Curriculum Vitae

Personal Data

Name and Last Name

Susanna Caroppo

Affiliation

Department of Civil, Computer Science and Aeronautical Technologies Engineering, Roma Tre University

Education

Roma Tre University
PhD. in Computer Science 2023–Current
Doctoral School of Engineering, Section of Informatics and Automatation
- **Thesis title**: "Quantum Graph Drawing" Expected to end in May 2026

Roma Tre University
M.S. in Computer Science 2020–2022
Computer Networks Laboratory, Department of Informatics and Automation (DIA)
110/110 cum Laude
- **Thesis title**: "A Methodology for the Characterization of Persistent Instabilities in Interdomain Routing"

Academic and Professional Experience

Roma Tre University
Research Collaborator (Project PRIN 2017 AHeaAD) September 2022–December 2022

Research Interests

My research focuses on advancing Quantum Algorithms and Complexity, with an emphasis on the intersection of quantum computation, graph theory, and combinatorial optimization. I am driven by fundamental theoretical questions that arise in designing quantum-enhanced methods for analyzing, representing, and optimizing complex networks.
My primary contribution is in the emerging area of quantum graph drawing, where I explore quantum computational models—such as the quantum circuit model and quantum annealing—to develop new solutions for classical network visualization challenges. This work involves creating novel algorithmic frameworks for graph layout, with particular attention to planarity, constrained embeddings, and layout optimization.
Additionally, I investigate quantum approaches to spectral methods, computational geometry, and graph theory. I am especially interested in the geometric and combinatorial properties of networks, and in designing quantum algorithmic frameworks that can exploit such structures. A key objective of my work is to develop hybrid techniques that effectively combine the strengths of classical paradigms—such as dynamic programming and divide-and-conquer—with quantum primitives.

Scholarships and Awards

2025	Student Scholarship for QIP 2026
2025	Student Scholarship for WADS 2025
2024	Best Student Paper at WALCOM 2024
2023	Student Scholarship for ADFOCS 2023
2021	Merit-Based Academic Scholarship "Luca Raso"
2017	Merit-Based Academic Scholarship

Research Stays

Sep 2025	University of Latvia under the supervision of professor Jevgēnijs Vihrovs (Visiting PhD student)
Oct-Dec 2024	University of Latvia under the supervision of professor Andris Ambainis (Visiting PhD student)

Lectures

Dec 2025 — A Quantum Circuit to Find All Solutions of 3-SAT Instances
Master Course "Quantum Computing", Roma Tre University

Dec 2025 — Quantum Annealing
Master Course "Quantum Computing", Roma Tre University

Nov 2025 — Quantum Annealing
Master Course "Decision Support Systems and Analytics", Roma Tre University

Dec 2023 — Quantum Annealing
Master Course "Quantum Computing", Roma Tre University

June 2023 — Entanglement Routing for Quantum Networks
PhD course "Advanced Topics in Computer Networks", Roma Tre University

Dec 2022 A Quantum Circuit to Find All Solutions of 3-SAT Instances

Master Course "Quantum Computing", Roma Tre University

Dec 2022 A Quantum Circuit to Construct All Maximal Cliques Using Grover's Search Algorithm

PhD course "Advanced Topics in Computer Networks", Roma Tre University

Service to the community

Referee Work

Conferences: International Workshop on AI for Quantum and Quantum for AI (AIQxQIA), The European Workshop on Computational Geometry(EuroCG), The International Symposium on Graph Drawing and Network Visualization (GD), International Conference on Network Protocols (ICNP), The International Symposium on Algorithms and Computation (ISAAC), Symposium on Theoretical Aspects of Computer Science (STACS), The IEEE Visualization Conference (VIS), The Algorithms and Data Structures Symposium (WADS), International Conference and Workshops on Algorithms and Computation (WALCOM), International Workshop on Graph-Theoretic Concepts in Computer Science (WG)

Teaching Experience

2025-2026	Teaching Assistant	Foundations of Computer Science, DIIEM	Roma Tre University
2025-2026	Teaching Assistant	Foundations of Computer Science, DICITA	Roma Tre University
Nov-Dec 2025	Teacher	Introduction to Computational Thinking and Coding	LUISS
2024-2025	Teaching Assistant	Foundations of Computer Science, DICITA	Roma Tre University
2023-2024	Teaching Assistant	Foundations of Computer Science, DIIEM	Roma Tre University
2023-2024	Teaching Assistant	Foundations of Computer Science, DICITA	Roma Tre University
2022-2023	Teaching Assistant	Mathematical Analysis, DICITA	Roma Tre University
2022-2023	Teaching Assistant	Foundations of Computer Science, DIIEM	Roma Tre University
2022-2023	Teaching Assistant	Foundations of Computer Science, DICITA	Roma Tre University

2020-2021	Teaching Assistant	Foundations of Computer Science	Roma Tre University
2021-2022	Teaching Assistant	Foundations of Computer Science	Roma Tre University

Invitation-Only Workshop

Sep 2025	Summer Workshop on Graph Drawing (SWGD' 25)	Caldana (Italy)
Sep 2024	Summer Workshop on Graph Drawing (SWGD' 24)	Caldana (Italy)
Sep 2023	Summer Workshop on Graph Drawing (SWGD' 23)	Caldana (Italy)

Conference Talks

WADS' 25	Quantum Speedups for Polynomial-Time Dynamic Programming Algorithms	Toronto
GD' 24	Quantum Algorithms for One-Sided Crossing Minimization	Vienna
WALCOM' 24	Quantum Graph Drawing (Best Student Paper)	Kanazawa

Attended PhD Courses and Schools

2024	PhD Course: "Advanced Topics in Computer Networking"
2024	PhD Course: "Approximation algorithms"
2024	PhD Course: "Lagrangian and Surrogate relaxation in Combinatorial Optimization"
2024	PhD Course: "Introduction to NISQ Algorithms"
2023	PhD Course: "Model-free and Model-based Auto-Scaling Techniques for Distributed Applications"
2023	PhD Course: "Teoria delle reti complesse"
2023	PhD Course: "Advanced Topics in Computer Networking"
2023	PhD School: "23rd Max Planck Advanced Course on the Foundations of Computer Science" (ADFOCS 2023)
2023	PhD School: "Quantum Information Processing - Gate-based and Annealing Systems"

Tutoring Activities

2021-2022	Prospective Student Support, Roma Tre University
2020-2021	Prospective Student Support, Roma Tre University

2020-2021 *Mondo digitale, Coding Girls*: Coach in schools for the Coding Girls project "Women who code the future"

Computer Skills

Quantum computing tools and platforms	D-Wave, Qiskit, PennyLane, Ocean™, Quirk
Programming languages	C, Python, Java, Lua, C#, Prolog, OCaml
Frameworks	Networkx, D-Wave NetworkX, NumPySciPy, Pandas, Solar2d
Typesetting and markup	LATEX2, BIBTEX2, Markdown

Contact

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ORCID

DBLP

HOMEPAGE

List of Publications

JOURNALS:

1. Carlos Alegría-Galicia, Susanna Caroppo, Giordano Da Lozzo, Marco D'Elia, Giuseppe Di Battista, Fabrizio Frati, Fabrizio Grosso, and Maurizio Patrignani. "Upward Pointset Embeddings of Planar st-Graphs" *Algorithmica*, vol. 87, no. 6, 930–960, 2025.

2. Susanna Caroppo, Giordano Da Lozzo, and Giuseppe Di Battista. "Quantum algorithms for one-sided crossing minimization" *Theoretical Computer Science*, vol. 1052, 115424, 2025.

3. Susanna Caroppo, Giordano Da Lozzo, and Giuseppe Di Battista. "Quantum Graph Drawing" *Journal of Graph Algorithms and Applications*, vol. 29, no. 2, 3–47, 2025.

CONFERENCES:

1. Susanna Caroppo, Giordano Da Lozzo, Giuseppe Di Battista, Michael T. Goodrich, and Martin Nöllenburg. "Quantum Speedups for Polynomial-Time Dynamic Programming Algorithms" In *19th International Symposium on Algorithms and Data Structures (WADS 2025)*, LIPIcs, vol. 349, 14:1–14:22. Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2025.

2. Giordano Andreola, Susanna Caroppo, Giuseppe Di Battista, Fabrizio Grosso, Maurizio Patrignani, and Allegra Strippoli. "A Walk on the Wild Side: A Shape-First Methodology for Orthogonal Drawings" In *33rd International Symposium on Graph Drawing and Network Visualization (GD 2025)*, LIPIcs, vol. 357, 35:1–35:20. Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2025.

3. Susanna Caroppo, Giordano Da Lozzo, and Giuseppe Di Battista. "Quantum Algorithms for One-Sided Crossing Minimization" In *32nd International Symposium on Graph Drawing and Network Visualization (GD 2024)*, LIPIcs, vol. 320, 20:1–20:9. Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2024.

4. Carlos Alegría, Susanna Caroppo, Giordano Da Lozzo, Marco D'Elia, Giuseppe Di Battista, Fabrizio Frati, Fabrizio Grosso, and Maurizio Patrignani. "Upward Pointset Embeddings of Planar st-Graphs" In *32nd International Symposium on Graph Drawing and Network Visualization (GD 2024)*, LIPIcs, vol. 320, 24:1–24:18. Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2024.

5. Susanna Caroppo, Giordano Da Lozzo, and Giuseppe Di Battista. "Quantum Graph Drawing (Best Student Paper)" In *WALCOM: Algorithms and Computation (WALCOM 2024)*, LNCS, vol. 14549, 32–46. Springer, 2024.

Technical Reports:

1. Giordano Andreola, Susanna Caroppo, Giuseppe Di Battista, Fabrizio Grosso, Maurizio Patrignani, and Allegra Strippoli. "A Walk on the Wild Side: a Shape-First Methodology for Orthogonal Drawings" *arXiv preprint arXiv:2508.19416*, 2025.

2. Susanna Caroppo, Giordano Da Lozzo, Giuseppe Di Battista, Michael T. Goodrich, and Martin Nöllenburg. "Quantum Speedups for Polynomial-Time Dynamic Programming Algorithms" *arXiv preprint arXiv:2507.00823*, 2025.

3. Carlos Alegría, Susanna Caroppo, Giordano Da Lozzo, Marco D'Elia, Giuseppe Di Battista, Fabrizio Frati, Fabrizio Grosso, and Maurizio Patrignani. "Upward Pointset Embeddings of Planar st-Graphs" *arXiv preprint arXiv:2408.17369*, 2024.

4. Susanna Caroppo, Giordano Da Lozzo, and Giuseppe Di Battista. "Quantum Algorithms for One-Sided Crossing Minimization" *arXiv preprint arXiv:2409.01942*, 2024.

5. Susanna Caroppo, Giordano Da Lozzo, and Giuseppe Di Battista. "Quantum Graph Drawing" *arXiv preprint arXiv:2307.08371*, 2023.

Posters:

1. Susanna Caroppo, Jevgēnijs Vihrovs, Dārta Zajakina, and Aleksejs Zajakins. "Quantum Time-Space Tradeoffs for Exponential Dynamic Programming." *29th Annual Quantum Information Processing Conference (QIP 2026)*, Accepted Poster, 2026.

2. Susanna Caroppo, Giordano Da Lozzo, Giuseppe Di Battista, Michael T. Goodrich, and Martin Nöllenburg. "Quantum Speedups for Polynomial-Time Dynamic Programming Algorithms." *29th Annual Quantum Information Processing Conference (QIP 2026)*, Accepted Poster, 2026.