Laura RODRÍGUEZ-NAVAS
Data Scientist | Software Engineer

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I hold a Bachelor's in Computer Science from UPC (2017), following a previous career as a professional tennis player that sharpened my competitive and goal-driven mindset. During my studies, I gained hands-on experience in software development and discovered a strong interest in research through my Bachelor's thesis. I began my research career at CTTC, working on 5G technologies, and later pursued a Master's in Artificial Intelligence with a specialization in Learning and Data Science at UIMP. From 2019 to 2023, I contributed to the development of bioinformatics infrastructure as a Research Engineer at BSC. I continued my research at UOC, where I worked on modelling historical epidemics. Until June 2024, I worked as a Data Scientist at the BETA Technological Center, focusing on sustainability, life cycle assessment, and carbon footprint modelling. I am currently seeking PhD opportunities and research positions at the intersection of AI and life sciences.

🎓 EDUCATION

2022   **M.Sc. Artificial Intelligence**, Menéndez Pelayo International University, Madrid (Spain). Master in Research in Artificial Intelligence (specialization in Learning and Data Science), organized by the Spanish Association for Artificial Intelligence (Asociación Española para la Inteligencia Artificial, AEPIA). Graduated with honours in Natural Language Processing (NLP).

2017   **B.Sc. Computer Science**, Polytechnic University of Catalonia (Universitat Politècnica de Catalunya, UPC), Barcelona (Spain). Bachelor's Degree in Informatics Engineering.

💼 EXPERIENCE

June 2025
June 2024

Research Engineer, BETA TECHNOLOGICAL CENTER, Vic (Spain)
Research Engineer in DIGITAL TRANSITION
> - Development of sustainability models, life cycle analysis and carbon footprint.
> - Projects : CARBON FARMING MED.

`Python` `Data Science`

June 2024
January 2024

Teacher, UNIVERSITY OF VIC - CENTRAL UNIVERSITY OF CATALONIA, Vic (Spain)
Teacher in FACULTY OF SCIENCES, TECHNOLOGY AND ENGINEERING
> - Classes of Big Data in Technology and Management. Study Abroad Programme.

`Python` `Scala` `Hadoop` `Spark` `Big Data`

April 2024
June 2023

Research Assistant, OPEN UNIVERSITY OF CATALONIA, Barcelona (Spain)
Software Developer in EPIDEMIOLOGY
> - Development of expansion models of plague and cholera outbreaks in Spain throughout the 19th century.
> - Construction of open modelling and visualization tools for historical and current epidemic data.
> - Projects : EPI-PREDICT.

`R` `Bayesian statistics` `Statistical Data Analysis` `Natural Language Processing (NLP)`

May 2023
December 2019

Research Engineer, BARCELONA SUPERCOMPUTING CENTER, Barcelona (Spain)
Software Developer in LIFE SCIENCES DEPARTMENT
> - Development of a Virtual Research Environment (VRE) for OpenNebula environments.
> - Development of a Workflow Execution Service backend (WfExS-backend) for HPC environments.
> - Projects : **BY-COVID**, **EJP RD** : EUROPEAN JOINT PROGRAMME ON RARE DISEASES, **iPC** : individualizedPaediatricCure, **EOSC-Life** and **TransBioNet**.
> - Development of scientific workflows for HPC environments with Slurm workload manager (e.g. structural variants workflows).

`Python` `PHP` `JavaScript` `HTML` `MongoDB` `Edge/Core Cloud Computing` `CWL` `Nextflow` `HPC`

November 2019
September 2017

Research Assistant, TELECOMMUNICATIONS TECHNOLOGICAL CENTER OF CATALONIA, Castelldefels (Spain)
Software Developer in COMMUNICATION NETWORK DIVISION – OPTICAL NETWORKS AND SYSTEMS DEPARTMENT
> - Development and system administration of networked systems (mainly in GNU/Linux environments).
> - Projects : **BLUESPACE** - Building on the Use of Spatial Multiplexing 5G Networks Infrastructures and Showcasing Advanced technologies and Networking Capabilities, **ADRENALINE testbed** © – Experimental research testbed on high-performance and large-scale intelligent optical transport networks.

`Java` `Python` `C/C++` `MATLAB` `Edge/Core Cloud Computing` `SDN/NFV` `5G` `IoT services`

July 2017 February 2016	Software Developer	Sysadmin, Polytechnic University of Catalonia, Barcelona (Spain) *Software Developer* in Department of Mathematics of the Faculty of Mathematics and Statistics > Maintenance of websites : `https://fme.upc.edu/en`, `https://mesioupcub.masters.upc.edu/en` and `https://mat.upc.edu/en`. > Ubuntu servers administration and security. > Software development in Python. > Support to promoting of computer engineering studies at Education Fair. HTML Genweb 4 MySQL PostgreSQL ownCloud Grafana Fail2ban Python
December 2016 November 2016	Teacher, Pompeu Fabra University, Barcelona (Spain) *Teacher Assistant* in ESCI-UPF, Bachelor's Degree in Bioinformatics > Support classes in Python for programming subjects in Bachelor's Degree in Bioinformatics using the virtual learning environment for computer programming : `https://jutge.org`. Python
August 2015 June 2014	Software Developer, VENCA, Vilanova i la Geltrú (Spain) > Development of a monitoring system in a .NET environment with TDD to control anomalies. Visual error visualization using PRTG interface. > Creation and maintenance of the website `https://www.3suisses.fr/`. > Software development for the migration programs of AS/400. C# DB2 Microsoft SQL Server AS/400 HTML CSS JavaScript TDD

🖥 Projects

CARBON FARMING MED
2024 - 2025

🗗 Website

The CARBON FARMING MED project aims to develop a resilient agricultural system in the Mediterranean and assist farmers in adopting carbon farming as a profitable green business model. **Funding : European commission**.

EPI-PREDICT
2023 - 2024

○ github.com/lrodrin/epi_predict   🗗 Website

The EPI-PREDICT project aims to prevent the past epidemics to cure those of the present exploring Natural Language Processing and Bayesian statistics for constructing predictive models of epidemic expansion. **Funding : BBVA Foundation**.

BY-COVID
2021 - 2023

🗗 Website

The BeYond-COVID project aims to make COVID-19 data accessible to scientists in laboratories and anyone who can use it, such as medical staff in hospitals or government officials. Going beyond SARS-CoV-2 data, the project will provide a framework for making data from other infectious diseases open and accessible to everyone. **Funding : European commission**.

Master's Thesis
2021 - 2022

🗗 Thesis 2022   🗗 Presentation 2022

Automated analysis and modelling applied to monitoring the time series of dairy cattle in Catalonia. The project presents a strategy for monitoring dairy cattle in Catalonia (northeast of Spain) to obtain reliable mortality indicators over time. **Funding : Government of Catalonia**.

TransBioNet
2020 - 2023

🗗 Website

TransBioNet aims to enhance translational impact within the Spanish National Health System (SNS). The task involved implementing a structural variants pipeline, contributing to the network's objectives of fostering collaboration among bioinformatics units in hospitals, facilitating precision medicine initiatives nationally and internationally, and consolidating governance structures for sustained impact. **Funding : European commission**.

EJP RD : EUROPEAN JOINT PROGRAMME ON RARE DISEASES
2019 - 2023

🗗 Website

The EJP RD project aims to improve the integration, efficacy, production and social impact of research on RD through the development, demonstration and promotion of Europe-wide and even worldwide sharing of research and clinical data, materials, processes, knowledge and know-how; to implement and further develop an efficient model of financial support for all types of research on RD (basic, clinical, epidemiological, social, economic, health service) coupled with accelerated exploitation of research results for the benefits of patients. **Funding : European commission**.

individualizedPaediatricCure : Cloud-based virtual-patient models for precision paediatric oncology   2019 - 2023

🔗 Website

Effective personalized medicine for paediatric cancers must address many challenges, including domain-specific ones. To overcome these challenges, the iPC project proposes a platform that will allow caregivers to query models and infer benefits and drawbacks for specific treatment combinations for each child. To construct this platform, it combined state-of-the-art computational methods and data from molecular assays and clinical and preclinical studies. **Funding : European commission**.

EOSC-Life : Providing an open collaborative space for digital biology in Europe   2019 - 2023

🔗 Website

As a joint response to the challenge of analysing and reusing the prodigious amounts of data produced by life sciences, EOSC-Life brings together the 13 Biological and Medical ESFRI research infrastructures (BMS RIs) to create an open and collaborative space for digital biology. It promotes FAIR life sciences data resources, defines policies and recommendations for secure and responsible data sharing, and enriches the European Open Science Cloud (EOSC) ecosystem of life-sciences tools. **Funding : European commission**.

ADRENALINE Testbed ©   2018 - 2019

🔗 Website

The ADRENALINE testbed ©- Experimental research testbed on high-performance and large-scale intelligent optical transport networks has evolved from being a GMPLS-enabled Intelligent Optical Network towards advanced experimental research on high-performance and large-scale intelligent optical transport networks, consisting of an SDN/NFV Cloud Computing Platform and Core Network for 5G Services and an EOS Experimental Platform for Optical OFDM Systems.

BlueSpace   2017 - 2019

🔗 Website

BlueSPACE - Building on the Use of Spatial Multiplexing 5G Networks Infrastructures and Showcasing Advanced Technologies and Networking Capabilities project aims to develop next-generation wireless technologies that the market demands now. BlueSPACE intends to contribute technologies to increase the speed of the current 4G network by a factor of 100 while at the same time reducing the power consumption of the network by 90%. **Funding : European commission**.

Bachelor's Thesis   2016 - 2017

🔗 github.com/lrodrin/TFG   🔗 Presentation 2017

Structural graph with edges of equivalence applied to relational data analysis. Design and development of a software package that automatizes the analysis and visualization of data using relational structures involved in graph theory. In addition to the research and the development of possible applications.

🔖 Publications
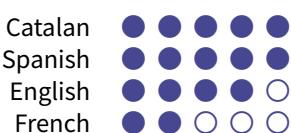
[1] S. Leo, M. R. Crusoe, **Rodríguez-Navas, Laura**, R. Sirvent, A. Kanitz, P. De Geest, R. Wittner, L. Pireddu, D. Garijo, J. M. Fernández, I. Colonnelli, M. Gallo, T. Ohta, H. Suetake, S. Capella-Gutierrez, R. de Wit, B. P. Kinoshita et S. Soiland-Reyes, « Recording provenance of workflow runs with RO-Crate, » *PLOS ONE*, t. 19, n° 9, p. 1-35, 2024. doi : `10.1371/journal.pone.0309210`.

[2] **Laura, Rodríguez-Navas**, B. J. Luis, T. Marta, C. Rita, S. Mireia, R. Carles, N. Sebastian, P. Lola, P. Pere, F.-F. Amanda et al., « Exploring Modelling Methods To Monitor Mortality Indicators In Dairy Farms. Case Study : Catalonia (Spain), » *Épidémiologie et Santé Animale*, n° 81, 2023.

[3] D. Bouyssié, P. Altiner, S. Capella-Gutierrez, J. M. Fernández, Y. P. Hagemeijer, P. Horvatovich, M. Hubálek, F. Levander, P. Mauri, M. Palmblad, W. Raffelsberger, **Rodríguez-Navas, Laura**, D. Di Silvestre, B. T. Kunkli, J. Uszkoreit, Y. Vandenbrouck, J. A. Vizcaíno, D. Winkelhardt et V. Schwämmle, « WOMBAT-P : Benchmarking Label-Free Proteomics Data Analysis Workflows, » *Journal of Proteome Research*, 2023. doi : `10.1021/acs.jproteome.3c00636`.

[4] R. Sirvent, J. Conejero, F. Lordan, J. Ejarque, **Rodríguez-Navas, Laura**, J. M. Fernández, S. Capella-Gutiérrez et R. M. Badia, « Automatic, Efficient and Scalable Provenance Registration for FAIR HPC Workflows, » in *2022 IEEE/ACM Workshop on Workflows in Support of Large-Scale Science (WORKS)*, 2022, p. 1-9. doi : `10.1109/WORKS56498.2022.00006`.

[5] L. Nadal, M. Svaluto Moreolo, J. A. Hernández, J. M. Fabrega, R. Casellas, R. Muñoz, R. Vilalta, **Rodríguez, Laura**, F. J. Vílchez et R. Martínez, « SDN-Enabled S-BVT for Disaggregated Networks : Design, Implementation and Cost Analysis, » *Journal of Lightwave Technology*, t. 38, n° 11, p. 3037-3043, 2020. doi : `10.1109/JLT.2020.2969457`.

[6] M. E. Piceno, **Rodríguez-Navas, Laura** et J. L. Balcázar, « Co-occurrence patterns in diagnostic data, » *Computational Intelligence*, t. 37, n° 4, p. 1499-1514, 2021. doi : `10.1111/coin.12317`.

[7] R. Casellas, F. J. Vílchez, **Laura Rodríguez**, R. Vilalta, J. M. Fàbrega, R. Martínez, L. Nadal, M. S. Moreolo et R. Muñoz, « An OLS Controller for Hybrid Fixed / Flexi Grid Disaggregated Networks with Open Interfaces, » in *Optical Fiber Communication Conference (OFC) 2020*, Optica Publishing Group, 2020. doi : `10.1364/OFC.2020.M3K.2`.

[8] R. Munoz, N. Yoshikane, R. Vilalta, J. M. Fabrega, **Rodriguez, L.**, D. Soma, S. Beppu, S. Sumita, R. Casellas, R. Martinez, T. Tsuritani et I. Morita, « Adaptive software defined networking control of space division multiplexing super-channels exploiting the spatial-mode dimension, » *Journal of Optical Communications and Networking*, t. 12, nº 1, A58-A69, 2020. DOI : `10.1364/JOCN.12.000A58`.

[9] L. Nadal, J. M. Fabrega, M. S. Moreolo, R. Casellas, R. Muñoz, **Rodríguez, Laura**, R. Vilalta, F. J. Vílchez et R. Martínez, « SDN-Enabled Sliceable Transceivers in Disaggregated Optical Networks, » *Journal of Lightwave Technology*, t. 37, nº 24, p. 6054-6062, 2019. DOI : `10.1109/JLT.2019.2945967`.

[10] M. E. Piceno et **Rodríguez-Navas, Laura**, « A graphical tool for the interpretation of medical data, » *Proceedings of the 6th ACM Celebration of Women in Computing : womENcourage*, 2019.

[11] J. L. Balcázar, M. E. Piceno et **Rodriguez-Navas, Laura**, « Hierarchical Visualization of Co-Occurrence Patterns on Diagnostic Data, » in *2019 IEEE 32nd International Symposium on Computer-Based Medical Systems (CBMS)*, 2019, p. 168-173. DOI : `10.1109/CBMS.2019.00043`.

[12] R. Muñoz, N. Yoshikane, R. Vilalta, J. M. Fàbrega, **L. Rodríguez**, R. Casellas, M. S. Moreolo, R. Martínez, L. Nadal, D. Soma, Y. Wakayama, S. Beppu, S. Sumita, T. Tsuritani et I. Morita, « SDN Control of Sliceable Multidimensional (Spectral and Spatial) Transceivers with YANG/NETCONF, » *J. Opt. Commun. Netw.*, t. 11, nº 2, A123-A133, 2019. DOI : `10.1364/JOCN.11.00A123`.

[13] R. Muñoz, N. Yoshikane, J. M. Fàbrega, **Rodríguez, L.**, R. Vilalta, D. Soma, S. Beppu, S. Sumita, R. Casellas, R. Martínez, T. Tsuritani et I. Morita, « SDN-Enabled Scaling Up/Down of SDM Super-Channels Exploiting Spatial Modes with Adaptive MIMO Equalization and Modulation Format Assignment, » in *2019 Optical Fiber Communications Conference and Exhibition (OFC)*, 2019, p. 1-3. DOI : `10.1364/OFC.2019.M4J.7`.

[14] J. Luis Balcázar, M. Ely Piceno et **Rodríguez-Navas, Laura**, « Decomposition of Quantitative Gaifman Graphs as a Data Analysis Tool, » in *Advances in Intelligent Data Analysis XVII*, W. Duivesteijn, A. Siebes et A. Ukkonen, éd., Cham : Springer International Publishing, 2018, p. 238-250, ISBN : 978-3-030-01768-2. DOI : `10.1007/978-3-030-01768-2_20`.

[15] R. Vilalta, R. Muñoz, G. Landi, **Rodriguez, L.**, M. Capitani, R. Casellas et R. Martínez, « Experimental Demonstration of the BlueSPACE's NFV MANO Framework for the Control of SDM/WDM-Enabled Fronthaul and Packet-Based Transport Networks by Extending the TAPI, » in *2018 European Conference on Optical Communication (ECOC)*, 2018, p. 1-3. DOI : `10.1109/ECOC.2018.8535514`.

[16] R. Muñoz, N. Yoshikane, J. M. Fábrega, R. Vilalta, **Rodríguez, L.**, M. S. Moreolo, R. Casellas, R. Martínez, S. Beppu, D. Soma, T. Tsuritani et I. Morita, « SDN Control and Monitoring System for Soft-Failure Detection and Optical Restoration of Spectral/Spatial Superchannels, » in *2018 European Conference on Optical Communication (ECOC)*, 2018, p. 1-3. DOI : `10.1109/ECOC.2018.8535244`.

[17] R. Muñoz, R. Vilalta, J. M. Fàbrega, **Rodríguez, Laura**, R. Martínez, R. Casellas, G. Landi et M. Capitani, « BlueSPACE's SDN/NFV Architecture for 5G SDM/WDM-Enabled Fronthaul with Edge Computing, » in *2018 European Conference on Networks and Communications (EuCNC)*, 2018, p. 403-9. DOI : `10.1109/EuCNC.2018.8443224`.

☰ IT Skills

Programming Languages	Python, R, Java, C/C++, C#, Bash, PHP, JavaScript, HTML, CSS
Data Science & AI	Pandas, NumPy, Scikit-learn, Seaborn, Matplotlib, CWL, Nextflow, Shiny
Databases	MongoDB, PostgreSQL, MySQL, Microsoft SQL Server, SQLite, IBM DB2
Developer Tools	Git, JetBrains IDEs, Visual Studio Code, Eclipse, NetBeans, Maven, SVN
Operating Systems	Linux (Ubuntu/Debian), macOS, Windows
Others	Agile methodology, LaTeX

🌐 Languages

Catalan ●●●●●
Spanish ●●●●●
English ●●●●○
French ●●○○○

✚ Strengths

> Enthusiast, Motivated, Autonomous
> Artificial Intelligence, Machine Learning
> Data Science, Exploratory Data Analysis
> Graph Theory, Time-Series

🔖 Awards

2019 Co-author of the "Best Student Paper Award" for the paper entitled "Hierarchical Visualization of Co-Ocurrence Patterns on Diagnostic Data", presented at the 32nd IEEE International Symposium on Computer-Based Medical Systems – IEEE CBMS 2019, which took place at Maimónides Biomedical Research Institute of Córdoba, Spain (link to special mention).

❝ References

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