



Joaquín Martínez-Minaya

Personal information

Basic Information

First and Family name: Joaquín Martínez-Minaya

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website: <https://jmartinez-minaya.github.io>

github: <https://github.com/jmartinez-minaya>

Education

2014 - 2019. **Ph.D. in Statistics and Optimization**

University of Valencia, Valencia (Spain). Cum laude

2013 - 2015. **M.Sc. in Biostatistics**

University of Valencia, Valencia (Spain). Honours

2008 - 2013. **B.Sc. in Mathematics**

University of Valencia, Valencia (Spain).

Summary

My research lies in the field of **Applied Bayesian Statistics**, where I develop statistical methods for the analysis of **multivariate, spatial and spatio-temporal data**. My work combines methodological developments in Bayesian inference with applications in **environmental health, ecology and biomedicine**.

I am particularly interested in hierarchical models, latent Gaussian models, compositional data analysis, survival analysis, measurement agreement and species distribution modeling. From a computational perspective, my research relies on modern Bayesian inference techniques, especially **Integrated Nested Laplace Approximation (INLA)**, **Markov chain Monte Carlo (MCMC)** and scalable approaches for high-dimensional data.

A major goal of my research is to provide statistical tools that support evidence-based decision making in areas such as environmental exposures, climate-related health risks, biodiversity conservation and public health.

Professional experience

2024 - **Associate Professor**, DEPARTMENT OF APPLIED STATISTICS AND OPERATIONAL RESEARCH AND QUALITY, TECHNICAL UNIVERSITY OF VALENCIA, Valencia, Spain.

2021 - 2024 **Assistant Professor**, DEPARTMENT OF APPLIED STATISTICS AND OPERATIONAL RESEARCH AND QUALITY, TECHNICAL UNIVERSITY OF VALENCIA, Valencia, Spain.

2019 - 2021 **Postdoctoral researcher**, BASQUE CENTER FOR APPLIED MATHEMATICS (BCAM), Bilbao, Spain.

2016 - 2019 **Predoctoral researcher**, UNIVERSITY OF VALENCIA, Valencia, Spain.

2014 - 2016 **Biostatistician**, VALENCIAN INSTITUTE FOR AGRICULTURAL RESEARCH (IVIA), Valencia, Spain.

2014 **Biostatistician**, EXPERIOR S.L., Valencia, Spain.

International Research Stays

30/10/2024- **University of Edinburgh, Edinburgh, UK**, PROFESSOR: *Vanda Inácio and Finn Lindgren*.

28/11/2024 inlabru, brms and nimble for computing Bayesian agreement measures in Medicine.

30/10/2023- **University of Edinburgh, Edinburgh, UK**, PROFESSOR: *Vanda Inácio*.

05/11/2023 Bayesian mixed models for agreement measures in Medicine.

16/01/2023- **University of Edinburgh, Edinburgh, UK**, PROFESSOR: *Vanda Inácio*.

20/01/2023 Bayesian mixed models for agreement measures in Medicine.

23/08/2022- **University of Edinburgh, Edinburgh, UK**, PROFESSOR: *Ruth King*.

06/09/2022 Compositional data for microbiome analysis.

25/07/2022- **Basque Center For Applied Mathematics, Bilbao, Spain**, PROFESSOR: *Dae-Jin Lee*.

04/08/2022 Compositional data using Hamiltonian Monte Carlo.

- 11/11/2022- **King Abdullah University of Science and Technology, Saudi Arabia**, PROFESSOR: *Haavard Rue*.
- 11/12/2022 Implementing R-package to deal with compositional data using INLA methodology. Implementing validation measures in this context.
- 16/02/2020- **King Abdullah University of Science and Technology, Saudi Arabia**, PROFESSOR: *Haavard Rue*.
- 12/03/2020 Compositional data using INLA methodology.
- 01/09/2018- **University of Edinburgh, Edinburgh, UK**, PROFESSOR: *Finn Lindgren*.
- 30/11/2018 Implementation of a new R-package to approximate the Bayesian Dirichlet Regression using INLA methodology.
- 01/09/2017- **University of Edinburgh, Edinburgh, UK**, PROFESSOR: *Finn Lindgren*.
- 30/11/2017 Learning deeply a Stochastic Partial differential Equation (SPDE) methodology to approximate Bayesian spatio-temporal models using the Integrated Nested Laplace Approximation (INLA), and develop a method to approximate the Bayesian Dirichlet Regression.

Relevant Publications

1. **J. Martínez-Minaya**, L. Zumeta-Olaskoaga and D.-J. Lee (2025). Soil Texture Prediction with Bayesian Generalized Additive Models for Spatial Compositional Data. *arXiv preprint arXiv:2508.07708*. <https://doi.org/10.48550/arXiv.2508.07708>
2. A. Adin, E. T. Krainski, A. Lenzi, Z. Liu, **J. Martínez-Minaya**, and H. Rue (2024). Automatic cross-validation in structured models: Is it time to leave out leave-one-out?. *Spatial Statistics*, 100843. <https://doi.org/10.1016/j.spasta.2024.100843>
3. **J. Martínez-Minaya** and H. Rue (2024). A flexible Bayesian tool for CoDa mixed models: logistic-normal distribution with Dirichlet covariance. *Statistics and Computing*, 34(3), 116. <https://doi.org/10.1007/s11222-024-10427-3>
4. F. García-García, D.-J. Lee, P. P. España Yandiola, I. Urrutia Landa, **J. Martínez-Minaya**, M. Hayet-Otero, M. N. Ermecheo, J. M. Quintana, R. Menéndez, A. Torres and R. Zalacain Jorge (2024). Cost-sensitive ordinal classification methods to predict SARS-CoV-2 pneumonia severity. *IEEE Journal of Biomedical and Health Informatics*. <https://doi.org/10.1109/JBHI.2024.3363765>
5. O. Bronte, F. García-García, D.-J. Lee, I. Urrutia, A. Uranga, M. Nieves, **J. Martínez-Minaya**, J. M. Quintana, I. Arostegui, R. Zalacain, L. A. Ruiz-Iturriaga, L. Serrano, R. Menéndez, R. Méndez, A. Torres, C. Cilloniz, P. P. España, COVID-19 and Air Pollution Working Group (2023). Impact of outdoor air pollution on severity and mortality in COVID-19 pneumonia. *Science of The Total Environment*, 164877. <https://doi.org/10.1016/j.scitotenv.2023.164877>
6. **J. Martínez-Minaya**, F. Lindgren, A. López-Quílez, D. Simpson, and D. Conesa (2023). The Integrated Nested Laplace Approximation for fitting Dirichlet regression models. *Journal of Computational and Graphical Statistics*, 1-19. <https://doi.org/10.1080/10618600.2022.2144330>
7. M. Hayet-Otero, F. García-García, D. J. Lee, **J. Martínez-Minaya**, P. P. España Yandiola, I. Urrutia Landa, M. Nieves Ermecheo, J. M. Quintana, R. Menéndez, A. Torres, R. Zalacain Jorge, I. Arostegui, with the COVID-19 and Air Pollution Working Group (2023). Extracting relevant predictive variables for COVID-19 severity prognosis: An exhaustive comparison of feature selection techniques. *Plos one*, 18(4), e0284150. <https://doi.org/10.1371/journal.pone.0284150>
8. I. Anguelovski, J. J. Connolly, H. Cole, M. Garcia-Lamarca, M. Triguero-Mas, F. Baró, ... and **J. Martínez-Minaya** (2022). Green gentrification in European and North American cities. *Nature communications*, 13(1), 3816. <https://doi.org/10.1038/s41467-022-31572-1>
9. **J. Martínez-Minaya**, D. Conesa, A. López-Quílez, J. L. Mira, and A. Vicent (2021). Modelling inoculum availability of *Plurivorosphaerella nawae* in persimmon leaf litter with Bayesian beta regression. *Phytopathology*, 111(7), 1184-1192. <https://doi.org/10.1094/PHYTO-08-20-0359-R>
10. **J. Martínez-Minaya**, D. Conesa, C. Alonso-Blanco, M.J. Fortin, X. Picó and A. Marcer (2019). A hierarchical Bayesian Beta regression approach to study the effects of geographic genetic structure and spatial autocorrelation on species distribution range shifts. *Molecular Ecology Resources*, 19(4), 929 – 943. <https://doi.org/10.1111/1755-0998.13024>
11. **J. Martínez-Minaya**, M. Cameletti, D. Conesa and M.G. Pennino (2018). Species distribution modeling: a statistical review with focus in spatio-temporal issues. *Stochastic Environmental Research and Risk Assessment*, 32(11), 3227 –

Research Projects

- 01 September 2025 - 01 September 2026 **CIGE/2024/71 - ComSOVA - Bayesian Learning for High-Dimensional Compositional Data: Analysis of the Socioeconomic Impact on the Vaginal Microbiota,**
PERFORMING ENTITY: *Universitat Politècnica de València, FISABIO and Universitat de València*,
ROLE: PI,
FUNDING: €10,000 (by Valencian government (GVA)).
- 01 September 2024 - 31 August 2027 **PID2023-152976NB-I00 - Novel Methodologies for Multi-Omics Integrative Analysis With Cutting-Edge Sequencing Technologies,**
PERFORMING ENTITY: *I2SysBio (CSIC)*,
ROLE: Research Team (PI: Sonia Tarazona and Ana Conesa),
FUNDING: €275,000 (by Spanish Government).
- 01 January 2024 - 31 December 2026 **INNVA1/2024/91 - Hireves: Interactive Tool for the Relocation of Emergency Medical Vehicles,**
PERFORMING ENTITY: *Universitat Politècnica de València*,
ROLE: Research Team (PI: Fulgencia Villa and Victor Sánchez),
FUNDING: €120,000 (by Agencia Valenciana de la Innovación).
- 01 September 2023 - 01 September 2025 **How good is this medical device? Bayesian mixed models for agreement measures,**
PERFORMING ENTITY: *Universitat Politècnica de València and University of Edinburgh*,
ROLE: PI jointly with Vanda Inacio,
FUNDING: €12,000 (by The Royal Society).
- 01 September 2021 - 31 August 2024 **PID2020-115882RB-I00 - New proposals for estimation, prediction and validation of semi-parametric models for the analysis of complex data with applications in health and climate change,**
PERFORMING ENTITY: *ASOC BCAM - Basque Center for Applied Mathematics*,
ROLE: Research Team (PI: Dae-Jin Lee),
FUNDING: €31,500 (by Spanish Government).
- 01 January 2022 - 31 December 2023 **ComBIOTA - Bayesian Analysis of Compositional Data of Human Microbiota,**
PERFORMING ENTITY: *FISABIO, Universitat de València, Universitat Politècnica de València*,
ROLE: Research Team (PI: Blanca Sarzo),
FUNDING: €20,000 (by Valencian government (GVA)).
- 01 January 2021 - 31 December 2021 **BMTF-Applied Mathematical Modelling for Health,**
PERFORMING ENTITY: *ASOC BCAM - Basque Center for Applied Mathematics*,
ROLE: Research Team (PI: Côté Rodríguez and Dae-Jin Lee),
FUNDING: €1000000 (by Basque Government).
- 01 March 2020 - 31 December 2021 **3KIA-Integral and Cross-cutting Proposal for the Design and Implementation of Reliable Artificial Intelligence-based Systems,**
PERFORMING ENTITY: *Basque Government (ELKARTEK)*,
ROLE: Research Team (PI: Dae-Jin Lee and Côté Rodríguez),
FUNDING: €134132.28 (by Basque Government).
- 01 September 2020 - 31 December 2020 **Development of spatial erosivity factor prediction models under climate change scenarios,**
PERFORMING ENTITY: *Basque Institute for Agricultural Research (NEIKER)*,
ROLE: Research Team (PI: Dae-Jin Lee),
FUNDING: €6000 (by Basque Government).

Doctoral thesis Supervision

- **Bayesian Neural Networks for Enhanced Biomedical Image Segmentation: Methods and Applications** (2024-) - Sebastián Bera. Supervisors: Adrián Colomer, and **Joaquín Martínez-Minaya**. Statistics and Operations Research thesis, Universitat Politècnica de València.
- **Bayesian Statistical Modeling for Spatiotemporal and Compositional Data in Marine Science: New Tools and Applications** (2024-) - Jorge Mestre. Supervisors: Marta Col, and **Joaquín Martínez-Minaya**. Statistics and Operations Research thesis, Universitat Politècnica de València.
- **Bayesian Multivariate Modeling of High-Dimensional Compositional Microbiome Data** (2024-) - Oihane Álvarez Polo. Supervisors: Blanca Sarzo, María José López-Espinosa and **Joaquín Martínez-Minaya**. Statistics and Operations Research thesis, Universitat Politècnica de València.
- **Effect of B-cell lymphomas on the immune system and immune reconstitution after chemoimmunotherapy** (2023-) - Eva María Donato Martín. Supervisors: María José Terol Casterá and **Joaquín Martínez-Minaya**. Medicine thesis, Universitat de València.

Visiting Doctoral Students Supervision

- **A Random Activation Framework for Cure Models with Waring-Distributed Latent Causes** (2025–2026) – Jonathan Kevin Vasquez from University of São Carlos. Collaborative work with Vera Tomazella and Danilo Alvares da Silva.
- **Bayesian Analysis with INLA for Survival Models with Latent Variables Modeled by the Zero-Modified Power Series Distribution** (09-2024–06-2025) – Katy Rocío Cruz Molina from University of São Carlos. Collaborative work with Vera Tomazella and Danilo Alvares da Silva.

Master thesis Supervision

- **Bayesian Modeling with Measurement Error Variables: Methods and Applications** (2024–2025) - Reinaldo Espina Navarro. Supervisor: **Joaquín Martínez-Minaya**. Master's Degree in Data Analysis, Process Improvement and Decision Support Engineering, Universitat Politècnica de València.
- **Bayesian Neural Networks for Classification Problems** (2024–2025) - Raúl López Romero. Supervisor: **Joaquín Martínez-Minaya**. Master's Degree in Data Analysis, Process Improvement and Decision Support Engineering, Universitat Politècnica de València.
- **Predictive Models for a Modal Split Problem** (2023–2024) - Luis Enrique Palma Mejía. Supervisors: Eva Vallada and **Joaquín Martínez-Minaya**. Master's Degree in Data Analysis, Process Improvement and Decision Support Engineering, Universitat Politècnica de València.
- **Bayesian Zero-Inflated Modeling of the Incidence and Burden of Injuries in Professional European Football** (2022–2023) - Oihane Álvarez Polo. Supervisors: Dae-Jin Lee and **Joaquín Martínez-Minaya**. Master's degree in Biostatistics, Universitat de València.
- **Spatial Analysis of Spanish Bank Branches** (2021–2022) - Constanza Dalla Quercia. Supervisors: David Conesa and **Joaquín Martínez-Minaya**. Master's degree in Data Analysis for Business, Università Cattolica del Sacro Cuore.
- **Spatial Bayesian Geo-Additive Modelling: Predicting Soil Texture in the Basque Country** (2019–2020) - Miguel Ruá del Barrio. Supervisors: Dae-Jin Lee and **Joaquín Martínez-Minaya**. Master's degree in Biostatistics, Universitat de València.
- **Spatial Modeling of Fish Richness in the Mediterranean Sea** (2019–2020) - Joao Carmezim. Supervisors: David Conesa and **Joaquín Martínez-Minaya**. Master's degree in Biostatistics, Universitat de València.

Computer Skills

Programming	R, Python, C++, Shiny	Bayesian Software	INLA, inlabru, Stan, brms, JAGS, OpenBUGS
Version Control	Git, GitHub		