Lorenzo Balzotti
Curriculum Vitae

Personal Information

Lorenzo Balzotti
Postdoc Researcher
Sapienza, University of Rome
Department of Statistical Sciences
Piazzale Aldo Moro, 5, 00185
Rome, Italy

Google Scholar: https://scholar.google.com/citations?hl=it&user=tF9YpYYAAAAJ
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Research Interests

- Graph theory and discrete mathematics
- Graph algorithms and applications
- Knowledge graphs
- Explainable Artificial Intelligence
- Computational complexity

Research Groups

- Giorgio Ausiello, Paolo G. Franciosa, Isabella Lari, Andrea Ribichini about graphs algorithms
- Donatella Firmani, Andrea Ribichini about knowledge graph embeddings and explainable artificial intelligence
- Carlo Cavicchia, Giorgia Zaccaria about creating an R package for statistical method for clustering

Research activity at qualified institutions

2022 – Current **Postdoc in Computer Science**
Sapienza University of Rome, Department of Statistical Sciences
Big Data Networks

Education

Jan 2023 **PhD in Mathematical Models for Engineering**
Sapienza University of Rome, Department of Basic and Applied Sciences for Engineering (SBAI)
Thesis: "Non-Crossing Shortest Paths in Planar Graphs with Applications to Max Flow, and Path Graphs"
Advisor: Prof. Paolo Giulio Franciosa

Jan 2019 **Master's Degree in Applied Mathematics**
110 cum laude, Sapienza University of Rome
Thesis: "Un nuovo algoritmo per il riconoscimento dei grafi Vertex Path Tree"
Advisor: Prof. Claudia Malvenuto
Co-Advisor: Prof. Nicola Apollonio

Oct 2015 **Bachelor's Degree in Mathematics**
110 cum laude, Sapienza University of Rome
Thesis: "Tempo di mescolamento in catene di Markov"
Advisor: Prof. Alessandra Faggionato

Community Services

Journal Reviews

1. Discrete Mathematics. Role: reviewer
2. Journal of Graph Algorithms and Applications. Role: reviewer

External Reviewer

1. **[SEA 2023]**: 21st Symposium on Experimental Algorithms. Role: subreviewer
2. **[CIAC 2023]**: Algorithms and Complexity: 13th International Conference. Role: subreviewer
3. **[STACS 2022]**: 39th International Symposium on Theoretical Aspects of Computer Science. Role: subreviewer
4. **[CIAC 2021]**: Algorithms and Complexity, 12th International Conference, CIAC 2021 Role: subreviewer
5. **[MFCS 2022]**: 47th International Symposium on Mathematical Foundations of Computer Science Role: subreviewer

Conferences

1. **Contributed talk** at *17th International Computer Science Symposium in Russia*, June 29–July 1, 2022, online
2. **Contributed talk** at *13th International Conference on Algorithms and Complexity*, 14 – 16 June, 202, Larnaca, Cyprus

Projects

1. Progetti Medi Sapienza, person in charge: Capparelli Stefano, Project Title: "Strutture algebro-geometriche e combinatorie relative a grafi, quiver, grassmanniane, codici e partizioni di interi", Department of Basic and Applied Sciences for Engineering, year: 2020, grant: €11.000,00

2. Progetti Medi Sapienza, person in charge: Pepe Valentina, Project Title: "Strutture algebro-geometriche e combinatorie relative a grafi, quiver, grasmanniane, codici e algebre di Lie, e questioni didattiche", Department of Basic and Applied Sciences for Engineering, year: 2021, grant: €13.900,00

Languages

- Italian (Mothertongue)
- English (Good Knowledge)

Computer Skills

C, C++, Python, Matlab, R, LaTeX, Excel

Publications

Articles

1. Lorenzo Balzotti, and Paolo G. Franciosa. "Non-crossing shortest paths lengths in planar graphs in linear time". https://doi.org/10.1016/j.dam.2023.12.011
2. Nicola Apollonio and Lorenzo Balzotti. "Two new characterizations of path graphs". Discrete Mathematics, 346.12 (2023): 113596., https://doi.org/10.1016/j.disc.2023.113596
3. Lorenzo Balzotti, and Paolo G. Franciosa. "Non-crossing Shortest Paths in Undirected Unweighted Planar Graphs in Linear Time". Journal of Graph Algorithms and Applications, 26 (2022), pp. 589–606, https://doi.org/10.7155/jgaa.00610
4. Lorenzo Balzotti, and Paolo G. Franciosa. "How Vulnerable is an Undirected Planar Graph with respect to Max Flow". Accepted to Networks

Proceedings

5. Lorenzo Balzotti, and Paolo G. Franciosa. "Non-crossing Shortest Paths in Undirected Unweighted Planar Graphs in Linear Time". In: Kulikov, A.S., Raskhodnikova, S. (eds) Computer Science – Theory and Applications. CSR 2022. Lecture Notes in Computer Science, vol 13296. Springer, Cham. https://doi.org/10.1007/978-3-031-09574-0_6
6. Lorenzo Balzotti, and Paolo G. Franciosa. "How Vulnerable is an Undirected Planar Graph with respect to Max Flow". in Algorithms and Complexity: 13th International Conference, CIAC 2023, June 13–16, 2023, Springer. https://dx.doi.org/10.1007/978-3-031-30448-4_7
7. Lorenzo Balzotti, and Paolo G. Franciosa. "Non-Crossing Shortest Paths Lengths in Planar Graphs in Linear Time". in Algorithms and Complexity: 13th International Conference, CIAC 2023, June 13–16, 2023, Springer. https://dx.doi.org/10.1007/978-3-031-30448-4_6

PhD Thesis

8. Lorenzo Balzotti. "Non-Crossing Shortest Paths in Planar Graphs with Applications to Max Flow, and Path Graphs". PhD Thesis (2023).

Preprints

9. Lorenzo Balzotti. "Non-Crossing Shortest Paths are Covered with Exactly Four Forests". arXiv preprint arXiv:2210.13036 (2022). (submitted to Discrete Mathematics)
10. Giorgio Ausiello, Lorenzo Balzotti, Paolo G. Franciosa, Isabella Lari, and Andrea Ribichini "A Linear Time Algorithm for Computing Max-Flow Vitality in Undirected Unweighted Planar Graphs". arXiv preprint arXiv:2204.10568 (2022).
11. Lorenzo Balzotti. "A New Algorithm to Recognize Path Graphs and Directed Path Graphs". arXiv preprint arXiv:2012.08476 (2021). (submitted to Discrete Applied Mathematics)

Rome 28/12/2023