Filipe S. Dias, PhD

Forest Ecologist and Data Analyst

Lisbon, Portugal fsdias@protonmail.com www.linkedin.com/in/fsdias8 https://fsdias.github.io/

PROFILE

My research examines how management practices and climate change affect Mediterranean oak woodlands, producing peer-reviewed publications that guide regional and national conservation strategies. In parallel, I collaborate with NGOs and select private firms to develop data-driven solutions for conservation and land-use planning.

SKILLS:

Statistical Analysis (R)	Data Wrangling (R, Python, SQL)	Spatial analysis (QGIS, GDAL, PostGIS, Python)
Bayesian Statistics (Stan)	Data Visualization (R, Python)	

WORK EXPERIENCE:

Researcher (2026 -)

Centro de Estudos Florestais, Instituto Superior de Agronomia, Universidade de Lisboa

Currently working on the project Satellite Information for Resilience Monitoring and Early warning of Ecosystem tipping points (SIRENE), funded by the European Space Agency (ESA), which has the overarching goal of improving the detection and prediction of climate-driven tipping points in terrestrial ecosystems, especially in vulnerable regions such as tropical rainforests, boreal forests, and drylands.

Freelance Data Analyst (2025)

WWF Portugal

- Developed a nationwide **geospatial prioritization framework** that identified **nine priority areas for ecological restoration** and informed WWF Portugal's **Re-Store Portugal** initiative (**PostgreSQL/PostGIS, QGIS**). which aims to invest **€1.8 million by 2030** in three of those areas.

Researcher (2019-2024)

Centro de Investigação em Biodiversidade e Recursos Genéticos (CIBIO/BIOPOLIS)

- Co-developed a **national-scale, uncertainty-aware framework** that integrates land-use resistance and climate resilience to identify ecological corridors connecting Portugal's protected areas, **providing**

robust, evidence-based priorities for conservation and land-use planning.

- Developed a **Bayesian approach** for modelling **ecological community dissimilarity** using beta-diversity indices implemented with **Stan's probabilistic programming language**. Link 1, Link 2
- **Led** the statistical analysis of a comprehensive **50-year, nationwide** study of **canopy-cover changes** in **Portugal's cork-oak and holm-oak woodlands**. Discovered a pivotal **post-1990 transition** from **overall canopy gain** to **widespread loss** caused by **climate and land-use changes**. Delivered the **first large-scale, quantitative evidence** of **Iberian oak degradation**. Link
- **Led** the **statistical analysis** of a **long-term field experiment** on **Mediterranean cork oak regeneration**, that used **Bayesian methods** that shows that interactions between cork oak seedlings and their shrub neighbors are species and community dependent. Link
- Co-developed a **species-agnostic spatial modeling framework that combines** omnidirectional connectivity models (Omniscape) and least cost path analysis to identify **optimal ecological corridors** between **protected areas in Portugal**.
- **Co-authored a pan-European methodological framework and practical guidelines for mapping functional and structural ecological connectivity**. Link
- **Participated** in the study that **reconstructed the historical process of plant discovery** in **Cabo Verde's endemic flora** using **Bayesian methods**. Link
- **Supervised** the analysis of a study that **mapped and predicted invasive alien-plant richness** across **Portugal's riparian ecosystems**, pinpointing **low-altitude, downstream, and densely populated areas** as invasion hotspots. Link
- **Supervised** the analysis of a study that used **remote-sensing data** and **Generalized Additive Models (GAMs)** to evaluate the effectiveness of **3,013 post-fire restoration projects** after the **2016-2017 wildfires**. Link
- **Contracted researcher** on the project "**Naturaconnect – Designing a resilient and coherent Trans-European Network for Nature and People**". Link
- **Contracted researcher** on the project **"RIVERSCALE – Ecological Patterns and Processes Across Scales: Application to River Networks"** (PTDC/BIA-ECO/28729/2017 – POCI-01-0145-FEDER-028729)

Data Analyst (2011 - 2022)
WWF Portugal

- **Managed** an **online GIS application** (built with **QGIS** and **Lizmap**) that provided **landowners** and **forest managers** with free access to **biodiversity** and **ecosystem services** data, enabling identification of **high-conservation-value areas** during **Forest Stewardship Council (FSC)** certification processes. Link
- Conducted **spatial conservation prioritization analyses** using **Pareto optimization** to identify areas important for the conservation of **biodiversity** and **ecosystem services**. The identified areas were included in **WWF's Green Heart of Cork project** and their landowners participated in **Payments for Ecosystem Services (PES)** schemes worth over **79 000 EURO** between 2011 and 2021. Link 1 Link 2

- **Extracted, transformed, and loaded (ETL)** data on **biodiversity** and **ecosystem services** into **PostgreSQL** databases (**QGIS**, **GRASS GIS**, **GDAL**, **R**, and **PostGIS**) and produced **maps and spatial visualizations** for **reports, proposals, and communication materials**.

- Provided **training and technical support** to **WWF staff** and **partner institutions** on **GIS workflows**, **spatial data management**, and **mapping tools**.

Postdoctoral Researcher (2016-2019)

Centro de Ecologia Aplicada "Prof. Baeta Neves", Instituto Superior de Agronomia, Universidade de Lisboa

- **Conducted the analysis of study that quantified** long-term persistence and conversion trajectories of **Portugal's evergreen (cork oak, holm oak) and deciduous oak forests** (1966-2006), revealing that only ~62 % of **cork oak** stands remain while **deciduous oaks** drop below 46 % and shift primarily to shrubland, highlighting differential vulnerability linked to economic value, protection status, and management regimes. The data were processed with **QGIS** and **PostGIS** and analysed with **multinomial regression** in **R**. Link

- **Analysed** data from a **survey** to assess the **potential impact** of a **proposed bauxite mine** on a key population of **western chimpanzees** in a **forest–savanna mosaic**. **Mapped** chimpanzee nest density in **Guinea-Bissau's Boé sector** and identified a **high-abundance core** that overlaps the planned **Ronde Hill bauxite mine**, showing that mining activities would directly intersect the most critical habitat for western chimpanzees. The analysis combined **distance sampling methods** with **Generalized Additive Models (GAM)**. Link

PhD Candidate (2011-2015)

Centro de Ecologia Aplicada "Prof. Baeta Neves", Instituto Superior de Agronomia, Universidade de Lisboa

- Demonstrated that **Forest Stewardship Council (FSC) certified cork oak woodlands in Portugal do not currently hold higher bird, reptile, or amphibian richness or irreplaceability than non-certified areas**, providing the first rigorous, quantitative assessment of certification's biodiversity outcomes in this ecosystem. The study combines **integer linear programming with randomization tests** and involved the creation of **automated ETL pipelines** for **data extraction, transformation, and loading**. Link

- **Showed that FSC certification markedly improves the ecological condition of streams in Mediterranean evergreen oak woodlands**, with five-year-old certified sites achieving riparian vegetation density and overall stream health comparable to least-disturbed reference streams. The study used linear mixed-effects implemented in R. Link

- **Demonstrated** that FSC conservation zones in Mediterranean **cork oak woodlands** significantly **improve oak regeneration and increase shrub species richness and diversity**, providing the first empirical evidence that **set-aside areas can counteract the widespread regeneration failure** threatening these ecosystems. The study combines distance sampling methods with Generalized Addtive Models (GAM) implemented in R. Link

- Designed and implemented a **multi-objective optimization framework using Pareto optimization in R to identify optimal areas for biodiversity conservation and ecosystem service provision.** Link

- Authored **peer-reviewed publications and technical reports, and presented research findings to scientists, policymakers, and land managers.**

Research assistant (2009)
Faculdade de Ciências, Universidade de Lisboa

- **Assisted** in the project **"Assessing the effectiveness of mitigation measures in reducing the negative impacts of highways,"** funded by **BRISA – Auto-estradas de Portugal, S.A.**

- **Trapped** and **captured stone martens** (*Martes foina*) and used **radio-tracking techniques** to monitor movements near a major highway in southern Portugal.

- **Developed** a **geographic information system (GIS)** to organize and analyze spatial and ecological data.

- **Performed** statistical analyses to evaluate **habitat selection** and **movement patterns** in relation to highway proximity.

EDUCATION

- **PhD in Forestry and Natural Resources (2011 - 2015)**

Instituto Superior de Agronomia, Universidade de Lisboa
Advisors: Miguel N. Bugalho and Jorges Orestes Cerdeira

Thesis: The Role of Forest Certification for the Conservation of Biodiversity and Sustainability of Cork Oak Woodlands

- **MSc in Conservation Biology (2008)**

Faculdade de Ciências, Universidade de Lisboa
Advisor: Margarida Santos-Reis

Thesis: Multi-Scale Analysis of Carnivores' Road Mortality Patterns in Highways: A Case Study with the Stone Marten and the Common Genet

- **Licenciate Degree in Environmental Biology (2003-2007)**

Faculdade de Ciências, Universidade de Lisboa

PUBLICATIONS

2026 Alagador, Diogo, Ana Ceia-Hasse, **Filipe S. Dias**, Jeremy S. Dertien, Miguel B. Araújo, and Francisco Moreira. "Integrating Land-Use and Climate Connectivity to Link Protected Areas at the Country Level." Landscape Ecology 41, no. 11 (2026): 218. https://doi.org/10.1007/s10980-026-02473-1.

2025 Zuleger, Annika M., Martina M. Viti, Luise Quoss, **Filipe S. Dias**, Luís Borda-de-Água, Miguel N. Bugalho, Henrique M. Pereira. 'Mapping Herbivore-Accessible Biomass across a Heterogeneous Mountain Landscape Using Multisensor High-Resolution UAV Data'. Science of Remote Sensing, 3 October 2025, 100302. https://doi.org/10.1016/j.srs.2025.100302.

2025 Borda-de-Água, Luís, M. Manuela Neves, Luise Quoss, Stephen P. Hubbell, **Filipe S.Dias**, and Henrique M. Pereira. 'Modelling the Species-Area Relationship Using Extreme Value Theory'. Nature Communications 16, no. 1 (2025): 4045. https://doi.org/10.1038/s41467-025-59239-7.

2024 Diniz, Écio Souza, **Filipe S. Dias**, Luís Borda-de-Água, and Patricia María Rodríguez González. "Anthropogenic Disturbance and Alien Plant Invasion Drive the Phylogenetic Impoverishment in Ri parian Vegetation." *Biodiversity and Conservation*, September 30, 2024. https://doi.org/10.1007/s10531-024-02949-z.

2024 Mexia, Teresa, Maria Conceição Caldeira, Xavier Lecomte, **Filipe S. Dias**, Margarida Tomé, Leónia Nunes, and Miguel Nuno Bugalho. "Is Forest Certification Mitigating Oak Decline in Mediterranean Open Woodlands?" Forest Ecology and Management 568 (September 15, 2024): 122105. https://doi.org/10.1016/j.foreco.2024.122105

2024 Lopes, L. F., **Filipe S. Dias,** P. M. Fernandes, and V. Acácio. "A Remote Sensing Assessment of Oak Forest Recovery after Postfire Restoration." European Journal of Forest Research, March 8, 2024. https://doi.org/10.1007/s10342-024-01667-z

2024 Acácio, Vanda, **Filipe S. Dias**, Mário Ferreira, Patricia M. Rodríguez-González, Hugo Matias, and Maria C. Caldeira. "Effects of Shrub Species Dominance and Diversity on Oak Seedling Survival in Mediterranean Woodlands: The Interplay of Abiotic Conditions and Plant Traits." Forest Ecology and Management 555: 121713. https://doi.org/10.1016/j.foreco.2024.121713

2022 **Dias, Filipe S.**, Michael Betancourt, Patricia María Rodríguez-González, and Luís Borda-de- Água. "BetaBayes—A Bayesian Approach for Comparing Ecological Communities." Diversity 14, no. 10 (October 2022): 858. https://www.mdpi.com/1424-2818/14/10/858/htm

2022 Pabst, Rebecca, **Filipe S. Dias**, Luís Borda-de-Água, Patricia María Rodríguez-González, and César Capinha. "Assessing and Predicting the Distribution of Riparian Invasive Plants in Continental Portugal." Frontiers in Ecology and Evolution 10 (May 6, 2022):875578. https://doi.org/10.3389/fevo.2022.875578

2021 Dias, Filipe S., Michael Betancourt, Patricia María Rodríguez-González, and Luís Borda-de- Água. "Analysing the Distance Decay of Community Similarity in River Networks Using Bayesian Methods." Scientific Reports 11, no. 1 (November 4, 2021): 21660.

https://10.1038/s41598-021-01149-x

2021 Acácio, Vanda, **Filipe S. Dias**, Filipe X. Catry, Miguel N. Bugalho, and Francisco Moreira. "Canopy Cover Loss of Mediterranean Oak Woodlands: Long-Term Effects of Management and Climate." Ecosystems, March 16, 2021. https://doi.org/10.1007/s10021-021-00617-9

2020 Romeiras, Maria M, Mark Carine, Maria Cristina Duarte, Sílvia Catarino, Filipe S. Dias, and Luís Borda-de- Água. "Bayesian Methods to Analyze Historical Collections in Time and Space: A Case Study Using Cabo Verde Endemic Flora." Frontiers in Plant Science 11, no. 278 (2020) https://doi.org/10.3389/fpls.2020.00278.

2019 **Dias, Filipe S.**, José F. C. Wenceslau, Tiago A. Marques, and David L. Miller. "Density and Distribution of Western Chimpanzees around a Bauxite Deposit in the Boé Sector, Guinea-Bissau." American Journal of Primatology 81, no. 9 (2019):e23047. https://doi.org/10.1002/ajp.23047

2019 Arsénio, Pedro, Patricia María Rodríguez-González, Ivan Bernez, **Filipe S. Dias**, Miguel Nunes Bugalho, and Simon Dufour. "Riparian Vegetation Restoration: Does Social Perception Reflect Ecological Value?: Social Perception of Riparian Vegetation Restoration." River Research and Applications, August 20, 2019. https://doi.org/10.1002/rra.3514

2017 Acácio, Vanda, **Filipe S. Dias**, Filipe X. Catry, Marta Rocha, and Francisco Moreira. "Landscape Dy namics in Mediterranean Oak Forests under Global Change: Understanding the Role of An thropogenic and Environmental Drivers across Forest Types." Global Change Biology 23, no. 3 (March 1, 2017): 1199–1217. https://doi.org/10.1111/gcb.13487

2016 **Dias, Filipe S.**, David L. Miller, Tiago A. Marques, Joana Marcelino, Maria C. Caldeira, J. Orestes Cerdeira, and Miguel N. Bugalho. "Conservation Zones PromoteOak Regeneration and Shrub Diversity in Certified Mediterranean Oak Woodlands." Biological Conservation 195 (March 2016): 226–34. https://doi.org/10.1016/j.biocon.2016.01.009

2015 **Dias, Filipe S.**, M N Bugalho, B. Briñas, and J. O. Cerdeira. "Using the High Conservation Value Forest Concept and Pareto Optimization to Identify Areas Maximizing Biodiversity and Ecosystem Services in Cork Oak Landscapes." Agroforestry Systems, April 19, 2015. https://doi.org/10.1007/s10457-015-9814-x

2015 **Dias, Filipe S.**, Miguel N. Bugalho, Patricia M. Rodríguez-González, António Albuquerque, and J. Orestes Cerdeira. "Effects of Forest Certification on the Ecological Condition of Mediterranean Streams." Journal of Applied Ecology 52, no.1 (February 2015): 190–98. https://doi.org/10.1111/1365-2664.12358

2013 **Dias, Filipe S.**, Miguel N. Bugalho, J. Orestes Cerdeira, and M. João Martins. "Is Forest Certification Targeting Areas of High Biodiversity in Cork Oak Savannas?" Biodiversity and Conservation 22 (November 2013): 93–112. https://doi.org/10.1007/s10531-012-0401-4

PEER REVIEW WORK

Review editor for Frontiers in Forests and Global Change
Biological Conservation
Biodiversity and Conservation
Forests
Diversity

REPORTS

2024 Moreira, Francisco, **Filipe S. Dias**, Jeremy Dertien, Ana Ceia Hasse, Luis Borda-de-Água, Silvia Carvalho, Miguel Porto, et al. "Guidelines for Connectivity Conservation and Planning in Europe." ARPHA Preprints 5 (June 6, 2024): e129021. https://doi.org/10.3897/arphapreprints.e129021

2017 Bugalho, Miguel N., **Filipe S. Dias**, and Rui Barreira. "Incêndios Rurais Em Portugal: Até Quando Deixaremos a Paisagem Arder?" Lisboa, Portugal: WWF Mediterrâneo (WWF MED)/Centro de Ecologia Aplicada Prof. Baeta Neves do Instituto Superior de Agronomia (CEABN/ISA), 2017. https://wwfeu.awsassets.panda.org/downloads/incendios_relatorio_vfinal_1.pdf

2010 Branco, Orlando, Miguel Nuno Bugalho, Luís Neves Silva, Rui Barreira, Pedro Vaz, and Filipe S. Dias. "Hotspot Areas for Biodiversity and Ecosystem Services in Montado." Lisbon: WWF Mediterranean –Portugal/Centre for Applied Ecology Prof. Baeta Neves (CEABN). https://awsassets.panda.org/downloads/habeas_report2010.pdf

INVITED TALKS

2023 "How to Manage and Process Big Datasets in R - an Example with eBird Data", CIBIO's Journal Club 2023, https://fsdias.github.io/presentations/bigdata/

2014 "Como utilizar o software R através do QGIS"
https://www.researchgate.net/publication/309264596_Como_utilizar_o_software_R_atraves_do_QGIS

2012 "HABEaS WebGIS: Practical applications",
Course "Evaluating ecosystem services for decision-making" , Natural Capital Project, Instituto Superior Técnico

CONFERENCES

2024 Acácio, Vanda, **Dias, F.S,**, Mário Ferreira, Patricia M. Rodríguez-González, Hugo Matias, Maria C. Caldeira, "Effects of shrub dominance and diversity on Mediterranean oak seedling survival: the interplay of abiotic conditions and plant traits", Encontro Nacional de Ecologia 2024, Porto.

2024 Moreira F, **Dias, F.S,**, Dertien J, Borda-de-Água L, Porto M, Carvalho S, Ceia-Hasse A, Seliger C, Schinegger R, Santini L, Maiorano L, Cosentino F, Sacchi A, Férnandez N, 'A critical evaluation of current practices in connectivity projects across Europe', 7th European Congress of Conservation Biology (ECCB 2024), Bologna, Italy.

2024 Moreira F, **Dias, F.S,**, Dertien J, Borda-de-Água L, Porto M, Carvalho S, Ceia-Hasse A, Seliger C, Schinegger R, Santini L, Maiorano L, Cosentino F, Sacchi A, Férnandez N, 'NaturaConnect project workshop on Building a resilient ecological network of conserved areas across Europe for nature and people: Guidelines for connectivity conservation and planning in Europe', 15th Meeting of the Carpathian Convention Working Group on Biodiversity, 2024, Vienna, Austria

2023 Borda-de-Água, L., Quoss, L., **Dias, F.S,** Neves, M., Hubbell, S.P., Pereira, H.M., A unified approach to the species-area-relationship using statistics of extremes, GfÖ Annual Meeting 2023, Leipzig

2023 Lopes, L.F., **Dias, F.S**., Fernandes, P., Acácio, V., 'Use of remote sensing to evaluate effects of postfire emergency stabilization on oak forests recovery', 8th International Wildfire Conference, Porto, Portugal

2019 Acácio, V., **Dias, F.S.**, Catry, F.X., Bugalho, M., Moreira F., 'Long-term dynamics of canopy cover in Mediterranean evergreen oak woodlands reveals a degradation trend determined by management and climate',15th EEF - European Ecological Federation Congress, 2019, Lisbon, Portugal

2016 Acácio, V., **Dias, F.S.**, Catry, F.X., Rocha, M., Moreira, F,'Landscape dynamics in Mediterranean oak forests under global change: understanding the role of anthropogenic and environmental drivers across forest types', Seminário "Ecologia, Florestas e Conservação" do Centro de Estudos Florestais e CEABN. Instituto Superior de Agronomia, Lisboa, Portugal

2016 Acácio, V., **Dias, F.S.**, Catry, F.X., Rocha, M., Moreira, F., 2016, 'Landscape dynamics in Mediterranean oak forests under global change: understanding the role of anthropogenic and environmental drivers across species', World Congress Silvo-Pastoral Systems 2016, University of Évora, Évora, Portugal

2009 Ascensão F, Tracey JA, Costa M, Pinheiro P, Clevenger A, Grilo,C.,Matos, H.M., **Dias,F.S.**, Santos-Reis M., 'Do highways work as barriers for stone marten movements? Yes, and more than what may look', IX Jornadas de la SECEM. 5-8 December 2009, Bilbao, Spain

2009 Pinheiro P, Costa M., Ascensão F., Grilo C., Matos H., **Dias, F.S.**, Reto D. & M. Santos-Reis, Stone martens and highway interactions: home range configurations and crossing movements, 27th Mustelid Colloquium, 18-20 November 2009, Lisbon, Portugal

2009 **Dias, F. S.**, Grilo, Clara; Ascensão, Fernando; Santos-Reis, Margarida, 'Multi-scale analysis of road mortality patterns: a case study with the stone marten and the common genet.' IENE-Infra Eco Network Seminar "Connecting Wildlife and People" 2009, Évora

STUDENT SUPERVISIONS

2014 Berta Briñas García, Erasmus Mundus, Instituto Superior de Agronomia

Thesis: *Mapping and identification of hotspots for biodiversity and ecosystem services in cork oak woodlands in Portugal*

JURY OF ACADEMIC DEGREE

2026 Manuel Campilho

Masters Degree in Agronomy, Instituto Superior de Agronomia, Universidade de Lisboa

Thesis: Efeito da sombra e da origem das bolotas na sobrevivência de plantas jovens de sobreiro (Quercus suber L.)

TEACHING

2010-2011 Assistant Lecturer of "Biodiversity, Environment and Conservation" (Licenciate Degree in Biology) — Instituto Superior de Agronomia (Universidade de Lisboa). ~ 25 students | With Jorge Orestes Cerdeira, Diogo Alagador, Tiago Monteiro-Henriques

2026 Assistant Lecturer of "Forest biology" (Licenciate Degree in Forestry) — Instituto Superior de Agronomia (Universidade de Lisboa). ~ 10 students | With Maria Conceição Caldeira

CERTIFICATIONS

R	"Breezing through the Tidyverse - Jumpstart Your R Skills with Sports-Based Examples" (Athlyticz, 2024)
Data cleaning	"Biodiversity Data Quality and Cleaning" (GBIF 2025)
Bayesian statistics and Stan	'Becoming a Bayezian I - Foundations of Bayesian Analysis" (Athlyticz, 2024); 'Becoming a BayeZian - Part II: Advanced Stan Programming" ((Athlyticz, 2026)

GIS	“PostGIS - Learn how to work with maps in SQL” (LearnSQL.com, 2025) ’GeoPandas Free Certification’ (Modern GIS, 2025)
SQL	“SQL Basics in PostgreSQL” (LearnSQL.com, 2025))
Python	‘FoundationZ of Data Science” (Athlyticz, 2025)
Ornithology	"Ornithology: Comprehensive Bird Biology" (Cornell Lab of Ornithology, 2025)
Science Writing	Science Writing (Prof. Diane Srivastava, Terra Laboratory, 2026)

LANGUAGES

Portuguese (Native), English (Fluent), French (Basics), Spanish (Basics)

INTERESTS AND HOBBIES:

- Birding
- Working out
- Building computers
- Football, cycling and handball analytics