# Andrea Cacioppo

*Curriculum vitae - November 5, 2024*

## ▬▬▬ Education

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| **pres.**<br>Nov 2022 | **Ph.D. in Quantum Machine Learning**, *Sapienza Università di Roma*, Italy<br>*Topics*: generative algorithms for quantum computers - physics-guided algorithms for graph coloring<br>*Group*: Fisica AI&QC group<br>*Supervisors*: Stefano Giagu, Fabio Sciarrino |
| Nov 2021<br>Nov 2020<br>(interrupted) | **Ph.D. in Quantum Communication**, *Technical University of Munich*, Germany<br>*Topics*: classical-quantum compound channels - automatic generation of quantum graph states in photonic qubits<br>*Group*: Theoretical quantum system design group<br>*Supervisors*: Janis Nötzel, Jonathan Finley |
| May 2020<br>Oct 2016 | **M.Sc. in Theoretical Physics**, *Sapienza Università di Roma*, Italy<br>*Thesis*: "Deep learning for the parameter estimation of tight-binding Hamiltonians"<br>*Supervisors*: Stefano Giagu, Stefan Bauer<br>*Grade*: 109/110 |
| Oct 2016<br>Sep 2013 | **B.Sc. in Physics**, *Sapienza Università di Roma*, Italy<br>*Thesis*: "Hidden Markov model"<br>*Supervisor*: Luciano Pietronero<br>*Grade*: 110/110 with honors |

## ▬▬▬ Work Experience

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| **pres.**<br>Jan 2022 | **AI Consultant**, *Freelance*, Italy<br>*Topics*: deep learning to solve PDEs - training neural networks on incomplete datasets - modelling complex physical systems |
| Nov 2023<br>Sep 2023 | **AI Advisor**, *Hypercube SA*, Lugano, Switzerland<br>*Task*: Time series anomaly detection and feasibility of AI projects |
| Aug 2023<br>Dec 2022 | **AI Advisor**, *Primis Group SRL*, Milan, Italy<br>*Tasks*: Determine best AI solutions tailored to LiDAR and satellite data - design of an anomaly detection algorithm for LiDAR data (contract of *Rete Ferroviaria Italiana SPA*) |
| Dec 2022<br>Jan 2022 | **Tutoring**, *Freelance*, Italy<br>*Topics*: Mathematics and physics lessons for university students |
| Nov 2021<br>Nov 2020 | **Tutoring**, *Technical University of Munich*, Munich, Germany<br>*Task*: assisting students of the "Quantum networking" class |
| Oct 2020<br>Sep 2019 | **Research Internship**, *Max Planck Institute for Intelligent Systems*, Tübingen, Germany<br>*Topics*: Deep learning for estimating tight-binding Hamiltonians - quantum machine learning models and kernel methods |

## Awards and grants

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| Nov 2024 | **Research grant**, *Sapienza Università di Roma*, Rome, Italy |
| Nov 2023 | "Development of quantum machine learning algorithms" - 1000€ |
| Oct 2016 | **Excellence program for honour students**, *Sapienza Università di Roma*, Rome, Italy |

## Academic Contributions

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| 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

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| Native | Italian |
| Fluent | English |
| Beginner | German |

## Software

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

# 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.