

Manuel MADEIRA

PERSONAL DATA

✉ : manuel.madeira@epfl.ch
🌐 : manuelmlmadeira.github.io
LinkedIn : manuel-madeira

👤 : manuelmlmadeira
Twitter : @manuelmlmadeira
Portuguese

ABOUT ME

I am a 4th-year PhD student at EPFL under the supervision of [Pascal Frossard](#) and [Dorina Thanou](#). My interests gravitate around generative modelling, graph deep learning and their applications in enabling scientific discoveries. I have proposed novel generative frameworks for graphs and developed methods that incorporate domain knowledge to enhance the controllability and performance of graph generation. Recently, I have also begun exploring vision and language foundational models in the context of digital pathology.

EDUCATION

- 2022 - PhD. in MACHINE LEARNING (Expected Graduation: December 2026)
PRESENT **École Polytechnique Fédérale de Lausanne**, Switzerland
- 2018 - 2019 Exchange student in COMPUTER SCIENCE
(FALL) **Tsinghua University**, China
- 2018 - 2021 MSc. in BIOMEDICAL ENGINEERING
Instituto Superior Técnico, Portugal
GPA: 19 / 20 (1st in class), THESIS: 20/20
- 2015 - 2018 BSc. in BIOMEDICAL ENGINEERING
Instituto Superior Técnico, Portugal
GPA: 19 / 20 (1st in class and 1st ever to attain such grade)

RESEARCH EXPERIENCE

- JUL 2025 - DEC 2025 **Applied Scientist Intern** at **AMAZON**
Developed a graph-based deep learning framework for predictive modeling in supply chain long-term planning.
- SEP 2022 - PRESENT **Doctoral Assistant** at **EPFL**
Studied the incorporation of structural constraints into graph discrete diffusion models and developed the first discrete flow matching model for graphs. Employed these methods in real-world applications, including molecular generation and digital pathology.
- SEP 2021 - AUG 2022 **Machine Learning Researcher** at **INDUCTIVA RESEARCH LABS**
Conducted research on deep learning based approaches to solve partial differential equations. Deployed physics-informed neural networks to model heat diffusion and coastal dynamics and analysed their generalization to arbitrary domains.
- MAR 2021 - JUN 2021 **Research Internship** at **INSTITUTE FOR SYSTEMS AND ROBOTICS**
SUPERVISORS: [Renato Negrinho](#), [João Xavier](#), and [Pedro Aguiar](#)
Researched on L -smoothness exploitation for first-order stochastic optimization methods with theoretical developments on algorithmic analysis.
- SEP 2019 - FEB 2020 **Research Internship** at **IST-ID**
Transcribed interviews on health technologies assessment in Portugal for the [MEDI-VALUE PROJECT](#).

AWARDS AND HONORS

- 2025 **Top Reviewer**, by NeurIPS 2025
- 2025 **Innovation Fellowship Finalist**, by Qualcomm
- 2022-23 **EDIC PhD Fellowship**, by EPFL
- 2016-18 **1st ranked student in Biomedical Engineering BSc**, by Instituto Superior Técnico
- 2015-20 **Diploma of Academic Excellence (Top 10%)**, by Instituto Superior Técnico
- 2009-15 **Best student in high school**, by Crédito Agrícola

PUBLICATIONS

-
- [1] A. Carballo-Castro, MM, Y. Qin, D. Thanou, and P. Frossard. **Generating Directed Graphs with Dual Attention and Asymmetric Encoding**. In: ArXiv. 2025.
 - [2] S. Öğüt, C. Vincent-Cuaz, MM, et al. **Benchmarking Instance-Level Learnability and Interpretability in Multiple Instance Learning**. In: Under Review. 2025.
 - [3] B. Chen*, C. Vincent-Cuaz*, L. A. Schoenfliug*, MM*, et al. **Revisiting Automatic Data Curation for Vision Foundation Models in Digital Pathology**. In: Early Acceptance (Top 9%). MICCAI. 2025.
 - [4] O. Zaghen, MM, L. Toni, and P. Frossard. **Graph Discrete Diffusion: a Spectral Study**. In: *DeLTa and XAI4Science Workshops*. ICLR. 2025.
 - [5] L. Sbicego, S. Öğüt, MM, Y. Qin, D. Thanou, and P. Frossard. **On the Role of Graph Structure in Graph Neural Networks**. In: *ICBINB Workshop*. Selected for PMLR Proceedings. ICLR. 2025.
 - [6] Y. Qin*, MM*, D. Thanou, and P. Frossard. **DeFoG: Discrete Flow Matching for Graph Generation**. In: Oral Presentation (Top 1%). ICML. 2024.
 - [7] MM, C. Vignac, D. Thanou, and P. Frossard. **Generative Modelling of Structurally Constrained Graphs**. In: NeurIPS. 2024.
 - [8] MM, D. Thanou, and P. Frossard. **Tertiary Lymphoid Structures Generation through Graph-based Diffusion**. In: *GRAIL Workshop*. MICCAI. 2023.
 - [9] S. Moalla*, MM*, L. Riccio*, and J. Lee*. [Re] **Reproducibility Study of Behavior Transformers**. In: *ML Reproducibility Challenge 2022*. Outstanding Paper Award (Honorable Mention). ReScience C. 2023.
 - [10] MM, R. Negrinho, J. Xavier, and P. M. Aguiar. **COCO Denoiser: Using Co-Coercivity for Variance Reduction in Stochastic Convex Optimization**. In: *OPT Workshop*. NeurIPS. 2021.

TALKS

-
- NeurIPS 2025**, Vancouver, Canada, 2025. *DeFoG: Discrete Flow Matching for Graph Generation*.
- AI Alliance: AI in Materials & Chemistry Webinar Series**, [online](#). *DeFoG: Discrete Flow Matching for Graph Generation*.
- Inductiva Machine Learning for Science & Engineering Summer School**, Porto, Portugal, 2025. *An Introduction to Graph Neural Networks*.
- BioML Workshop**, Lausanne, Switzerland, 2025. *Constrained Graph Generative Models in Science*.
- Applied Machine Learning Days**, Lausanne, Switzerland, 2025. *Constrained Graph Generative Models in Science*.
- DataMakers Fest**, Porto, Portugal, 2023. *Generative Models in Science: A Peek into Graph Diffusion Models for Digital Pathology*.

TEACHING EXPERIENCE

Teaching Assistant for:

- Network Machine Learning (Lead TA in 2024/2025)
- Probability and Statistics
- Practice of Object-Oriented Programming
- Analysis I
- Histology

Supervised 4 students.

EXTRACURRICULAR ACTIVITIES

2023 Attended Cambridge Ellis Unit Summer School on Probabilistic Machine Learning

2022 - PRESENT Co-organizer of [Deep Learning Session Portugal](#)

2021 Attended Lisbon Machine Learning Summer School

2009-21 Competitive football player (national level)

2015 National finalist in Biology Olympiad

LANGUAGES

PORTUGUESE: Native

ENGLISH: C2, TOEFL iBT: 114 / 120

SPANISH: A2

FRENCH: A2

CHINESE: Elementary (Tsinghua course)

SOFTWARE SKILLS

-
- | | |
|-------------|------------------------------------------------------------------------------------|
| LANGUAGES: | Python, Matlab, Java, Mathematica, R |
| FRAMEWORKS: | PyTorch, Keras, Tensorflow, Pandas, Scikit-learn, NumPy, CVX, CVXPY/CVXOPT, Abaqus |
| MISC: | Unix, Git, Docker, Kubernetes, SLURM, Run:AI |

PERSONAL INTERESTS

Football, CrossFit, Ski, Reading, Cinema

COMMUNITY SERVICE

Reviewer for NeurIPS, NPGML workshop (NeurIPS) and ComBayNS workshop (IJCNN)