

Curriculum Vitae

Personal Details

Date of birth **March 1, 1998.**
Citizenship **Spanish.**

Education

- 2022– **PhD**, *FAU Erlangen-Nürnberg/Universidad Autónoma de Madrid (UAM)*, Germany/Spain.
Advisor: Enrique Zuazua Iriondo. Co-advisor: Rafael Orive Illera.
- Oct–Nov 2022 **Research Internship**, *Chair for Dynamics, Control, Machine Learning and Numerics*, Friedrich-Alexander-Universität, (hosted by Prof. Enrique Zuazua).
- 2021–2022 **Master's degree in Advanced Mathematics**, *Universidad Complutense de Madrid*, Spain.
- 2016–2021 **Bachelor's double degree in Mathematics and Physics**, *Universidade de Santiago de Compostela (USC)*, Spain, Academic exchange year 2019–2020 in *Universidad de Granada*.
Highest Honors in 19 out of 59 courses.

Scientific production

Published articles

Interplay between depth and width for interpolation in neural ODEs, with *Arselane Hadj Slimane and Enrique Zuazua*, *Neural Networks*, Volume 180, 106640, 2024.
<https://doi.org/10.1016/j.neunet.2024.106640>

Cluster-based classification with neural ODEs via control, with *Rafael Orive-Illera and Enrique Zuazua*, *Journal of Machine Learning*, Volume 4(2), 128-156, 2025.
<https://doi.org/10.4208/jml.241114>

Constructive approximate transport maps with normalizing flows, with *Borjan Geshkovski and Domènec Ruiz-Balet*, *Applied Mathematics and Optimization*, Volume 92, 33, 2025.
<https://doi.org/10.1007/s00245-025-10299-7>

Preprints (submitted)

Continuous Temporal Learning of Probability Distributions via Neural ODEs with Applications in Continuous Glucose Monitoring Data, with *Marcos Matabuena*, arXiv:2505.08698.

Invited talks (Conferences & workshops)

- 27th Aug 2024 **Cluster-based classification with neural ODEs via control**. *Conference X Partial differential equations, optimal design and numerics* (Centro de Ciencias de Benasque Pedro Pascual).
- 26th Aug 2024 **Interplay between depth and width for interpolation in neural ODEs**. *Conference X Partial differential equations, optimal design and numerics* (Centro de Ciencias de Benasque Pedro Pascual).
- 21st June 2024 **Controllability of neural ODEs for data classification**. *21 French-German-Spanish Conference on Optimization* (Universidad de Oviedo).
- 14th Nov 2023 **Neural ODEs and data classification**. *V BYMAT Conference* (ICMAT).
- 1st March 2023 **On the separability of two finite sets of random points using hyperplanes**. *Mini-workshop between Technische Universität München (Applied Numerical Analysis group) and FAU-DCN*.

Invited talks (Seminars)

- 29th Sept 2025 **Entropy-driven control of the continuity equation for normalizing flows**. *Machine Learning and Scientific Computing Seminar*. **National University of Singapore**.
- 16th Sept 2025 **Entropy-driven control of the continuity equation for normalizing flows**. *Nonlinear PDE seminar*. Department of Mathematics. **Texas A&M University**.
- 2024–2025 **Presentations in lecture seminars: Learning Rate — Machine Learning Research Discussion Series** (FAU - UAM), 4 sessions (29.10.2024; 05.11.2024; 30.05.2025; 13.06.2025).
- 1st April 2024 **Controllability of neural differential equations**. *Seminario Fontán de Matemáticas*. **USC**.
- 22th Feb 2024 **Stable Architectures for Deep Neural Networks**. *Mathematics for Deep Learning reading group*. **Universities of Bath, Cambridge, and University College London**.

- 25th Jan 2024 **Efficient classification and interpolation with neural ODEs.** *Mathematics Seminar.* School of Mathematics. **Sichuan University.**
- 28th Feb 2023 **Breaking the curse of dimensionality with Barron Spaces.** *Applied PDEs Seminar.* Applied Mathematics and Mathematical Physics Section. **Imperial College London.**
- 14th Nov 2022 **Breaking the curse of dimensionality with Barron Spaces.** *FAU-DCN.*
- 4th April 2021 **Formation of singularities in the incompressible Euler fluid equations.** *Seminarios de Iniciación a la Investigación.* Instituto de Matemáticas. **USC.**

Poster presentations

- 7th–10th Oct 2024 Fudan University, Shanghai. **2024 Conference on Control, Inversion and Numerics for PDEs.** Title: **Controllability of Neural ODEs for Classification.**
- 10th Sept 2024 Casa Convalescència, Barcelona. **Mathematical Aspects of Learning Theory – 20 years later.** Title: **Simultaneous Control of Neural ODEs for Data Classification.**
- 9th July 2024 Fields Institute, Toronto. **Fourth Symposium on Machine Learning and Dynamical Systems.** Title: **Simultaneous Control of Neural ODEs for Data Classification.**
- 12th June 2024 FAU. **Trends in Mathematical Sciences (Conference).** Title: **Optimized Classification with Neural ODEs.**
- 25th March 2024 Engineers' House, Bristol. **Dynamics, Data and Deep Learning Workshop.** Title: **Optimized Classification with Neural ODEs.** Best Poster Award.
- 11th Dec 2023 George Mason University, Fairfax. **Mathematical Opportunities in Digital Twins (Workshop).** Title: **Optimized Classification with Neural ODEs.**

Awards

- 2025 **Student travel award,** *2025 IMS International Conference on Statistics and Data Science (ICSIDS).*
- 2024 **Best poster award,** *Workshop Dynamics, Data and Deep Learning, Bristol.*
- 2018 **Academic excellence award,** *Best qualifications of Galician University System 2017/18.*
- 2016 **USC's A Ponte program award,** *Top students in the University Entrance Exam.*
- 2014 **National Award,** *Compulsory Secondary Education 2013/14.*

Scholarships

- Aug 2025–Nov 2026 **FPU Mobility Supplement,** *Ministerio de Universidades, Spain.*
Ranked #1 (6 awards nationwide).
- Dec 2022–Dec 2026 **FPU Predoctoral fellowship,** *Ministerio de Universidades, Spain.*
Ranked #6 (18 awards nationwide).
- Sept 2021–June 2022 **Research fellowship for Master's degree "JAE Intro SOMdM 2021",** *Supervisor: Prof. Alberto Enciso. Subject: Mathematical analysis,* Institute of Mathematical Sciences (ICMAT).
7 awards nationwide.
- July 2021 **Summer research scholarship,** *Supervisor: Prof. Paulo Félix Lamas. Subject: Pattern recognition in cardiovascular diseases using machine learning techniques,* CiTIUS (USC).
- July–Sept 2020 **Scholarship Severo Ochoa-ICMAT for introduction to research,** *Supervisor: Prof. Alberto Enciso. Project: "Mathematical problems in fluid mechanics",* ICMAT.

Visits (at least one week)

- Aug–Nov 2025 **National University of Singapore,** *Singapore,* hosted by Prof. Qianxiao Li.
- May–July 2025 **Sorbonne Université, Laboratoire Jacques-Louis Lions,** *Paris, France,* hosted by Dr. Borjan Geshkovski.
- May–June 2024 **FAU-DCN,** *Erlangen, Germany,* hosted by Prof. Enrique Zuazua.
- Jan 2024 **Sichuan University, School of Mathematics,** *Chengdu, China,* hosted by Prof. Qi Lü.
- Aug–Sept 2023 **Massachusetts Institute of Technology, Department of Mathematics,** *Cambridge, USA,* hosted by Dr. Borjan Geshkovski.
- Feb–March 2023 **Imperial College London, Applied Mathematics and Mathematical Physics Section,** *London, United Kingdom,* hosted by Domènec Ruiz-Balet.

Participation in scientific events

23rd–26th June 2025	Workshop , <i>Mean Field Games, Optimal Transport, and Machine Learning</i> , NYU - Paris, Paris, France.
28th–30th April 2025	Workshop , <i>Machine Learning and PDEs</i> , FAU, Erlangen, Germany.
24th–29th Nov 2024	Seminar , <i>Oberwolfach Seminar: Control and Machine Learning</i> , Mathematisches Forschungsinstitut Oberwolfach, Oberwolfach, Germany.
7th–10th Oct 2024	Conference , <i>2024 Conference on Control, Inversion and Numerics for PDEs</i> , Fudan University, Shanghai, China.
9th–13th Sept 2024	Conference , <i>Mathematical Aspects of Learning Theory – 20 years later</i> , Centre de Recerca Matemàtica, Barcelona, Spain.
19th Aug–30th Aug 2024	Conference , <i>X Partial differential equations, optimal design and numerics</i> , Centro de Ciencias de Benasque Pedro Pascual, Huesca, Spain.
22nd–26th July 2024	Summer School , <i>C.I.M.E. Session on “PDEs, Control and Deep Learning”</i> , Cetraro, Italy.
8th–12th July 2024	Conference , <i>Fourth Symposium on Machine Learning and Dynamical Systems</i> , Fields Institute, Toronto, Canada.
18th–21st June 2024	Conference , <i>21 French-German-Spanish Conference on Optimization</i> , Universidad de Oviedo, Spain.
10th–15th June 2024	Conference , <i>Trends in Mathematical Sciences</i> , FAU, Erlangen, Germany.
25th–26th March 2024	Workshop , <i>Dynamics, Data and Deep Learning Workshop</i> , Engineers’ House, Bristol, UK.
11th–13th Dec 2023	Workshop , <i>Mathematical Opportunities in Digital Twins</i> , George Mason University, Fairfax, Virginia.
13th–16th Nov 2023	Conference , <i>V BYMAT Conference</i> , ICMAT, Madrid, Spain.
10th–11th July 2023	Summer School , <i>XV International ICMAT Summer School on Geometry, Dynamics and Field Theory</i> , ICMAT, Madrid, Spain.
3rd–7th July 2023	Summer School , <i>Escuela JAE de Matemáticas 2023</i> , ICMAT, Madrid, Spain.
22nd Feb 2023	Workshop , <i>Exploring foundation models</i> , The Alan Turing Institute, London, United Kingdom.
12th–14th Sept 2022	Workshop , <i>Fall workshop on nonlinear and nonlocal PDEs</i> , UAM, Madrid, Spain.
21st Aug–2nd Sept 2022	Conference , <i>IX Partial differential equations, optimal design and numerics</i> , Centro de Ciencias de Benasque Pedro Pascual, Huesca, Spain.

Teaching (assistant)

Jan–May 2025	Calculus II , <i>Bachelor’s Degree in Data Science and Engineering</i> , UAM.
Jan–May 2025	Probability and Statistical Inference , <i>Bachelor’s Degree in Computer Science</i> , UAM.
Feb–May 2024	Numerical Calculus , <i>Bachelor’s double degree in Mathematics and Computer Science</i> , UAM.
Feb–May 2023	Data Analysis , <i>Bachelor’s degree in Biology</i> , UAM.

Organization of scientific events

2024–2025	Machine Learning Seminars, Junior colloquia, Lecture group “Learning Rate” , ICMAT, UAM, FAU-DCN.
2024	Two young researchers sessions , Benasque, Spain. <i>Conference X Partial differential equations, optimal design and numerics.</i>

Peer reviews

Mathematical Control, Signals and Systems; Neural Networks.

Languages

Spanish	Native
Galician	Native
English	C2 Proficiency
French	Delf B2

Skills

Technology	Matlab, Python, R, Latex
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Languages **Spanish, Galician (Native), English (C2 Proficiency), French (Delf B2)**