

Matteo Nulli

Website, GitHub, LinkedIn, Twitter

Email : matteo.nulli@outlook.com

Mobile : +39-334-248-4311

Research Interests Multimodal LLMs, Visual-representation Learning, Compositional Understanding, Visual-grounded Reasoning.

EDUCATION

- **University of Amsterdam** Amsterdam, The Netherlands
MSc in Artificial Intelligence; GPA: 4.0/4.0 (8.3/10) Sep 2023 - Sep 2025
 - **Thesis:** Investigating Compositional Understanding and Visual Grounding in Vision Foundation Models. Supervised by prof. [Yuki Asano](#), [Ivona Najdenkoska](#) and [Michael Dorkenwald](#).
 - **ELLIS Honours Student:** Selected as ELLIS MSc Honours Student for 2025, research visit at [FunAI Lab](#).
 - **Relevant Courses:** Foundation Models, Deep Learning 1 & 2, Computer Vision, Natural Language Processing, Information Retrieval, Machine Learning 1.
- **Università Commerciale Luigi Bocconi** Milan, Italy
BSc in Mathematics and Computing Sciences for Artificial Intelligence; GPA: 3.6/4.0 (99/110) Sep 2020 - July 2023
 - **Thesis:** Analysed **Generative** Adversarial Networks and Recurrent Neural Networks with time-series financial data to determine future prices of stocks.
 - **Relevant Courses:** Machine Learning, Mathematical Modelling for Finance, Mathematical Analysis 1,2 & 3, Physics 1 & 2, Statistical and Quantum Physics, Optimization Algorithms, Programming.
- **University of Sydney** Sydney, Australia
Exchange Semester in Applied Mathematics and Computing Sciences; GPA: 3.6/4.0 Feb 2023 - July 2023
 - **Scholarship:** Selected by merit and received a full ride scholarship of 26,500 A\$.
 - **Relevant Courses:** Stochastic Processes (Adv), Big Data and Data Diversity (Adv), Deep Learning

EXPERIENCE

- **eBay** Amsterdam, The Netherlands
Applied Research Intern July 2024 - Current
 - **MLLMs:** Research intern on **Multimodal LLMs**.
 - **Focus:** Working on pre-training and fine-tuning VLMs for eCommerce-oriented tasks while conducting theoretical research on architecture. Supervised by [Hadi Hashemi](#), Vladimir Orshulevich.
- **BAINSA** Milan, Italy
Co-Founder Jan 2022 - July 2023
 - **AI association:** Founded first Artificial Intelligence association at Bocconi.
 - **Events:** Spread awareness & perception on AI's applications through events held inside and outside the university.
 - **Partners:** Main Partners include [Bending Spoons](#), [Vedrai](#) and [Insitute Europia](#).
- **Aindo** Milan, Italy
Research Intern June 2022 - Sep 2022
 - **VAEs:** [Developed](#) a variant of Variational Auto-encoders from scratch for Synthetic data generation. Supervised by [Sebastiano Saccani](#).

PUBLICATIONS & PREPRINTS

- Vincenti, J., Sadek, K. A. A., Velja, J., **Nulli, M.** & Jazbec M. [Dynamic Vocabulary Pruning in Early-Exit LLMs](#), **NeurIPS ENLSP 2024**, Vancouver, Canada.
- **Nulli, M.**, Ibrahimi, A., Pal, A., Lee, H., & Najdenkoska, I. [In-Context Learning Improves Compositional Understanding of Vision-Language Models](#). **ICML 2024 Workshop on Foundation Models in the Wild**, Vienna, Austria.
- Sadek, K. A. A., **Nulli, M.**, Velja, J., & Vincenti, J. ['Explaining RL Decisions with Trajectories': A Reproducibility Study](#). Transactions on Machine Learning Research @**NeurIPS**, 2024, Vancouver, Canada.

PROJECTS

- **Machine Learning for Breast Cancer Cells analysis:** *Competition winner AI-Lab, 2022.*
Utilized Unsupervised and Supervised ML methods (Tree based methods and Deep Neural Network) to analyse breast cancer cells and capture interactions between them. Detected with a success rate of 95% Hypoxic vs Normoxic cells. Won the competition among peers and presented our findings at the University of Oxford Oncology Department. Supervised by professor [Francesca Buffa](#).
- **Model compression for Machine Translation on ALMA Models:** *University project, 2024.*
Applied several quantization (GPTQ, Q-LoRA, SmoothQuant) and pruning (Wanda, DSnot) techniques to ALMA-7B. Combined Wanda + GPTQ to obtain memory gains up to 3.5x.
- **Content-Based Retrieval Ranking and Re-Ranking Systems:** *University project, 2024.*
Applied Neural-IR ranking and re-ranking methods through Cross-Encoder, Sparse and Dense Encoders with BERT Transformer. Achieved a 4% enhancement in performance when combining Dense and Cross-Encoders together.
- **CLIP based visual prompting, Transfer Learning CNNs:** *University project, 2023.*
Learned different Visual prompts through CLIP and adapted network to different datasets.
- **Deep Generative models and Transformer based models:** *University project, 2023.*
Implementing causal self-attention in gpt-2 and developed Variational Auto-encoders and Adversarial Auto-encoders from scratch in PyTorch.

SCHOLARSHIPS & AWARDS

- **Scholarship:** [ELLIS Unit Amsterdam Honours student](#). Part of the 2025 cohort of Honours students, receiving +2500\$ for visiting expenses.
- **Scholarship:** University of Sydney, full ride scholarship of 26,500A\$.
- **Award:** University of Oxford, Università Commerciale Luigi Bocconi.
AI-Lab Competition Winner, presented the project at Oncology Department at University of Oxford, received travel reimbursement. Supervised by professor [Francesca Buffa](#).
- **Scholarship:** Mario Negri Foundation, scholarship of 800\$.

SKILLS

Programming Languages: Python, R, SQL, LaTeX, C (Beginner)

Libraries: Pytorch, OpenCV, Transformers, SciPy, Pandas, NumPy, Matplotlib, Scikit Learn, CLIP, ...

Languages: Italian (Native), English (Fluent), Spanish (Fluent)

VOLUNTEERING

- **Class Representative:** *University of Sydney, 2023.*
Representing my fellow students within the faculty whilst talking with professors to solve problems of the class.
- **Technical Consultant - ML Engeneering:** *BSI Bocconi - Build Sustainable Innovation, 2021-2023.*
Implemented ML & Statistical based solutions for Companies. Applied Data analysis techniques to costumer provided datasets.
- **Institute Representative - Head Student:** *Liceo Scientifico G.B. Grassi Latina, 2019-2020.*
In my senior year I was appointed to be the Head Student for my High School representing more than 1500 students. During this period I worked together with the Head Master to manage the school's problems and improved my public speech abilities.