Laura RODRÍGUEZ-NAVAS
Computer Scientist | Software Engineer

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I completed my undergraduate studies in Computer Science at the Polytechnic University of Catalonia in 2017. In 2022, I obtained a Master's degree in Artificial Intelligence from Menendez Pelayo International University, organized by the Spanish Association for Artificial Intelligence. After four years of experience in software development during my undergraduate studies, I decided to pursue a research career. In 2017, I joined the Telecommunications Technological Center of Catalonia as a Research Assistant, and I participated in international, European, and industrial research projects focused on 5G technologies. In 2019, I started working at the Barcelona Supercomputing Center as a Research Engineer in the Life Sciences department. At the BSC, I was involved in research projects developing bioinformatics infrastructures at the international, European, and national levels. Now, I work part-time in epidemiology as a Research Assistant at the Open University of Catalonia (Universitat Oberta de Catalunya, UOC).

💼 EXPERIENCE

Present
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.

`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 and **EOSC-Life**.
> Development of scientific workflows for HPC environments with Slurm workload manager (e.g. structural variants workflows).

`Python` `PHP` `JavaScript` `HTML` `CSS` `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)**
Working Student 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`

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

💻 Projects

EPI-PREDICT   2023 - Present
🔗 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.**

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] Raül Sirvent, Javier Conejero, Francesc Lordan, Jorge Ejarque, **Rodríguez-Navas, Laura**, José M. Fernández, Salvador Capella-Gutiérrez et Rosa 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.

[2] Laia Nadal, Michela Svaluto Moreolo, José Alberto Hernández, Josep M. Fabrega, Ramon Casellas, Raul Muñoz, Ricard Vilalta, **Rodríguez, Laura**, F. Javier Vílchez et Ricardo Martínez. « SDN-Enabled S-BVT for Disaggregated Networks : Design, Implementation and Cost Analysis ». In : *Journal of Lightwave Technology* 38.11 (2020), p. 3037-3043. DOI : 10.1109/JLT.2020.2969457.

[3] Marie Ely Piceno, **Rodríguez-Navas, Laura** et José Luis Balcázar. « Co-occurrence patterns in diagnostic data ». In : *Computational Intelligence* 37.4 (2021), p. 1499-1514. DOI : 10.1111/coin.12317.

[4] Ramon Casellas, F. Javier Vílchez, **Laura Rodríguez**, Ricard Vilalta, Josep M. Fàbrega, Ricardo Martínez, Laia Nadal, Michela Svaluto Moreolo et Raul 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.

[5] 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 ». In : *Journal of Optical Communications and Networking* 12.1 (2020), A58-A69. DOI : 10.1364/JOCN.12.000A58.

[6] Laia Nadal, Josep M. Fabrega, Michela Svaluto Moreolo, Ramon Casellas, Raul Muñoz, **Rodríguez, Laura**, Ricard Vilalta, F. Javier Vílchez et Ricardo Martínez. « SDN-Enabled Sliceable Transceivers in Disaggregated Optical Networks ». In : *Journal of Lightwave Technology* 37.24 (2019), p. 6054-6062. DOI : 10.1109/JLT.2019.2945967.

[7] Marie Ely Piceno et **Rodríguez-Navas, Laura**. « A graphical tool for the interpretation of medical data ». In : *Proceedings of the 6th ACM Celebration of Women in Computing : womENcourage* (2019).

[8] José Luis Balcázar, Marie Ely 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.

[9] R. Muñoz, N. Yoshikane, R. Vilalta, J. M. Fàbrega, **L. Rodríguez**, R. Casellas, M. Svaluto 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 ». In : *J. Opt. Commun. Netw.* 11.2 (2019), A123-A133. DOI : 10.1364/JOCN.11.00A123.

[10] 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.

[11] José Luis Balcázar, Marie Ely Piceno et **Rodríguez-Navas, Laura**. « Decomposition of Quantitative Gaifman Graphs as a Data Analysis Tool ». In : *Advances in Intelligent Data Analysis XVII*. Sous la dir. de Wouter Duivesteijn, Arno Siebes et Antti Ukkonen. Cham : Springer International Publishing, 2018, p. 238-250. ISBN : 978-3-030-01768-2. DOI : 10.1007/978-3-030-01768-2_20.

[12] 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.

[13] R. Muñoz, N. Yoshikane, J. M. Fábrega, R. Vilalta, **Rodríguez, L.**, M. Svaluto 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.

[14] Raul Muñoz, Ricard Vilalta, Josep M. Fàbrega, **Rodríguez, Laura**, Ricardo Martínez, Ramon Casellas, Giada Landi et Marco 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, CWL, Nextflow.
Frameworks & Libraries	Matplotlib, NumPy, Pandas, Scikit-learn, Seaborn.
Databases	MongoDB, Microsoft SQL Server, MySQL, PostgreSQL, IBM DB2, SQLite.
Developer Tools	JetBrains, Eclipse, Apache NetBeans, Visual Studio Code, Maven, SVN, git.
Operating systems	Mac OS X, Windows, Linux Ubuntu/Debian.
Others	Shiny, 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).

66 References

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