

Alejandro García Castellanos

Ph.D. Candidate Machine Learning
AMLab, University of Amsterdam

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Google Scholar: [Alejandro García-Castellanos](https://scholar.google.com/citations?user=HgXzQAAJAAQ&hl=en)

RESEARCH INTERESTS

Applying topology, geometry, and algebra to the representation learning and generative modeling of shapes for enhanced human-AI collaboration.

EXPERIENCE

Ph.D. Candidate

AMLab (Amsterdam Machine Learning Lab), UvA

Feb. 2024 – Present

Amsterdam, Netherlands

- Under the supervision of Erik Bekkers (UvA) and co-supervision of Daniël Pelt (ULEI)
- Sponsored by [The Hybrid Intelligence Centre](#)
- Geometry-informed machine learning techniques for collaborative human-computer image annotation

Research Engineer

RPL (Division of Robotics, Perception and Learning), KTH

Mar. 2023 – Feb. 2024

Stockholm, Sweden

- Under the supervision of Danica Kragic
- Metric learning in generative models
- Hierarchy discovery in Hyperbolic geometry

Trainee Internship

MEDAL laboratory, CTB (Center of Biomedical Technology)

Sep. 2020 – Jan. 2021

Madrid, Spain

- Under the supervision of Ernestina Menasalvas
- Development of new techniques for information recognition in medical corpus
- Fine-tuning an LLM in breast and lung cancer's clinical notes

EDUCATION

MSc in Machine Learning

KTH Royal Institute of Technology

Sep. 2021 – Oct. 2023

Stockholm, Sweden

- Average grade: 4.00 GPA
- Thesis in “*Topological regularization and relative latent representations*”

B.S. in Mathematics and Computer Science

Universidad Politécnica de Madrid

Sep. 2017 – Jul. 2021

Madrid, Spain

- Average grade: 9.78/10.0 (4.00 GPA)
- Best academic record amongst all programs at the ETSIINF (Higher Technical School of Computer Engineers) of the promotion 2020/2021
- Honours granted by UPM in 29 courses
- Three Scholarships for Academic Excellence granted by the Community of Madrid
- Thesis in “*Robustness of Persistent Homology: the Stability Theorem*”

SKILLS

Programming: Python, Java, C, R, SQL, MATLAB, Maple, Prolog, Bash

ML Frameworks: PyTorch, PyTorch Lightning, JAX, TensorFlow

Tools: L^AT_EX, Git, Microsoft Office, Keynote, Pages, Adobe Photoshop, Adobe Lightroom

Soft Skills: public speaking, written communication, teamwork, project and time management, critical thinking, analytical skills, research skills, creativity, strategic thinking

TEACHING

Reinforcement Learning

Teaching assistant

2025, 2026

Master In Artificial Intelligence, UvA

Deep Learning 2

Teaching assistant and project supervisor

2024, 2025

Master In Artificial Intelligence, UvA

Master Thesis Supervisor

Thesis: "Persistent Homology Go Combinatorial"

2025

Master In Artificial Intelligence, UvA

RESEARCH PUBLICATIONS

NeurIPS '25

A. García-Castellanos, D. R. Wessels, N. J. Berg, R. Duits, D. M. Pelt, E. J. Bekkers (2025). "*Equivariant Eikonal Neural Networks: Grid-Free, Scalable Travel-Time Prediction on Homogeneous Spaces*". In: *Advances in Neural Information Processing Systems (NeurIPS)*.

ALENEX '25

A. García-Castellanos*, A. A. Medbouhi*, G. L. Marchetti, E. J. Bekkers, D. Krasic (2025). "*Hypersteiner: Computing heuristic hyperbolic steiner minimal trees*". In: *2025 Proceedings of the Symposium on Algorithm Engineering and Experiments (ALENEX)*.

TAG-DS '25

Oral

O. Boufalis*, J. Carrasco-Pollo*, J. Rosenthal*, E. Terres-Caballero*, **A. García-Castellanos** (2025). "*Symmetry-Aware Graph Metanetwork Autoencoders: Model Merging through Parameter Canonicalization*". In: *Proceedings of the 1st Conference on Topology, Algebra, and Geometry in Data Science (TAG-DS). Oral presentation*.

UniReps '24

A. García-Castellanos, G. L. Marchetti, D. Krasic, M. Scolamiero (2024). "*Relative representations: Topological and geometric perspectives*". In: *Proceedings of the II edition of the Workshop on Unifying Representations in Neural Models (UniReps)*.

PREPRINTS & MANUSCRIPTS

UniReps '25
(Ext. Abs.)

B. Kuipers*, F. Byrman*, D. Uyterlinde* **A. García-Castellanos** (2025). "*Symmetry-Aware Fully-Amortized Optimization with Scale Equivariant Graph Metanetworks*". In: *Extended Abstract track of the III edition of the Workshop on Unifying Representations in Neural Models (UniReps)*.

ArXiv '25
(Preprint)

A. García-Castellanos*, A. A. Medbouhi*, G. L. Marchetti, D. M. Pelt, E. J. Bekkers, D. Krasic (2025). "*Randomized HyperSteiner: A Stochastic Delaunay Triangulation Heuristic for the Hyperbolic Steiner Minimal Tree*".

GRaM '24
(Blog Post)

D. Canez*, N. Midavaine*, T. Stessen*, J. Fan*, S. Arias*, **A. García-Castellanos** (2024). "*Effect of equivariance on training dynamics*". In: *Workshop Blog track at the I edition of the Workshop on Geometry-grounded Representation Learning and Generative Modeling (GRaM)*.

GRaM '24
(Blog Post)

M. Carrasco*, A. Berentzen*, **A. García-Castellanos** (2024). "*Applications of TopoX to Equivariant Topological Networks*". In: *Workshop Blog track at the I edition of the Workshop on Geometry-grounded Representation Learning and Generative Modeling (GRaM)*.

INVITED TALKS

4th workshop on Mathematics and AI
Tilburg, Netherlands

June 2025

Learning on Graphs Conference
Amsterdam, Netherlands

November 2024

COMMUNITY SERVICE

Reviewer	2025
<i>NeurIPS Proceedings</i>	
Reviewer	2025
<i>NeurReps Workshop</i>	
Reviewer	2024
<i>UniReps Workshop</i>	
Reviewer	2024
<i>ICML Proceedings</i>	

LANGUAGES

English: Advanced level (C1), CAE by Cambridge English

Spanish: Native language

German: Low Beginner Level