Jaume **Ivars Grimalt**

Research Scientist · Applied ML & Vision

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Profile

Scientist-engineer working at the boundary between mathematical theory and deployed ML systems. Core interests in Mechanistic Interpretability, Neural ODEs, and the geometry of learned representations—driven by the conviction that understanding *why* a model works matters more than achieving another SOTA benchmark. Background in Chaos Theory, Algebraic Geometry, and Quantum Mechanics informs a first-principles approach to architecture design. Currently building production vision systems for neuroimaging (700k+ MRI volumes) and computational microbiology, where correctness is non-negotiable. I design, train, validate, and ship.

Technical Skills

Theory	Neural ODEs, Algebraic Geometry, Chaos Theory, Dynamical Systems, Quantum Mechanics, Measure Theory, Statistics
Research	Mechanistic Interpretability, Loss Landscape Geometry, Attention Mechanisms, Density Estimation, Deep Learning Theory
ML / Vision	PyTorch, MONAI, OpenCV, NumPy, Scikit-learn, TensorFlow, Matplotlib
Systems	Python, Docker, Git, Linux, GCP, CI/CD, REST APIs

Experience

MIALAB — Medical Imaging Analysis Laboratory, UPV

Valencia, Spain

Research Engineer — *May 2024 – Present*

- Designed Attention-augmented U-Net architectures for volumetric brain MRI parcellation across 700k+ heterogeneous acquisitions, achieving state-of-the-art neuroanatomical precision on the VolBrain platform.
- Analyzed and restructured the full inference data flow—from raw NIfTI ingestion through multi-scale feature extraction to voxel-level label assignment—reducing computation time and enabling reproducible deployment.
- Developed quantitative validation protocols against expert neuroanatomical annotations, ensuring clinical-grade segmentation reliability across acquisition sites, field strengths, and patient demographics.
- Established principled experiment tracking and modular architecture for a research group previously operating ad-hoc, enabling systematic ablation studies and reproducible baselines.

Mycrospace — Biotech Startup

Valencia, Spain

Co-Founder & Chief Scientist — *Jan. 2024 – Present*

- Formulated the high-density colony counting problem (>300 overlapping colonies per plate) as a density estimation task and designed proprietary Density Map Regressors from first mathematical principles.
- Architected hybrid detection-regression pipelines combining spatial priors with learned density kernels, achieving 95% median accuracy against expert microbiologist annotations.
- Curated a domain-specific dataset of 3,500 annotated images across 12 microbial species; co-designed annotation protocols with microbiologists to ensure ground-truth integrity.
- Built end-to-end ML infrastructure—PyTorch training framework, data pipelines, and containerized inference (Docker/GCP)—taking each model from mathematical formulation to deployed system.

Neurocatching

Valencia, Spain

AI Research Intern — Industrial Bachelor's Project — *2022 – 2023*

- Built ML models for temporal gaze-pattern analysis: extracted features from raw ocular movement sequences, designed predictive pipelines, and evaluated against behavioural ground truth.

Sciling

Valencia, Spain

ML Engineering Intern — *2022*

- Early exposure to large language models (GPT-2/3) and Diffusion Models; contributed to applied NLP and generative modelling projects.

Education

Universitat Politècnica de València (UPV)

Valencia, Spain

M.Sc. in Artificial Intelligence, Computer Vision & Digital Image — *2023 – 2024*

- Grade: 8.7/10. Master's Thesis completed with Honours.
- Focus: Deep Learning Theory, Attention Mechanisms, Semantic Segmentation, Loss Landscape Analysis.

Universitat Politècnica de València (UPV) *Valencia, Spain*

B.Sc. in Computer Science *2018 – 2023*

- Grade: 8.3/10. Honor Mentions in Machine Learning and Statistics.
- Strong elective focus on mathematical foundations: Linear Algebra, Numerical Methods, Probability Theory, Discrete Mathematics.

Honors & Awards

2024	**1st Prize**, IdeasUPV Startup Competition (Mycrospace)	*Valencia, Spain*
2015	**Direct 3rd-Year Entry**, EMMA — High-Performance Mathematics Program (selected among top secondary-school students)	*Alicante, Spain*
2015	**Invited Speaker (Age 15)**, Public lectures on Non-Euclidean Geometry, Hyperbolic Trigonometry, and AI — University of Alicante	*Alicante, Spain*