Federico Battista

Curriculum Vitæ

Harold S. Mohler Laboratory 200, West Packer Avenue
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USA
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Professional experience

from 2023.02 to Present **Postdoctoral Researcher**, *Lehigh University, Dept. of Industrial and Systems Engineering*, Bethlehem, PA, USA,
Advisor: Prof. Ted Ralphs
Development of methods for solving general Mixed-Integer Bilevel Linear Programs.

from 2022.02 to 2022.08 **Visiting Ph.D. Student**, *Alpen-Adria-Universität, Institut für Mathematik*, Klagenfurt, Austria,
Advisor: Prof. Angelika Wiegele
Development of Alternating Directions Method of Multipliers for large-scale Semidefinite Programs.

Education

from 2019.11 to 2023.01 **Ph.D in Operations Research**, *Università degli Studi di Roma "La Sapienza"*, Rome, Italy,
Thesis: On Semidefinite Lift-and-Project of Combinatorial Optimization Problems
Supervisors: Prof. Marianna De Santis, Prof. Fabrizio Rossi, Prof. Stefano Smriglio

from 2017.10 to 2019.07 **Master's degree in Computer Science**, *Università degli Studi dell'Aquila*, L'Aquila, Italy,
Thesis: Application of the Lovász-Schrijver M+ operator to compact stable set integer programs
Supervisors: Prof. Fabrizio Rossi, Prof. Stefano Smriglio
Final mark: 110/110 magna cum laude

from 2014.09 to 2017.10 **Bachelor's degree in Computer Science**, *Università degli Studi dell'Aquila*, L'Aquila, Italy,
Thesis: Natural Language Processing and Machine Learning for Conversational Agents
Supervisor: Prof. Giovanni De Gasperis
Final mark: 110/110 magna cum laude

Refereed publications

2024 F. Battista, M. De Santis, **Dealing with Inequality Constraints in Large-Scale Semidefinite Relaxations for Graph Coloring and Maximum Clique Problems**, *4OR. A Quarterly Journal of Operations Research*, `https://doi.org/10.1007/s10288-024-00569-5`

2023 F. Battista, **On Semidefinite Lift-and-Project of Combinatorial Optimization Problems**, *Ph.D. Thesis, Università di Roma Sapienza*, `https://hdl.handle.net/11573/1668673`

Working papers and publications in review

2025 S. Fallah, F. Battista, T. Ralphs, **A Branch-and-Bound Algorithm for Constructing the Efficient Frontier of a Mixed-Integer Linear Optimization Problem**, *Working paper, COR@L Laboratory, Lehigh University*

F. Battista, T. Ralphs, **Improving Directions in Mixed Integer Bilevel Linear Optimization**, *arXiv preprint arXiv:2511.03566*, `https://arxiv.org/abs/2511.03566`

2024 F. Battista, F. Rossi, S. Smriglio, **Application of the Lovász-Schrijver Operator to Compact Stable Set Integer Programs**, *arXiv preprint arXiv:2407.19290*, `https://doi.org/10.48550/arXiv.2407.19290`

Conference presentations and talks

2025 F. Battista, T. Ralphs, S. Fallah **The Restricted Value Function of MILPs and Its Construction with SYMPHONY**, *18th INFORMS Computing Society (ICS) Conference, Toronto, Canada*

2024 F. Battista, T. Ralphs, **A Branch-and-Cut Algorithm for Mixed-Integer Bilevel Linear Optimization Based on Improving Directions**, *International Symposium on Mathematical Programming, Montreal, Canada*

2023 F. Battista, T. Ralphs, **Exploiting Dual Functions in Mixed Integer Bilevel Linear Programs**, *INFORMS Annual Meeting, Phoenix, AZ*

2022 F. Battista, M. De Santis, F. Rossi, S. Smriglio, **On Semidefinite Lift-and-Project Relaxations for Combinatorial Optimization Problems**, *University of Pavia, Pavia, Italy*

F. Battista, F. Rossi, S. Smriglio, **Application of the Lovász-Schrijver Operator to Representative Formilation for Graph Coloring Problem**, *International Symposium on Combinatorial Optimization, Paris, France*

2021 F. Battista, M. De Santis, **Dealing with Inequalities in Large Scale Semidefinite Programs**, *International Conference on Optimization and Decision Science, Rome, Italy*

Software

Maintainer **SDP_lift_and_project**, *Python,Matlab*
`https://github.com/febattista/SDP_lift_and_project`

Maintainer **ADAL-ineq**, *Python,Matlab*
`https://github.com/febattista/ADAL-ineq`

Contributor **MibS: Mixed Integer Bilevel Solver**, *C++*
`https://github.com/coin-or/MibS`

Contributor **SYMPHONY**, *C*
`https://github.com/coin-or/SYMPHONY`