

Matteo Nulli

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Research Interests Multimodal Learning, Compositional Reasoning, Inference Optimization

EDUCATION

• University of Amsterdam

- MSc in Artificial Intelligence; GPA: 4.0/4.0 (8.5/10) - **Cum Laude & ELLIS Honours** Sep 2023 - Sep 2025
- **Thesis:** Object-Guided Visual Tokens: Eliciting Compositional Reasoning in Multimodal Language Models. Supervised by Prof. Yuki Asano, Ivona Najdenkoska and Mohammad Mahdi Derakhshani.
 - **ELLIS Honours Student:** Selected as ELLIS MSc Honours Student for 2025.
 - **Relevant Courses:** Foundation Models, Deep Learning 1 & 2, Computer Vision, Natural Language Processing, Information Retrieval, Machine Learning 1.

Amsterdam, Netherlands

Sep 2023 - Sep 2025

• Università Commerciale Luigi Bocconi

- BSc in Mathematics and Computing Sciences for Artificial Intelligence; GPA: 3.6/4.0 (99/110) Sep 2020 - July 2023
- **Thesis:** Generative Adversarial Networks and Recurrent Neural Networks for time-series asset price prediction. Supervised by Prof. Claudio Tebaldi.
 - **Relevant Courses:** Machine Learning, Mathematical Modelling for Finance, Mathematical Analysis 1,2 & 3, Physics 1 & 2, Statistical and Quantum Physics, Optimization Algorithms, Programming.

Milan, Italy

• University of Sydney

- 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

Sydney, Australia

Feb 2023 - July 2023

PUBLICATIONS & PREPRINTS

- Nulli, M., Najdenkoska, I., Derakhshani, M. M., Asano, Y. M. **Object-Guided Visual Tokens: Eliciting Compositional Reasoning in Multimodal Language Models**, EurIPS 2025 PriGM Workshop, Copenhagen, Denmark.
- Nulli, M., Ibrahimi, A., Pal, A., Lee, H., & Najdenkoska, I. **In-Context Learning Improves Compositional Understanding of Vision-Language Models**. ICML 2024 Foundation Models in the Wild, Vienna, Austria.
- Vincenti, J., Sadek, K. A. A., Velja, J., Nulli, M. & Jazbec M. **Dynamic Vocabulary Pruning in Early-Exit LLMs**, NeurIPS ENLSP 2024, Vancouver, Canada.
- Sadek, K. A. A., Nulli, M., Velja, J., & Vincenti, J. **'Explaining RL Decisions with Trajectories': A Reproducibility Study**. Transactions of Machine Learning Research, 2024, Vancouver, Canada.

EXPERIENCE

• Applied Researcher

- eBay, Foundation Models Team Aug 2025 - Current
- **Focus:** Research on Inference Optimization and Multimodal Search-Reasoning models.

Amsterdam, Netherlands

Aug 2025 - Current

• Applied Research Intern

- eBay, Foundation Models Team, advised by Prof. Cees Snoek Jul 2024 - Jul 2025
- **Focus:** Research on **Multimodal LLMs**. Training MLLMs for e-Commerce tasks while conducting theoretical research on architecture. Working with Hadi Hashemi and Vladimir Orshulevich. Developed eBay's **Vision-Language Models**, executing comprehensive domain-adaptation, training the model from scratch on a blend of open-source and proprietary data.

Amsterdam, Netherlands

Jul 2024 - Jul 2025

• Research Intern

- Fundamental AI Lab, University of Technology Nuremberg, advised by Prof. Yuki Asano Mar 2025 - Jul 2025
- **Focus:** Researching **Compositional Reasoning** and Visual Grounding in Multimodal Learning.

Nuremberg, Germany

Mar 2025 - Jul 2025

- **Co-Founder** Milan, Italy
Jan 2022 - July 2023
BAINSA
 - **Focus:** Founded first Artificial Intelligence association at Bocconi. Spreading awareness & perception on AI's applications through events held inside and outside the university.
 - **Partners:** Main Partners included [Bending Spoons](#), [Vedrai](#) and [Institute Europa](#).
- **Research Intern** Milan, Italy
Jun 2022 - Sep 2022
Aindo, advised by [Sebastiano Saccani](#)
 - **Focus:** Built and deployed deep learning models for synthetic data generation, specializing in [VAEs](#).

SCHOLARSHIPS & AWARDS

- **Award:** [Nova 111 Student List 2025](#)
Selected as one of the 10 most promising Italian students in Mathematics & Data Analytics, part of the Nova 111 Student List 2025.
- **Scholarship :** [ELLIS Honours Student - ELLIS Unit Amsterdam](#)
[ELLIS Honours Student](#) scholarship (top 5% of students) of 2.500\$ supporting research visits, 2025.
- **Scholarship:** [University of Sydney](#)
Received a full ride scholarship of 20.000\$ to attend semester abroad at University of Sydney, 2023.
- **Award:** [University of Oxford, Università Commerciale Luigi Bocconi](#)
Won a ML competition to analyze Hypoxia in **breast cancer cells**. Awarded funding to present [our research](#) at the **University of Oxford**, Oncology Department. Supervised by prof. [Francesca Buffa](#), 2022.
- **Scholarship:** [Mario Negri Foundation](#)
Merit scholarship of 800\$ for outstanding high-school performance in Mathematics and Science.

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](#).
- **Perception, Localization, Planning and Control on RAE Robots:** *University project, 2025.* Built an integrated perception-localization-planning-control pipeline on a RAE robot. We go over Camera Calibration, Line Following, Localization, Curling Match playing (see Video 1) and Mapping, Planning and Control, to allow our RAE Robot to freely move across our environment.
- **Model compression for Machine Translation:** *University project, 2024.* Applied several quantization (GPTQ, Q-LoRA, SmoothQuant) and pruning (Wanda, DSnot) techniques to ALMA-7B. Combined Wanda and GPTQ to obtain memory gains up to 3.5x.

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

- **Technical Consultant - ML Engineering:** [BSI Bocconi - Build Sustainable Innovation, 2021-2023.](#)
Implemented ML & Statistical based solutions for Companies. Applied Data analysis techniques to customer provided datasets.