiv](https://CRAN.R-project.org/?q=rasterdiv).
- 4 **E. Thouverai**, S. Pavoine, E. Tordoni, D. Rocchini, C. Ricotta, A. Chiarucci, and G. Bacaro, *Rarefy: Rarefaction methods*, 2021. [URL: https://CRAN.R-project.org/package=Rarefy](https://CRAN.R-project.org/package=Rarefy).