Andrea Cacioppo

Curriculum vitae - January 3, 2025

andrea.cacioppo@uniroma1.it
www.andreacacioppo.com
andrea-cacioppo

Education

pres. **Ph.D. in Physics**, *Sapienza University of Rome*, Italy
Nov 2022 *Topics*: quantum generative models and physics-informed optimization algorithms
Group: Fisica AI&QC group
Supervisors: Stefano Giagu, Fabio Sciarrino

Nov 2021 **Ph.D. in Computer Engineering**, *Technical University of Munich*, Germany
Nov 2020 (interrupted) *Topics*: classical-quantum compound channels and algorithms for the automatic generation of quantum graph states
Group: Theoretical quantum system design group
Supervisors: Janis Nötzel, Jonathan Finley

May 2020 **M.Sc. in Theoretical Physics**, *Sapienza University of Rome*, Italy
Oct 2016 *Thesis*: "Deep learning for the parameter estimation of tight-binding Hamiltonians"
Supervisors: Stefano Giagu, Stefan Bauer
Grade: 109/110

Oct 2016 **B.Sc. in Physics**, *Sapienza University of Rome*, Italy
Sep 2013 *Thesis*: "Hidden Markov model"
Supervisor: Luciano Pietronero
Grade: 110/110 with honors

Work Experience

pres. **ML Consulting**, *Individual clients*, Italy
Jan 2022 *Topics*: training NNs to solve PDEs in finance - implementation of diffusion models - training NNs on incomplete datasets - invoice reconciliation using an online LLM

pres. **ML Consulting**, *Grid +*, Rome, Italy
Nov 2024 *Topic*: Automatic analysis of legal documents and anomaly detection

Nov 2024 **Tutoring**, *Individual clients*, Italy
Jan 2022 *Topics*: mathematics, physics and computer science for university students

Nov 2023 **ML Consulting**, *Hypercube SA*, Lugano, Switzerland
Sep 2023 *Topic*: application of ML techniques to the detection of time series anomalies

Aug 2023 **ML Consulting**, *Primis Group SRL*, Milan, Italy
Dec 2022 *Tasks*: determine best ML solutions tailored to LiDAR and satellite data, design of an anomaly detection algorithm for LiDAR data (contract of *Rete Ferroviaria Italiana SPA*)

Nov 2021 **Tutoring**, *Technical University of Munich*, Germany
Nov 2020 *Task*: assisting students of the "Quantum networking" class

Oct 2020 **Research Internship**, *Max Planck Institute for Intelligent Systems*, Tübingen,
Sep 2019 Germany

Topics: Deep learning for estimating tight-binding Hamiltonians, quantum machine learning models and their connection with kernel methods

Awards and grants

Nov 2024 **Research grant**, *Sapienza University of Rome*, Italy
Nov 2023 "Development of quantum machine learning algorithms" - 1000 €

Oct 2016 **Excellence program for honor students**, *Sapienza University of Rome*, Italy

Academic Contributions

Oct 2024 **Quantum Computing @ INFN, Padova, Italy**, Talk
"Quantum diffusion models for quantum data learning"

Oct 2024 **38° cycle PhD seminar, Rome, Italy**, Talk
"Quantum machine learning and physics-informed deep learning algorithms"

Apr 2024 **EuCAIFCon2024, Amsterdam, Netherlands**, Flash Talk
"Quantum diffusion models

Feb 2024 **Communication Physics, Nature Publishing Group** , Reviewer

Nov 2023 **QTML2023 Conference, Geneve, Switzerland**, Poster
"Parameterised quantum circuits for anomaly detection and generative tasks"

Nov 2023 **QAIxIAQ2023 Workshop, Rome, Italy**, Talk
"Quantum diffusion models using parameterized quantum circuits for data denoising"

Oct 2023 **Quantum Computing and Simulation Workshop 2023, Venice, Italy**, Poster
"Parameterised quantum circuits for anomaly detection and generative tasks"

July 2021 **ISIT, 2021 IEEE International Symposium on Information Theory**, Talk
"Compound channel capacities under energy constraints and application"

Mar 2021 **EACN 2021: Entanglement Assisted Communication Network**, Organization

Feb 2021 **BeyondC: Quantum Information Systems Beyond Classical Capabilities**, Poster
"Quantum receiver design"

Jun 2020 **BiGmax: Big data driven material science**, Poster
"Deep learning for the parameter estimation of tight-binding Hamiltonians"

Languages

Native Italian
Fluent English
Beginner German

Software

Advanced Python, PyTorch
Good Tensorflow, GitHub, Linux, LaTeX
Basic C, HTML

Hobbies

I like building objects with wood, making robotic devices (like a drone and an automatic greenhouse), growing edible mushrooms and doing improvisation theater

Publications

[1] Andrea Cacioppo, Lorenzo Colantonio, Simone Bordoni, and Stefano Giagu. Quantum Diffusion Models. *arXiv preprint arXiv:2311.15444*, 2023.

[2] Andrea Cacioppo, Janis Nötzel, and Matteo Rosati. Compound Channel Capacities under Energy Constraints and Application. In *2021 IEEE International Symposium on Information Theory (ISIT)*, pages 640–645. IEEE, 2021.

[3] Andrea Cacioppo. Deep learning for the parameter estimation of tight-binding Hamiltonians. Master's thesis, Sapienza Università di Roma, Italy, 2020.

[4] Lorenzo Colantonio, Andrea Cacioppo, Federico Scarpati, and Stefano Giagu. Efficient graph coloring with neural networks: A physics-inspired approach for large graphs. *arXiv preprint arXiv:2408.01503*, 2024.