

Giovanni Duca

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Education

University of Trento, CIMEC

Trento, Italy

M.Sc. in Cognitive Science

2023 – 2026

Computational and theoretical modelling of Language and Cognition

- Machine Learning: Main architectures and algorithms; explainability
- Cognitive Science: Human perception and cognition; brain computational models
- Vision: Embodiment; augmented representations of concepts

Orientale University of Naples

Naples, Italy

B.A. in Comparative Languages and Cultures

2018 – 2022

- Discourse Analysis: Critical texts analysis (papers, movies, social media, etc.)
- Cultures and Society: In-depth knowledge of eastern-western cultural differences
- Comparative Literature: Intertextual analysis and applied critical thinking of literatures

Experience

Inria, ALMAAnaCH

Paris, France

Supervised by Cassell, J and Mohapatra, B

Mar 2025 – Dec 2025

- **Thesis Research:** Machine mental imagery to improve agentic reasoning in situated contexts.
- **Research Intern:** Enhance conversational grounding in dialogue systems, improving interaction by dynamically adapting to user comprehension via Reinforcement Learning on synthetic data.

Projects

synth4indiref: Algorithmically generate complex scenarios; synthesize natural language dialogues based on them; create challenging, high-quality questions about the generated dialogues.

FedX-mod: SimSiam as a lightweight alternative to FedX's original contrastive method; compare performance on CIFAR-10 and SVHN. SimSiam's simplicity and smaller batch needs make it suitable for resource-limited devices.

pythia4sylo: Probe an open source LLM inside a probabilistic heuristic theory of syllogistic reasoning by analysing its answers to a set of syllogisms and comparing them against human results.

Fine-tuning LLMs for various NLP tasks (sentiment analysis, text classification) using standard fine-tuning, LoRA (Low-Rank Adaptation), and quantization.

Certifications

CS50x - Introduction to Computer Science (HarvardX)

Dec 2022

IELTS - C1 Academic, 8.0 Overall

Oct 2022

Apple Foundation Program

Dec 2021

Publications

MLLMs Construction Company: Investigating Multimodal LLMs'

Sept 2025

Communicative Skills in a Collaborative Building Task

Marika Sarzotti*, **Giovanni Duca***, Chris Madge, Raffaella Bernardi, Massimo Poesio

CLiC-it 2025: Eleventh Italian Conference on Computational Linguistics

Skills & Interests

Programming: C, Python (PyTorch, SKlearn, Pandas, NumPy) | Git, Slurm | HTML, CSS, SQLite

Languages: Italian (Native) | English (C1) | Spanish (B1) | French (B1) | Japanese (A2)

Volunteering: Experience as tutor and student representative