

Francesco Rota

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ABOUT ME

I am a research scientist with international academic experience (BSc, MSc, PhD) in ecology, botany and geospatial data science. My work bridges field ecology and advanced analytics, with a focus on understanding environmental patterns using data-driven methods. During my PhD, I specialized in species distribution modeling to predict range shifts of alpine endemic species in the Dolomites due to climate change, investigating the role of topographic heterogeneity. In my recent postdoctoral position, I extended this expertise to predict forest species distributions in relation to soil properties from different data sources. My strengths lie in quantitative ecology, GIS, and the development of reproducible, high quality workflows for analyzing complex environmental datasets in HPC environments. I have extensive experience in data validation, spatial analysis, machine learning and technical writing. I am passionate about applying science to real-world environmental challenges, and approach my work with precision, critical thinking, and a strong sense of responsibility and collaboration.

SKILLS

- **Programming:** R, Python, bash, SQL, LaTeX, C
- **Technical Skills:** data analyses, statistical modeling, predictive analytics, big data processing, machine learning, GIS, scientific writing
- **Tools:** VS Code, RStudio, Linux, HPC, Slurm, Docker, Singularity, GoogleEarthEngine, QGIS, ArcGIS Pro, GitHub, Overleaf, Shiny, Office Suite
- **Soft Skills:** problem-solving, critical thinking, science communication, project management, knowledge sharing, teamwork, teaching

LANGUAGES

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|----------------------|--------------|-------------|
| • Italiano
native | • English C1 | • German B1 |
| | • Spanish C1 | • French B1 |

PROFESSIONAL CERTIFICATES

2024	Computer Science for Artificial Intelligence ONLINE HARVARDX-EDX · Harvard University 📍	
2022	Professional Habilitation ALBO DEGLI AGROTECNICI E DEGLI AGROTECNICI LAUREATI · Ministero della Giustizia, Roma 📍	

PUBLICATIONS

- Google Scholar:
<https://scholar.google.com/citations?user=qOLAf08AAAAAJhl=deoi=ao>

EXPERIENCE

2022–2024	Post-Doc Researcher GIS & DATA SCIENCE · Swiss Federal Institute for Forest Snow and Landscape Research WSL, Birmensdorf 📍 Forest Resources and Management, Forest Biodiversity, Machine Learning, SDM, Digital Soil Maps, High Performance Computing	
2021	Visiting Researcher BOTANY · Universität Innsbruck 📍 Genomics Lab, Bioinformatics, Population genomics, RADseq, Genetic Diversity, HPC	
2018–2022	Researcher & Teaching Assistant ECOLOGY · Free University of Bozen-Bolzano 📍 Machine Learning, Data Science, Climate Change, Rare Alpine Endemic Plants, Species Distribution Models, Maps, Phylogeography, Teaching Assistant in Botany	
2017	Erasmus+ Trainee ECOLOGICAL MONITORING · Universidad de La Laguna, Tenerife 📍 Island Ecology, Ecological Restoration, Biodiversity Conservation, Data Science	

EDUCATION

2018–2022	PhD MOUNTAIN ENVIRONMENT & AGRICULTURE · Free University of Bozen-Bolzano 📍 Major in Ecology, Environment and Protection of Mountain Areas	
2020	Pedagogical Training 24 cfu ITALIAN TEACHER QUALIFICATION CREDITS · Free University of Bozen-Bolzano 📍 Pedagogy, Developmental Psychology, Anthropology of Education, and Teaching Methodologies	
2015–2017	MSc NATURAL SCIENCES · Università di Bologna 📍 Biometry and Statistics, Environmental Economy and Impact, Laboratory of Digital Mapping and GIS, Physiology of Plants, Speleology, Systematic Botany Laboratory, Vegetation Ecology	
2014	Erasmus+ fellowship BIOLOGICAL AND ENVIRONMENTAL SCIENCES · Universidad de Salamanca 📍	
2012–2015	BSc NATURAL SCIENCES · Università di Milano 📍 Physical Geography and Cartography, Biology, Mathematics, Physics, Chemistry, Genetics, Physiology, Zoology, Botany, Ecology and Ethology, Conservation Biology, Geology, Oceanography, Renewable Energies	
2012	High School Diploma LICEO SCIENTIFICO WITH SPECIALIZATION IN PHYSICS · Istituto Andrea Fantoni, Clusone, Bergamo, Italy 📍	

PUBLICATIONS EXTRACT

- Li, X., Rota, F., Peter, M., Gross, A., Scherrer, D. and Baltensweiler, A. (2025), Integrating Soil Properties Into Species Distribution Models Enhances Predictive Accuracy for Terricolous Macrofungi. *J Biogeogr* e15124. <https://doi.org/10.1111/jbi.15124>
- Rota F., Scherrer D., Bergamini A., Price B., Walthert L., Baltensweiler A., (2024) Unraveling the impact of soil data quality on species distribution models of temperate forest woody plants. *Science of the Total Environment*, 173719. <http://dx.doi.org/10.1016/j.scitotenv.2024.173719>
- Rota, F., Carnicero, P., Casazza, G., Nascimbene, J., Schönschwetter, P., Wellstein, C. (2024). Survival in nunatak and peripheral glacial refugia of three alpine plant species is partly predicted by altitudinal segregation. *Molecular Ecology*, 00, e17343. <https://doi.org/10.1111/mec.17343>
- Puglielli, G., Bricca, A., Chelli, S., Petruzzellis, F., Acosta, A. T., Bacaro, G., ..Rota, F., .. Tordoni, E. (2024). Intraspecific variability of leaf form and function across habitat types. *Ecology Letters*, 27(3), e14396. <https://doi.org/10.1111/ele.14396>
- Rota F., Casazza G., Genova G., Midolo G., Prosser F., Bertolli A., Wilhalm T., Nascimbene J., Wellstein C. (2022) Topography of the Dolomites modulates range dynamics of narrow endemic plants under climate change. *Scientific Reports*, 12(1), 1-12. <https://doi.org/10.1038/s41598-022-05440-3>
- Rota F., Vidal-Rodríguez M., Chiarucci A., Fernández-Palacios J.M., Whittaker R.J. (2021) Monitoring a thermophilous woodland reforestation project in Tenerife, Canary Islands, *Scientia Insularum*, número 4, doi: <https://doi.org/10.25145/j.SI.2021.04.02>

CONGRESS, SEMINARS

- Conference talk: Rota F., Scherrer D., Bergamini A., Price B., Walthert L., Baltensweiler A., (2024) Enhancing performance of SDMs for forest taxa with high-resolution soil maps. at: World Biodiversity Forum 2024, 17-20th June 2024, Davos, Switzerland.
- Conference talk (PICO presentation): Rota F., Scherrer D., Bergamini A., Price B., Walthert L., Baltensweiler A., (2024) Soil data quality matters when predicting woody plant species in temperate forests. at: EGU24 Conference of the European Geosciences Union, 14-19th April 2024, Wien, Austria.
- Conference poster: Rota F., Scherrer D., Bergamini A., Price B., Walthert L., Baltensweiler A., (2024) Unraveling the impact of soil data quality and resolution on species distribution models of temperate forest woody plants. at: 11th Biennial Conference of the International Biogeography Society, 7-11th January 2024, Prague, Czech Rep.
- Conference talk: Rota F., Carnicero P., Casazza G., Nascimbene J., Schönschwetter P., Wellstein C. Diversified and complex survival history within which refugium? Phylogeography of the endemic plants of the Dolomites. at: CYBO 2.023 (Conference for Young Botanist) Conferenza per giovani botanici, 9-10th February 2023, Bozen/Bolzano, Italy
- Conference poster: Rota F., Casazza G., Schönschwetter P., Wellstein C. Future and past of the endemic alpine plants of the Dolomites: response to future climate change and phylogeography at: 117° Congresso della Società Botanica Italiana onlus (VIII International Plant Science Conference), 7-9th September 2022, Bologna, Italy
- Conference talk: Rota F., Casazza G., Wellstein C. Quantifying habitat suitability for narrow endemic alpine plant species in the Dolomites (Italy) under predicted climate change at: CYBO (Conference for Young Botanist) Conferenza per giovani botanici 6-7th February 2020, Genova, Italy
- Conference poster: Rota F., Wellstein C. The impact of climate change on stenoendemic alpine plant species in the southern Alps: a research proposal. at: 2nd International Conference on Community Ecology, June 04-06th 2019, Bologna, Italy
- Conference poster: Rota F., Vidal-Rodríguez M., Chiarucci A., Fernández-Palacios J.M., Whittaker R. Monitoring an endemic thermophilous woodland reforestation in Tenerife, Canary Islands at: Island Biology 3rd International conference on Island Ecology, Evolution and Conservation, July 08-13th 2019, Saint-Denis, La Réunion Island, France

TRAINING SCHOOLS, COURSES AND SCIENTIFIC MISSIONS

- "SDMs for the multi-taxon Bottoms-Up database using HPC cluster" Short Term Scientific Mission (STSM grant, 1500€) within the COST Action Bottoms-Up CA18207, 25/09/2023 to 29/09/2023, La Sapienza University Rome, Prof. Sabina Burrascano
- R-packaging, 28 August 2023, Swiss Institute of Bioinformatics SIB, Lausanne
- Interdisciplinary summer school on forest ecosystems, Ljubljana, Slovenia, 10-14 July 2023, organized by three COST Actions (3dForEcoTech CA20118, Bottoms-Up CA18207, Proclias CA19139 COST Actions). Arguments: proximal laser scanning, process based forest ecology models, multi-taxon biodiversity
- Docker and Singularity for Reproducible Research: Getting Started with Containers, 26 April 2023, online course, Swiss Institute of Bioinformatics SIB
- Presenting science to non-expert audiences, 18 April 2023 and 2 May 2023, Zürich, Communication Academy ETHzürich
- Basic of science communication, 10 March 2023, online course, Communication Academy ETHzürich
- Forest Genetic Monitoring Training School, Kaunas, Lithuania, 5th July – 8th July 2022. COST ACTION "CA18201 - An integrated approach to conservation of threatened plants for the 21st Century" organized by Prof. Ziva Fiser (University of Primorska), Prof. F. A. (Phil) Aravanopoulos (Aristotle University of Thessaloniki) and Darius Danusevicius (Aleksandras Stulginskis University)
- IUCN Red list Assessor Training Workshop, Podgorica (Montenegro), 29th March – 1st April 2022. COST ACTION "CA18201 - An integrated approach to conservation of threatened plants for the 21st Century" organized by Dr. Malin Rivers (Botanic Gardens Conservation International), Dr. Emily Beech (Botanic Gardens Conservation International), Prof. Peter Glasnović (University of Primorska)
- Google Earth Engine Summer School, Firenze, 06 -10 September 2021, organized by Prof. G. Chirici (Università di Firenze)
- Campionamento ed analisi dati per l'ecologia vegetale, Siena, 13-14 June 2019, organized by Gruppo di Lavoro per l'Ecologia della Società Botanica Italiana onlus
- Environmental data management and analysis with GIS, Trento, 11-15 March 2019, organized by prof. Paolo Zatelli, prof. Marco Ciolli, prof. Alfonso Vitti (Università di Trento)
- International Summer School in Alpine Plant Ecology, Furka Pass, Switzerland, 07.2018, organized by Prof. C. Körner (Basel University)