Luca Moschella
Machine Learning Researcher

Websites: 🌐 luca.moschella.dev   ⌂ lucmos   in lucamoschella   Scholar

Education

ELLIS PhD ↗ in Computer Science
Nov 2019 – May 2024
Sapienza University of Rome ↗
Rome, Italy
Thesis: Latent Communication in Artificial Neural Networks
Advisors: Prof. Emanuele Rodolà and Prof. Francesco Locatello

M.Sc. in Computer Science
Sep 2017 – Oct 2019
Sapienza University of Rome ↗
Rome, Italy
Grade: 110/110 magna cum laude ↗   **GPA**: 30.3/30 ↗
Relevant courses: Natural Language Processing, Computer Vision, Web and Social Information Extraction, Machine Learning, Foundations of Data Science.

B.Sc. in Computer Science
Sep 2013 – Mar 2017
Sapienza University of Rome ↗
Rome, Italy
Grade: 110/110 magna cum laude ↗   **GPA**: 30.5/30 ↗
Relevant courses: Artificial Intelligence, Algorithm Design.

Research Experience

International experience in fundamental research (IST Austria), engineering (NNAISENSE) and applied research (NVIDIA).

IST Austria ↗
Oct 2023 – Jan 2024
International Research Visit
Klosterneuburg, Austria
Research visit in the CLAI laboratory led by Prof. Francesco Locatello.

École polytechnique ↗
Jun 2023
International Research Visit
Paris, France
Research visit in the GeoViC group led by Prof. Maks Ovsjanikov.

NVIDIA ↗
Sep 2022 – May 2023
Research Intern
Toronto, Canada (remote)
Apply diffusion models to 3D fast prototyping with image-space supervision.

NNAISENSE ↗
Jul 2021 – Dec 2021
Research Intern
Lugano, Switzerland
Designed and implemented a generic deep learning framework on top of PyTorch to bootstrap industrial projects and automate the hyperparameters tuning.

DLAI ↗ @ Sapienza University of Rome
Feb 2020 – Jun 2023
Teaching Assistant
Rome, Italy
Lectured and mentored 200+ students. Designed and implemented 30+ interactive and animated lab sessions in Colab, for the Deep Learning and Applied AI course.

Selected Invited Talks

*Dedicated to impactful communication, evidenced by **15+** invited talks at renowned institutions (e.g. Cambridge, UCL Gatsby, ENS, ICL, Tübingen AI Center, AutoDesk, NVIDIA). Most of my talks are uniquely animated.* ↗

Leveraging Emerging Similarities for Latent Communication ↗
Sep 2023
Universitat Pompeu Fabra, hosted by Prof. Marco Baroni
Barcelona, Spain

Relative representations enable zero-shot latent space communication ↗
Feb 2023
UCL Gatsby, hosted by Prof. Andrew Saxe
London, UK

Full list of invited talks available at: luca.moschella.dev ↗.

Achievements

Outstanding academic contributions, including chairing a major workshop @ NeurIPS and an oral top 5% paper @ ICLR.

Notable top 5% paper
May 2023
ICLR 2023
Kigali, Rwanda
· First-author paper [5] selected as notable top 5% paper, oral presentation @ ICLR 2023.
· Introduce the concept of *latent communication*, a focus of the UniReps Workshop @ NeurIPS 2023.

Program Chair
Dec 2023
UniReps @ NeurIPS 2023 ↗
New Orleans, US
· Supported the ideation and organization of the UniReps Workshop ↗ @ NeurIPS 2023, which successfully attracted *800+ participants*.
· Coordinated 150+ reviewers over 90+ submissions, ensuring at least two reviews for all papers with 95% having three.

Outstanding Reviewer ↗
Oct 2023
ICCV 2023
Paris, France
· Recognized as outstanding reviewer for the International Conference on Computer Vision 2023.

Academic merits
2009-2017
ABB & Sapienza
Italy
· Sponsored for academic merits by ABB ↗ for ten years and by Sapienza to cover B.Sc. tuition fees.

Selected Open Source Projects

Earned over 1000 stars ★ on projects I've led or co-led on GitHub ⌂.

powermanim ↗
Mar 2023
Collection of manim components layouts and slide templates to design animated live presentations.

NN Template ↗
Feb 2021
Popular (> 500 ★) template to bootstrap a PyTorch project with Lightning, HF Datasets, Hydra, W&B, DVC and Streamlit; enforcing best practices in data versioning, code organization and reproducibility.

Ultrawide Windows ↗
Nov 2018
The 3th most popular Kwin script, providing simplified window tiling emulation.

Referees

Prof. Emanuele Rodolà *(ERC grantee)*
Sapienza
🌐 *Homepage*

Prof. Francesco Locatello
ISTA
🌐 *Homepage*

Dr. Maria Shugrina
NVIDIA
🌐 *Homepage*

Selected Publications

*My research explores **latent space communication** between neural networks, a foundational concept introduced in [5]. This key observation is fundamental in understanding the universality and reusability of neural representations. Latent communication, a central theme at the UniReps Workshop @ NeurIPS 2023, has inspired other researchers to pursue innovative and state of the art work in fields such as natural language processing, computer vision, reinforcement learning, multimodal learning, and in supervised, weakly-supervised, and unsupervised learning settings.*

Google Scholar statistics

Total citations: 633
h-index: 5

Collaborations

Engaged in collaborations with some of the most prominent researchers in AI and related areas, leading to peer-reviewed publications:

Leonidas Guibas ↗	Stanford University
Maks Ovsjanikov ↗ *(ERC grantee)*	École polytechnique
Or Litany ↗	NVIDIA & Technion
Pietro Liò ↗ *(ERC grantee)*	University of Cambridge
Francesco Locatello ↗	IST Austria

Peer reviewed

[1] I. Cannistraci, **L. Moschella**, M. Fumero, V. Maiorca, and E. Rodolà. "From Bricks to Bridges: Product of Invariances to Enhance Latent Space Communication". In: *The Twelfth International Conference on Learning Representations (ICLR 2024, spotlight, top 5%)*. 2024. URL: https://openreview.net/forum?id=vngVydDWft.

[2] I. Cannistraci, **L. Moschella**, V. Maiorca, M. Fumero, A. Norelli, and E. Rodolà. "Bootstrapping Parallel Anchors for Relative Representations". In: *Tiny Paper Track at the International Conference on Learning Representations (Tiny Paper Track at ICLR 2023)*. 2023. URL: https://openreview.net/pdf?id=VBuUL2IWlq.

[3] D. Crisostomi, I. Cannistraci, **L. Moschella**, P. Barbiero, M. Ciccone, P. Lio, and E. Rodolà. "From Charts to Atlas: Merging Latent Spaces into One". In: *NeurIPS 2023 Workshop on Symmetry and Geometry in Neural Representations (NeurReps at NeurIPS 2023)*. 2023. URL: https://openreview.net/forum?id=ZFu7CPtznY.

[4] V. Maiorca[*], **L. Moschella**[*], A. Norelli, M. Fumero, F. Locatello, and E. Rodolà. "Latent Space Translation via Semantic Alignment". In: *Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS 2023)*. 2023. URL: https://openreview.net/forum?id=pBa70rGHlr.

[5] **L. Moschella**[*], V. Maiorca[*], M. Fumero, A. Norelli, F. Locatello, and E. Rodolà. "Relative representations enable zero-shot latent space communication". In: *International Conference on Learning Representations (ICLR 2023, oral, notable top 5%)*. 2023. URL: https://openreview.net/forum?id=SrC-nwieGJ.

[6] A. Norelli, M. Fumero, V. Maiorca, **L. Moschella**, E. Rodolà, and F. Locatello. "ASIF: Coupled Data Turns Unimodal Models to Multimodal without Training". In: *Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS 2023)*. 2023. URL: https://openreview.net/forum?id=XjOj3ZmWEl.

[7] **L. Moschella**, S. Melzi, L. Cosmo, F. Maggioli, O. Litany, M. Ovsjanikov, L. Guibas, and E. Rodolà. "Learning Spectral Unions of Partial Deformable 3D Shapes". In: *Computer Graphics Forum (EG 2022)*. 2022. DOI: 10.1111/cgf.14483.

[8] G. Trappolini, L. Cosmo, **L. Moschella**, R. Marin, S. Melzi, and E. Rodolà. "Shape Registration in the Time of Transformers". In: *Thirty-Fifth Conference on Neural Information Processing Systems (NeurIPS 2021)*. 2021. URL: https://openreview.net/forum?id=ui4xChWcA4R.

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[*]Equal contribution.