Eleonora Vercesi

Department of Informatics - Università della Svizzera Italiana
Istituto Dalle Molle di Studi sull'Intelligenza Artificiale

: eleonora.vercesi@usi.ch
: eleonoravercesi.github.io
: eleonoravercesi

Education

- 01-10-2023/present: **PostDoc** in Computational Methods for the Integrality Gap analysys
  IDSIA (USI - SUPS) & Università della Svizzera Italiana (USI). Advisor: Prof. Luca Maria Gambardella, Prof. Palmo Monaldo Mastrolilli.

- 01-10-2020/24-10-2023: **Ph.D. Candidate** in Computational Mathematics and Decision Sciences.
  International Ph.D. Program, University of Pavia (UniPv) & Università della Svizzera Italiana (USI). Supervisor: Prof. Stefano Gualandi (UniPv).
  Graduated with honors.

- 10-06-2020: **MSc** in Applied Mathematics, UniPv.
  Title of the thesis: "*The Gene Mover's Distance. Single Cell Similarity via Optimal Transport*". Supervisors: Prof. Stefano Gualandi (UniPv). Grade: 110/110 cum Laude.

- 2016–2020: **Collegio Nuovo - Fondazione Sandra ed Enea Mattei, Pavia, Italy.**
  Selected by merit and tests to Collegio Nuovo - accredited by MIUR as a Center of Educational Excellence by a decree of the President of the Italian Republic.

- 21-11-2017: **BSc** in Mathematics, UniPv.
  Title of the thesis: "*Azioni di gruppi finiti*". Supervisor: Prof. Paola Frediani (UniPv).

Publications & Preprints

Journal papers

1. Vercesi, E., Barta, J., Gambardella, L. M., Gualandi, S., & Mastrolilli, M. (2025). On the integrality gap of small Asymmetric Traveling Salesman Problems: A polyhedral and computational approach. Discrete Optimization, 57, 100901.

2. Bernardelli, A. M., Bonasera, L., Duma, D., & Vercesi, E. (2024). Multi-objective stochastic scheduling of inpatient and outpatient surgeries. Flexible Services and Manufacturing Journal, 1-55.

3. Vercesi, E., Gualandi, S., Mastrolilli, M., & Gambardella, L. M. (2023). On the generation of metric TSP instances with a large integrality gap by branch-and-cut. Mathematical Programming Computation, 15(2), 389-416.

4. Gualandi, S., Vercesi, E., & Toscani, G. (2022). A kinetic description of the body size distribution of species. Mathematical Models and Methods in Applied Sciences, 32(14), 2853-2885.

Conference papers

5. Villa, T., Vercesi, E., Barta, J., & Mastrolilli, M. (2025). The Integrality Gap of the Traveling Salesman Problem is 4/3 if the LP Solution Has at Most $n+6$ Non-zero Components. The 27th Conference on Integer Programming and Combinatorial Optimization (IPCO).

6. Encz, K. I., Mastrolilli, M., Vercesi, E., Branch-and-Bound Algorithms as Polynomial-time Approximation Schemes. The 52nd EATCS International Colloquium on Automata, Languages, and Programming (ICALP).

7. Gambardella, L. M., Gualandi, S., Mastrolilli, M., & Vercesi, E. (2022). Predicting the Empirical Hardness of Metric TSP Instances. In Workshop on Operation Research and Data Science in Public Services (pp. 1-16). Cham: Springer International Publishing.

Under Review

8. Huber, S., Mastrolilli, M., & Vercesi, E., The falsification problem: How hard is it to falsify heuristics? (Preprint available upon request)

9. Bernardelli, A. M., Vercesi, E., Gambardella, L.M., Gualandi, S., & Mastrolilli, M., Lower bounds for the integrality gap of the bi-directed cut formulation of the Steiner Tree Problem. (link)

10. E. Vercesi & A. Buchanan, The Dantzig-Fulkerson-Johnson TSP formulation is easy to solve for few subtour constraints. (link)

Preprints

11. Bellazzi, R., Codegoni, A., Gualandi, S., Nicora, G., & Vercesi, E. (2021). The Gene Mover's Distance: Single-cell similarity via Optimal Transport. (link)

Workshops and Conferences

- 2026, July. Invited Participant, *Dagstuhl Seminar: Analysis of Algorithms Beyond the Worst Case* Schloss Dagstuhl – Leibniz Center for Informatics, Germany.
- 2025, July. *PhD School on Intersections of Algorithms and Machine Learning Theory*, Odense. Accepted talk: "Branch & Bound methods as polynomial time approximation schemes".
- 2025, May. "Easy to see, hard to prove". *Invited Lecture for the Master in Applied Mathematics in Pavia.*
- 2025, May. *Conference: Women in Mathematics*, Lausanne, Accepted talk: "The limits of exact solvers: hard instances for the Travelling Salesperson Problem".

- 2023, Feb. *7^{th} AIROYoung Workshop, Operations Research Beyond Frontier*, Milano, Accepted talk: "On the generation of Metric TSP instances with a large integrality gap by branch-and-cut".
- 2022, Nov. *Workshop "Matematica per l'intelligenza artificiale e il Machine Learning - Giovani Ricercatori"*, Torino, Contributed talk: "Computing Disease-Specific Gene Embeddings via Constrained Optimization".
- 2022, Jul. *ZIB Seminars*, Berlin, Invited Talk: "On the generation of Metric TSP instances with a large integrality gap by branch-and-cut".
- 2022, May. *2022 Mixed Integer Programming Workshop 2022*, DIMACS, Rutgers University, Accepted poster: "On the generation of Metric TSP instances with a large integrality gap by branch-and-cut".
- 2022, Mar. *PhD Spring Workshop 2022*, Pavia, Contributed talk: "Hardness of TSP instances: a computational study".
- 2022, Feb. *OT-SDM 2022: The 1st International Workshop on Optimal Transport and Structured Data Modeling*, Online, Contributed talk: "The Gene Mover's Distance: single-cell similarity via optimal transport".
- 2022, Feb. *6^th AIRO Young Workshop "Operations Research and Data Science in Public Service"*, Rome, Contributed talk: "Hardness of Metric TSP instances: a computational study".
- 2021, Sep. *1st Young Applied Mathematicians Conference*, Santa Maria di Leuca, Contributed talk: "A new family of hard-to-solve instances for the metric TSP".
- 2021, Feb. *5th AIRO Young Workshop "Optimization and Data Science: Trends and Application"*, Online, Contributed talk: "The Gene Mover's Distance: single-cell similarity via optimal transport".

Teaching

Main lecturer

- Deep Learning Lab - AYs 2023–2026 - Università della Svizzera Italiana, Master in Artificial Intelligence
- Pre-requisite in Math - AYs 2020–2022 - University of Pavia - Bachelor in Economics

Teaching assistant

- **BSc in Mathematics - University of Pavia**
  - *TA in Python Programming* - AYs 2020–2021, 2021–2022;
  - *TA in Calculus 1 and 2 - University of Pavia* - AYs 2017–2018.
- **BSc in Pharmacy - University of Pavia**

- *TA in Math* - AYs 2018–2019, 2019–2020.

- **BSc in Economics - University of Pavia**
  - *TA in Math* - AYs 2018–2022

Service to the Scientific Community

Organizational activities

- Co-organizer of the EUROYoung workshop in Lugano (October 2026)
- Co-organizer of the "Work In Progress" seminars at IDSIA.
- Co-organizer of the 9th AiroYoung Workshop – Shaping a Sustainable Future in the Era of Big Data (26 - 28 Feb. 2025)

Editorial activities

I am Editor of the 9th AiroYoung Workshop – Shaping a Sustainable Future in the Era of Big Data

Review activities

- I have served as a reviewer for the annual **AAAI Conference on Artificial Intelligence** since 2022.
- I have served as a reviwer for **The 26th Conference on Integer Programming and Combinatorial Optimization**
- I have served as a reviewer for articles submitted to journals such as **Optimization Letters**, **INFORMS Journal of Computing**, and **Discrete Optimization**.

Reserach Visiting & Abroad Experiences

- **Visiting student** at Università della Svizzera Italiana (USI), October 2022 - May 2023. Advisor: Prof. Luca Maria Gambardella.
- **Visiting student** at Free University of Berlin, Konrad-Zuse Zentrum für Informationstechnik Berlin, as part of the "Graduate-level Research in Industrial Projects for Students" program, May - August 2022.

Thesis co-supervision

- Ignacio Utrilla Mas, "Il Problema del commesso viaggiatore Asimmetrico" (SUPSI), 2023. Co-supervision with Palmo Monaldo Mastrolilli (IDSIA).

- G. Maggiorano, "Cell-cell similarity measures via optimal transport and principal component analysis for clustering", 2021. Co-supervision with S. Gualandi.
  BSc in Mathematics at University of Pavia.
- A Cirelli, "Minumum distortion embedding and application to genomics", 2021. Co-supervision with S. Gualandi.
  BSc in Mathematics at University of Pavia.

Awards & Grants

- 2022, Dec. "Best Paper Award" for my submission at "Operations Research and Data Science in Public Services (6th AIROYoung Workshop)".
- 2022, Jun. 14th AIMMS-MOPTA Optimization Modeling, Second place.
  Team work with A. M. Bernardelli, L. Bonasera, D. Duma.
- 2022, May. Awarded the "2022 Research Award" by the Alumnae Association of Collegio Nuovo.
  Full coverage of the expenses to attend and present a poster to MIP2022.
- 2022, Travelling Grant GNAMPA.

Languages

- Italian – mother tongue.
- English B2 – IELTS Certified in 2018.
- German A1 – self-taught

Computer Skills

- Windows, Ubuntu, MacOS: good knowledge.
- C, C++, MATLAB, Python, Julia, Java, R: good knowledge.
- Optimization tools: Gurobi, CPLEX, Minizinc, SCIP.
- Git, SLURM: good knowledge.

Miscellanea

- I have co-funded MyPhDMentor associations.
- I love staying with people and leading an active life: I have always played volleyball in various teams at different levels. I also practice skiing, windsurfing, beach volleyball, and pole dancing at an amateur level.

In compliance with the GDPR and the Italian Legislative Decree no. 196 dated 30/06/2003, I hereby authorize you to use and process my personal details contained in this document.

Eleonora Sorcesi