



Marta Monaci

WORK EXPERIENCE

[12/06/2025 – Current]

Tenure-track Researcher

Universitas Mercatorum, Rome, Italy

[02/01/2025 – 11/06/2025]

Postdoctoral Researcher

Institute for Systems Analysis and Computer Science "A. Ruberti" (IASI) - National Research Council of Italy (CNR), Rome, Italy

Research project: *ATENA - Agricoltura di precisione e Intelligenza Artificiale per l'innovazione sostenibile dell'arboricoltura*

URL: <https://atena.iasi.cnr.it/>

[09/12/2024 – 15/12/2024]

Visiting Researcher

Department of Statistics and Operations Research, University of Vienna, Vienna, Austria

Research activity: Collaboration on developing semidefinite programming relaxations for Interpretable Machine Learning models

Hosted by Prof. Immanuel Bomze

[02/2024 – 01/2025]

Adjunct Lecturer

Sapienza University of Rome, Italy

I had the privilege to teach the "Operations Research Laboratory" course as part of the Bachelor's program in Management Engineering.

This course was designed to equip students with standard modeling strategies that can be applied to effectively solve real-world optimization problems. Throughout the course, students acquired practical skills in translating optimization models into AMPL language and using several optimizers to solve the mathematical problems defined.

City: Rome | **Country:** Italy

[01/02/2024 – 31/12/2024]

Research Fellow

Department of Computer, Control, and Management Engineering -Antonio Ruberti- (DIAG), Sapienza University of Rome, Italy

Research project: *Making Interpretable Machine Learning possible: Leveraging SVMs to construct Margin Optimal Trees.*

[01/2024]

Independent Research Assignment

Department of Computer, Control, and Management Engineering -Antonio Ruberti- (DIAG), Sapienza University of Rome, Italy

Research project: *Margin Optimal Decision Trees for the interpretation of black box Machine Learning models*

EDUCATION AND TRAINING

[09/2022 – 02/2023]

Visiting PhD Researcher

Copenhagen Business School

City: Copenhagen | **Country:** Denmark |

Hosted by Prof. Dolores Romero Morales.

Research project: Feature interactions in Univariate Optimal Decision Trees

PhD Program in Automatic Control, Bioengineering and Operations

[01/11/2020 – 30/01/2024]

Research

Sapienza University of Rome

City: Rome | **Country:** Italy | **Field(s) of study:** Operations Research | **Final grade:** Cum Laude | **Thesis:** Interpretable Machine Learning: Leveraging SVMs to construct Optimal Decision Trees - Supervisor: Prof. Laura Palagi

Mixed Integer Programming, Interpretable Machine Learning, Optimal Decision Trees, Support Vector Machines

[09/2018 – 10/2020]

MSc in Management Engineering

Sapienza University of Rome

City: Rome | **Country:** Italy | **Field(s) of study:** Business Intelligence and Analytics | **Final grade:** 110/110 cum laude | **Thesis:** Solving Job Shop Scheduling via Deep Reinforcement Learning - Advisors: Prof. Laura Palagi, Dr. G. Grani (SINTEF Digital Research Institute, Oslo, Norway)

Operations Research, Statistics, Optimization methods for Machine Learning, Derivative-Free and Combinatorial Optimization, Games and Equilibria.

[01/2020 – 05/2020]

Erasmus+ Program

University of Strasbourg

City: Strasbourg | **Country:** France | **Field(s) of study:** Faculté des sciences économiques et de gestion (FSEG)

[09/2015 – 10/2018]

BSc in Management Engineering

Sapienza University of Rome

City: Rome | **Country:** Italy | **Final grade:** 110/110

LANGUAGE SKILLS

Mother tongue(s): Italian

Other language(s):

English

LISTENING C1 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION B2 **SPOKEN INTERACTION** B2

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

SKILLS

Core Competences

Operations Research | Optimization | Machine Learning | Data Science

Computer Skills

Python | AMPL | Microsoft Office | IBM CPLEX | GUROBI | LaTeX

Python Libraries

Numpy | Pandas | Scikit-Learn | PyTorch | Seaborn | Matplotlib

PUBLICATIONS

[2025]

[**Strength of the Upper Bounds for the Edge-Weighted Maximum Clique Problem**](#)

F. Ciccarelli, V. Dose, F. Furini, M. Monaci

Preprint on arXiv. Submitted to Discrete Applied Mathematics.

- [2025] [Random Forest-driven Heuristic for Margin Optimal Regression Trees](#)
V. Marcelli, L. Palagi, M. Monaci, I. Ciocci
Technical report
- [2024] [Unboxing Tree Ensembles for interpretability: a hierarchical visualization tool and a multivariate optimal re-built tree](#)
Reference: EURO Journal on Computational Optimization,12,100084
G. Di Teodoro, M. Monaci, L. Palagi
DOI: [10.1016/j.ejco.2024.100084](#)
- [2024] [Margin Optimal Classification Trees](#)
Reference: Computers & Operations Research, 161,106441
F. D'Onofrio, G. Grani, M. Monaci, L. Palagi
DOI: [10.1016/j.cor.2023.106441](#)
- [2024] [An actor-critic algorithm with policy gradients to solve the job shop scheduling problem using deep double recurrent agents](#)
Reference: European Journal of Operational Research 312 (3), 910-926
M. Monaci, V. Agasucci, G. Grani
DOI: [10.1016/j.ejor.2023.07.037](#)
- [2023] [Optimization-based approaches for learning Optimal Classification Trees](#)
Reference: IFORS News 18 (1), 5-7
F. D'Onofrio, M. Monaci, L. Palagi
OR tutorial on Mathematical Optimization and Optimal Classification Trees
- [2021] [Heuristics for the Traveling Salesperson Problem based on Reinforcement Learning](#)
Reference: Department of Computer, Control, and Management Engineering Antonio Ruberti Technical Report n. 04, 2021. ISSN 2281-4299
C. Coppola, G. Grani, M. Monaci, L. Palagi
Technical report

CONFERENCES AND SEMINARS

- [22/06/2025 – 25/06/2025] **EURO 2025 - 34th European Conference on Operational Research**
University of Leeds, Leeds, England
Delivered a talk titled: *Leveraging Support Vector Machines to construct Margin Optimal Decision Trees* (Young Women 4OR session)
- [30/06/2024 – 03/07/2024] **EURO 2024 - 33rd European Conference on Operational Research**
Technical University of Denmark - DTU, Copenhagen, Denmark
Delivered a talk titled: *Margin Optimal Trees: a novel formulation and a SVM-based decomposition approach*
- [24/07/2023 – 26/07/2023] **Optimization 2023** University of Aveiro, Aveiro, Portugal

Delivered a talk titled: *A decomposition algorithm leveraging the SVM structure of Margin Optimal Trees*

Chair of the session: "Optimization and Machine Learning"

[01/12/2022] **NeEDS Workshop On the Latest Advances in Machine Learning to Deal with Complex Data**

Copenhagen Business School, Copenhagen, Denmark

Delivered a talk titled: *Maximum Margin Optimal Classification Trees*

[05/10/2022] **Machine Learning NeEDS Mathematical Optimization** Online series

Delivered a talk titled: *Maximum Margin Optimal Classification Trees*

[01/08/2022 – 02/08/2022] **EUROPT Summer School 2022**

NOVA School of Science and Technology, Lisbon, Portugal

Courses: First Order Optimization Methods, Equilibrium Selection.

[29/07/2022 – 30/07/2022] **EUROPT 2022 - 19th International Workshop on Advances in Continuous Optimization**

NOVA School of Science and Technology, Lisbon, Portugal

Delivered a talk titled: *Maximum Margin Optimal Classification Trees*

[23/02/2022 – 25/02/2022] **6th AIROYoung Workshop - Operation Research and Data Science in Public Services 23**

Roma Tre University, Italy

Delivered a talk titled: *Maximum Margin Optimal Decision Trees*

[14/09/2021 – 17/09/2021] **ODS 2021 - International Conference on Optimization and Decision Sciences on "Optimization in Artificial Intelligence and Data Science"**

Sapienza University of Rome, Italy

Delivered a talk titled: *An actor-critic algorithm with deep double recurrent agents to solve job shop scheduling*

Chair of the session "Machine Learning-based optimization"

[11/07/2021 – 14/07/2021] **EURO 2021 - 31st European conference for Operational Research** University of West Attica, Athens, Greece

Delivered a talk titled: *An actor-critic algorithm with deep double recurrent agents to solve job shop scheduling*

[07/07/2021 – 09/07/2021] **EUROPT 2021 - 18th International Workshop on Advances in Continuous Optimization**

Toulouse (online), France

[08/02/2021 – 12/02/2021] **AIRO PhD School 2021 and 5th AIROYoung Workshop**

University "Federico II" of Naples (online), Italy

AIRO PhD School and 5th AIROYoung Workshop 2021 on "Optimization and Data Science: Trends and Applications"

[19/11/2020] **ODS 2020 - International Conference on Optimization and Decision Science on "Operations Research, Machine Learning and Analytics"**

Attended online

PROJECTS

[02/01/2025 – Current]

ATENA - Agricoltura di precisione e Intelligenza Artificiale per l'innovazione sostenibile dell'arboricoltura

Role: Participant

Funder: Programma Regionale FESR Lazio 2021-2027 – RIPOSIZIONAMENTO COMPETITIVO RSI (D.G.R. 1043 del 9 novembre 2022) Ambito 2 – Economia del mare, Green economy e Agrifood

URL: <https://atena.iasi.cnr.it/>

[2023]

Making Interpretable Machine Learning possible: leveraging SVMs to construct Margin Optimal Trees

"Avvio alla Ricerca" Project - Type 2, Sapienza University of Rome

Role: Principal Investigator

Project ID: AR223188B4BE6D60

[2023]

Optimization for Enhancing Machine Learning Models

"Progetto di Ricerca Medio", Sapienza University of Rome

Role: Participant

Project ID: RM123188F479D981

[2022]

Maximum Margin Optimal Classification Trees

"Avvio alla Ricerca" Project - Type 1, Sapienza University of Rome

Role: Principal Investigator

Project ID: AR1221816C6DC246

[2022]

Interpretable machine learning tools for health applications

"Progetto di Ricerca Medio", Sapienza University of Rome

Role: Participant

Project ID: RM1221816BAE8A79

[2021]

Ghost penalties in optimization

"Progetto di Ricerca Medio", Sapienza University of Rome

Role: Participant

Project ID: RM12117A857F64F2

HONOURS AND AWARDS

[2024]

Honorable Mention from the Marguerite Frank Award jury for the Best EJCO Paper 2024

The article *"Unboxing Tree Ensembles for Interpretability: A Hierarchical Visualization Tool and a Multivariate Optimal Re-built Tree"*, published in the EURO Journal on Computational Optimization (EJCO), received an Honourable Mention in the selection process for the Marguerite Frank Best EJCO Paper Award 2024.

- [2024] **YoungWomen4OR 2024-2025 Awarding institution:** EURO WISDOM Forum
- Selected as one of the 12 young women researchers by EURO WISDOM Forum, an initiative promoting early-career women in Operations Research, either in academia or in the industry, by fostering networking, mentoring, and research visibility.
- [2023] **Funding for "Avvio alla Ricerca" Project - Type 2 Awarding institution:** Sapienza University of Rome
- Awarded funding to initiate research on the project: "Making Interpretable Machine Learning possible: leveraging SVMs to construct Margin Optimal Trees"
- [2022] **Funding for "Avvio alla Ricerca" Project - Type 1 Awarding institution:** Sapienza University of Rome
- Awarded a funding to initiate research on the project: "Maximum Margin Optimal Classification Trees"
- [2022] **PhD Mobility Scholarship Awarding institution:** Sapienza University of Rome
- Awarded a PhD mobility scholarship to conduct a research period at Copenhagen Business School under the supervision of Prof. Dolores Romero Morales
- [2022] **Tutoring Scholarship Awarding institution:** Sapienza University of Rome
- Awarded a working scholarship position at the I3S Department of Engineering as tutor assistant for the Analisi Matematica I course
- [2021] **Tutoring Scholarship Awarding institution:** Sapienza University of Rome
- Awarded a working scholarship position at the I3S Department of Engineering as tutor assistant for the Complementi di Matematica course

TEACHING ACTIVITIES

- [2025 – Current] **Joint Lecturer of a Bachelor's Course**
- Universitas Mercatorum, Italy
- Lecturer of the "**Ricerca Operativa per ICT**" course held in the Bachelor's Degree in Computer Engineering
- [2021 – Current] **Co-Advisor of MSc Theses**
- Sapienza University of Rome, Italy
- I had the opportunity to assist in the academic supervision of MSc theses.
- [2024 – 2025] **Advisor or BSc Theses**
- Sapienza University of Rome, Italy
- I have supervised 26 BSc theses.
- [02/2024 – 01/2025] **Adjunct Lecturer**
- Lecturer of the **Laboratorio di Ricerca Operativa** course held in the Bachelor's Degree in Management Engineering
- [09/2022 – 02/2023] **Teaching assistant**
- Sapienza University of Rome, Italy

Official tutor of the **Analisi Matematica I** course held in the Bachelor's Degree in Management Engineering

[09/2021 – 02/2022] **Teaching assistant**

Sapienza University of Rome, Italy

Official tutor of the **Complementi di Matematica** course held in the Bachelor's Degree in Management Engineering

Autorizzo il trattamento dei miei dati personali presenti nel CV ai sensi dell'art. 13 d. lgs. 30 giugno 2003 n. 196 - "Codice in materia di protezione dei dati personali" e dell'art. 13 GDPR 679/16 - "Regolamento europeo sulla protezione dei dati personali".

15/09/2025