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About me

I am a data scientist with a strong background in artificial intelligence and mathematics, holding a degree in Statistics and a master's in Logic, Computation, and AI. Currently, I am a researcher at the University of Seville, working on the European project REXASI-PRO and pursuing a PhD focused on improving AI reliability mainly through topological data analysis. With over three years of experience in data science, I am passionate about leveraging AI for impactful applications, staying at the forefront of innovation, and contributing to scientific and technological progress.

Work Experience

12/2023 - now	Researcher. Department of Applied Mathematics I, University of Seville. Pre-doctoral researcher under the European project REXASI-PRO (HORIZON-CL4-HUMAN-01). My role focuses on optimizing energy consumption in machine learning models for pedestrian detection through topology-based methods, reducing input data while preserving performance. I also work on optimizing robot fleet behavior using explainable models to enhance reliability and predict secure wheelchair routes(WP6). Additionally, I contribute to the project's dissemination and communication efforts as part of WP8.
04/2025 - 06/2025	Research Stay. AIDOS Lab, University of Fribourg, between April 06 and June 06, 2025 visiting Prof. Dr. Bastian Rieck's team. Main objective was to use Topological Machine Learning techniques in the context of computational healthcare, more specifically in predicting the response of treatment to lung cancer.
10/2024 - 10/2024	Research Stay. Consiglio Nazionale delle Ricerche, Istituto di Elettronica e di Ingegneria dell'Informazione e delle Telecomunicazioni (CNR-IEIIT, Genova), between October 01 and October 31, 2024 visiting Maurizio Mongelli's team. Main objective was to mix both fields, Topological Data Analysis and Explainable Artificial Intelligence.
12/2022 - 12/2023	Data Scientist. Igluco Tech. My role focuses on the development of deep learning models for blood glucose prediction. I also worked on data analysis and creating reports and visualizations.
09/2022 - 12/2022	Software Developer. Solera. Software and test development in Java and Python
01/2022 - 03/2022	Data Scientist. FISEVI. My role focuses on the development of data analysis, including data import, data cleaning and data cleansing, applying statistical techniques. Also developing an automated library for time saving and also in the production of reports.

Education

2024 – now	PhD in Mathematics and AI , University of Seville. Research line: Topological Data Analysis for Trustworthy AI.
06/2025	Statistical Optimal Transport summer graduate workshop, Simons Laufer Mathematical Sciences Institute (SLMath), between June 09 and June 20, in Berkeley, California. Granted by SLMath.

Education (continued)

2022 – 2023	Master's Degree in Logic, Computation and Artificial Intelligence. University of Seville. Thesis title: <i>Applications of artificial intelligence in predicting blood glucose levels using non-invasive techniques.</i>
2018 – 2022	Bachelor's Degree in Statistics. University of Seville Thesis title: <i>Statistical indicators associated to the living conditions survey.</i>

Skills

Engineering	Machine Learning algorithms (e.g., decision trees), Deep Learning algorithms (e.g., neural networks), mathematical analysis, statistical methods, cleaning, and debugging data.
Languages	Python, R, Java, Javascript.
Tools	Tensorflow, Keras, Pytorch, Dash, Git, , VScode, Jupyter, Excel, SPSS, $\LaTeX$.
Databases	MySQL, PostgreSQL.

Languages

Spanish	Native.
English	Overall B2 Listening C Reading B2 Writting B2 Speaking B2.

Achievements

Participation in "II Jornadas de Topología de Datos" (TDA2025) with a talk titled "Interpolation and Function Approximation Using Neural Networks and Barycentric Coordinates". Certificate.

Seminar titled "Topological Data Analysis for data analysis and AI in robotics" in Scuola di Robotica, Genova. Certificate.

Participation in the Centre for Topological Data Analysis 2024 conference, organized by the University of Oxford. A poster titled "Representative measure approach to assess decision trees reliability" was presented.

Participation in The 2nd World Conference on eXplainable Artificial Intelligence. Oral presentation on the paper published in this conference [3], and in consortium with poster.

Participation in the GATMAID EMS Summer School, organized by the Centre de Recerca Matemàtica from June 25 to 29, 2024. A poster titled "Representative measure approach to assess decision trees reliability" was presented.

Participation in the ETSII Research Days (JIETSII 2024) with the talk titled "Topological Data Analysis for Trustworthy Artificial Intelligence".

NVIDIA DLI Certificate - "Fundamentals of Accelerated Data Science". Credential ID Jkg8E3DnSZu7hLnQfgBLDQ.

NVIDIA DLI Certificate - "Fundamentals of Deep Learning". Credential ID ToLN84tLTUKly-6eRmtGqA.

Research Projects

12/2023 – now	Researcher of the "REliable & eXplAinable Swarm Intelligence for People with Reduced mObility" european project (REXASI-PRO, GRANT AGREEMENT NO.101070028). University of Seville.
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Research Projects (continued)

02/2023 – 11/2024 **Member of the work team of the "Topología Computacional para el ahorro de energía y la optimización de métodos de aprendizaje profundo para alcanzar soluciones verdes de Inteligencia Artificial" project (TED2021-129438B-I00).** University of Seville.

Research Teams

2023 – now **Team member of the Combinatorial IMage Analysis research group.** University of Seville.

Publications

Please check my publications on [Google Scholar](#).

- 1 **V. Toscano-Duran**, S. Narteni, A. Carlevaro, R. Gonzalez-Diaz, M. Mongelli, and J. Guzzi, "Safe and efficient social navigation through explainable safety regions based on topological features," *arXiv preprint arXiv:2006.16824*, Mar. 2025, Submitted and accepted at The 3rd World Conference on eXplainable Artificial Intelligence. [DOI](#): 10.48550/arXiv.2503.16441.
- 2 J. Perera-Lago, **V. Toscano-Duran**, E. Paluzo-Hidalgo, R. Gonzalez-Diaz, M. A. Gutiérrez-Naranjo, and M. Rucco, "An in-depth analysis of data reduction methods for sustainable deep learning," *Open Research Europe*, vol. 4:101, Sep. 2024. [DOI](#): 10.12688/openreseurope.17554.2.
- 3 J. Perera-Lago, **V. Toscano-Duran**, E. Paluzo-Hidalgo, S. Narteni, and M. Rucco, "Application of the representative measure approach to assess the reliability of decision trees in dealing with unseen vehicle collision data," in *World Conference on Explainable Artificial Intelligence*, L. Longo, S. Lapuschkin, and C. Seifert, Eds., Springer Nature Switzerland, Jul. 2024, pp. 384–395, ISBN: 978-3-031-63803-9. [DOI](#): 10.1007/978-3-031-63803-9_21.

References

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Miguel Ángel Gutiérrez Naranjo	Assistant Professor, University of Seville, magutier@us.es .