Matteo GUARRERA, PhD student @ Berkeley AI Research

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As a PhD student at UC Berkeley, my research focus is Physics-Inspired Machine Learning for Dynamical Systems. In particular I am working at the boundary of Modeling, Differential Equations, Solvers and Neural Networks. I am part of the Berkeley AI Research (BAIR) group, where I collaborate with some of the world's leading experts in machine learning and robotics. Committed to continuous learning, I am now deepening expertise in the Deep Unsupervised Learning, Generative Models and LLMs finetune for long context understanding. I am fluent in Italian, English, learning French. **Graduation Date: Summer 2027.** Proficient in **Python, PyTorch, C, MATLAB, Git**

Education

2022 **CS PhD Student @ Berkeley AI Research (BAIR)** — UC, Berkeley
GPA: 4.0, classes: Physics-Inspired Machine Learning, Deep Learning, Deep Unsupervised Learning, Statistical Learning, Natural Language Processing, Deep Reinforcement Learning, Convex Optimization.
Advised by Alberto Sangiovanni-Vincentelli

2020–2021 **Visiting Student Researcher** — UC, Berkeley
Master Thesis: *Out-of-Distribution Detection for Supervised Image Classification*

2018–2021 **Double MSc Electronic Engineering** — Politecnico di Torino - EURECOM - Télécom Paris
Top 5%, Score: 110/110 cum laude (max)

Work Experience

2024 **Graduate Student Instructor** @UC Berkeley, content and discussion TA for a 400+ student class

2022 **EURECOM Research Fellow**, designed a medical image segmentation algorithm using generative modeling.

2017–2019 **MathWorks Ambassador**, created the biggest community of students in Italy (1500+), conducted **seminars** about control, learning, and linear algebra.

HKN-IEEE Honor Society, organized workshops and events, and tutored undergrads.

2019 **National Automobile Museum Guide**, held classes and workshops with groups of students

2014–2016 **FIV Sailing Instructor** @ Circolo Velico Gela, Taught sailing classes to people of different ages

Projects

2024 **Discrepancy Modeling and Neural ODEs**, current research project in discrepancy modeling

Diffusion Models for Motion Planning, designing latent state based policy to enhance speed of planning

2023 **Long sequence Q&A**, funded by Meta-AI , developing LLMs algorithm for Q&A on books.

2022 **Knowledge Distillation: Properties Transfer**, benchmarked distillation techniques for autonomous driving

2020 **Electromagnetic Noise Exploitation**, control smartphones noise to appear like a legitimate radio signal

2019 **Telemetry system Demonstrator**, designed and manufactured for National Automobile Museum, Turin to enable the gamification of science. Sold for [~1k €]

2017 **Scientific Laboratory *DroneLAB***, managed 15 students and built semi autonomous drones

Awards

2023 Meta AI - BAIR Commons, *by Meta AI and UC Berkeley* [15k $]

2022 Young Researcher Grant, *by Fondazione CEUR* [15k $]

2021 *Design Automation of Out-of-Distribution Image Data Detectors* proposal, *for Berkeley DeepDrive* [100k $]

2015-2021 Young Talent Award, by *Politecnico di Torino, Fondazione CRT, Camplus College* [~24k €]

2015 Italian National Register of Outstanding Students, *by Ministry of Public Education* [450 €]

Publications

Cohen, J. P., Viviano, J. D., Bertin, P., Morrison, P., Torabian, P., **Guarrera, M.**, … Hashir, M. et al. (2022). Torchxrayvision: A library of chest x-ray datasets and models. International Conference on Medical Imaging with Deep Learning.

Guarrera, M., Jin, B., Lin, T.-W., Zuluaga, M. A., Chen, Y., & Sangiovanni-Vincentelli, A. (2022). Class-wise thresholding for robust out-of-distribution detection. FADETRCV 2022, IEEE CVPR 2nd Workshop on Fair, Data-efficient, and Trusted Computer Vision.