

Alice Calamita

CURRENT POSITION: PHD CANDIDATE IN OPERATIONS RESEARCH AT SAPIENZA UNIVERSITY OF ROME

Education

Sapienza University of Rome

Rome, Italy

PHD PROGRAM IN AUTOMATIC CONTROL, BIOENGINEERING AND OPERATIONS RESEARCH

Nov, 2020 - Current

- Curriculum: Operations Research
- Department: Computer, Control and Management Engineering (DIAG)
- Thesis: "Location problems with covering constraints: models and solution approaches for the telecommunications"
- Advisor: Laura Palagi

Sapienza University of Rome

Rome, Italy

MASTER'S DEGREE IN MANAGEMENT ENGINEERING

Oct, 2018 - Oct, 2020

- Thesis: "Neural network as surrogate model for the optimization of membrane gas separation processes"
- Advisor: Laura Palagi; Co-advisors: Bernardetta Addis, Veronica Piccialli
- Grade: 110/110 cum laude

Sapienza University of Rome

Rome, Italy

BACHELOR'S DEGREE IN MANAGEMENT ENGINEERING

Oct, 2015 - July, 2018

- Grade: 110/110 cum laude

Research Activity

My main research activity focuses on efficient modeling and solution of emerging combinatorial optimization problems in the field of covering and location, including congested partial set covering location, congested capacitated facility location, site and power assignment in wireless networks. I am interested in tackling large real-world problems, also involving data uncertainty (C6, C9). My second research interest concerns developing machine learning models to be embedded in optimization tools (C1, C7, C8). Throughout my research, I have actively collaborated with multi-disciplinary teams, and I have used a combination of tools and methods of mixed integer (non)-linear programming and machine learning to solve complex optimization problems with applications in different domains, including telecommunications (P1, P3, C2, C3, C4), risk assessment (C7, C8), and chemical engineering (C1). My professional knowledge covers several state-of-the-art solvers for the mathematical modeling and solution of optimization problems (P2, C5).

Research Collaborations

ESSEC Business School of Paris, Paris, France

Paris, France

VISITING PERIOD

Mar, 2023 - Aug, 2023

- Department: Information Systems, Decision Sciences and Statistics
- Host Supervisor: Ivana Ljubić
- Developed decomposition algorithm to solve robust set covering location problems in presence of congestion and uncertainty in the customer demand

Fondazione Ugo Bordoni, Rome, Italy

Rome, Italy

RESEARCH ASSIGNMENT

Dec, 2020 - Nov, 2022

- Optimization and learning methods applied to the design of fixed networks in LTE and 5G technology
- Developed a planning tool for the optimal deployment of radio base stations for the Municipality of Bologna

LORIA and LRGP Research Centers, Université de Lorraine, Nancy, France

Rome, Italy

MASTER THESIS PROJECT

March, 2020 - Jan, 2021

- Implemented machine learning models to improve the performance in the optimal design of multi-membrane system
- Used multistart methods for global optimization and simulation tools for the validation of the neural networks

Publications

INTERNATIONAL JOURNALS

[P1] P. Avella, A. Calamita, L. Palagi. **A compact formulation for the base station deployment problem in wireless networks.** *Networks.* (2023), 1– 16. <https://doi.org/10.1002/net.22146>

UNDER REVIEW

[P2] P. Avella, A. Calamita, L. Palagi. **A computational study of off-the-shelf MINLP solvers on a benchmark set of congested capacitated facility location problems.** <https://doi.org/10.48550/arXiv.2303.04216>

[P3] P. Avella, A. Calamita, L. Palagi. **Speeding up the solution of the Site and Power Assignment Problem in Wireless Networks.** <https://doi.org/10.48550/arXiv.2210.04022>

Conferences

**presenting author*

[C9] **ODS 2023*** - *The congested partial set covering location problem with uncertain customer demand*, A. Calamita, I. Ljubić, L. Palagi, International Conference on Optimization and Decision Sciences on “Optimization in Green Sustainability and Ecological Transition”, Ischia, Italy. September 4-7, 2023

[C8] **ODS 2023** - *Machine learning-based evaluation of risk of delay for the real-time Railway Traffic Management Problem*, A. Calamita, C. Meloni, M. Pranzo, M. Samà, International Conference on Optimization and Decision Sciences on “Optimization in Green Sustainability and Ecological Transition”, Ischia, Italy. September 4-7, 2023

[C7] **POMS 2023*** - *Machine learning-based evaluation of risk of delay in activity networks*, A. Calamita, C. Meloni, M. Pranzo, M. Samà, Production and Operations Management Society International Conference on “Operations Management & United Nation’s Sustainable Development Goals”, Paris, France. July 18-20, 2023

[C6] **EUROYoung 2023*** - *A Benders decomposition approach for congested partial set covering location with uncertain demand*, A. Calamita, I. Ljubić, L. Palagi, 3rd EUROYoung Workshop, Cergy, France. June 5-6, 2023

[C5] **Europt 2022*** - *Computational comparison of various formulations of MIQP problems*, P. Avella, A. Calamita, L. Palagi, 19th International Workshop on Advances in Continuous Optimization, Lisbon, Portugal. July 29-30, 2022

[C4] **EURO 2022*** - *Optimization aspects of wireless network design*, P. Avella, A. Calamita, L. Palagi, 32nd Conference of the Association of European Operational Research Societies, Espoo, Finland. July 3-6, 2022

[C3] **AIROYoung 2022*** - *Wireless networks planning: a compact formulation for the base station deployment problem*, P. Avella, A. Calamita, L. Palagi, 6th AIRO Young Workshop on “Operation Research and Data Science in Public Services”, Roma Tre University, Rome, Italy. March 23-25, 2022

[C2] **ODS 2021*** - *Planning on wireless networks: optimization and technological aspects*, P. Avella, A. Calamita, L. Palagi, International Conference on Optimization and Decision Sciences on “Optimization in Artificial Intelligence and Data Sciences”, Statistical Department of Sapienza University of Rome, Rome, Italy. September 14-17, 2021

[C1] **INFORMS 2020** - *Membrane Separation Processes Using Machine Learning Based Mathematical Programming Models*, B. Addis, A. Calamita, C. Castel, F. Di Luzio, E. Favre, A. Macali, V. Piccialli, Annual Meeting of the Institute for Operations Research and Management Sciences, online. November 7-13, 2020

Invited Talks & Seminars

[T2] Spring 2023. *From Theory to Practice: Optimization Applied to the Real World.* Guest Seminar, Integer Programming and Combinatorial Optimization Course, MSc in Management Engineering at Sapienza University of Rome

[T1] Fall 2022. *Software optimization modeling tools.* Guest Seminar, Combinatorial Optimization Course, BSc in Management Engineering at Sapienza University of Rome

Teaching Experience

Spring 2023	Decision Analytics , MSc Grande École in Management at ESSEC Business School of Paris. Teaching Assistant	<i>Paris, France</i>
Spring 2022, 2023	Integer Programming and Combinatorial Optimization , MSc in Management Engineering at Sapienza University of Rome. Course Tutor	<i>Rome, Italy</i>
Fall 2021, 2022	Combinatorial Optimization , BSc in Management Engineering at Sapienza University of Rome. Course Tutor	<i>Rome, Italy</i>

Academic Awards & Scholarships

- *PhD Mobility Grant*, 2023. Funded by Sapienza University of Rome
- *Tutoring Scholarship at MSc*, 2023. Funded by Sapienza University of Rome.
- *Tutoring Scholarship at BSc*, 2021, 2022. Funded by Sapienza University of Rome.
- *Scholarship for a PhD Course provided by the National Taught Course Centre in Operational Research (NATCOR)*, 2021. Funded by the Association of European Operational Research Societies (EURO). Italian winner
- *Three-years PhD Scholarship*, 2020. Funded by Department of Computer, Control, and Management Engineering at Sapienza University of Rome
- *Scholarships for Thesis Abroad*, 2020. Funded by Fondazione Roma Sapienza
- *Highest Achieving Student Award*, 2019. First place in the ranking of the Sapienza highest achieving students of Management Engineering

Editorial Activities, Society Memberships & Third Mission Activities

- Reviewer for LNCS Springer
- Reviewer for EURO Journal on Computational Optimization
- Member of the Italian Operations Research Society (AIRO)
- Promoted Sapienza BSc, MSc and PhD programs at the events OpenDiag (2021, 2022) and Sapienza Open Days (2022)

Skills & Competencies

Core Competencies *Operations Research*, Data Analytics, Machine Learning

Programming skills *Python*, AMPL, R, MATLAB, MySQL

Optimization solvers Gurobi, IBM CPLEX, FICO Xpress, SCIP, MOSEK

Qualifications Professional Italian Title of Engineer, achieved in December 2021

Languages English (full professional working proficiency), Italian (native)