

## CONTACT INFORMATION

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## RESEARCH INTERESTS

**Discrete optimization** with contributions spanning theory, methodology, and computation toward more effective solution approaches for complex **mixed-integer linear problems** and the development of open-source tools for the community.

**Combinatorial optimization**, particularly the design of strong relaxations for graph problems, such as, the **maximum clique/independent set** and **graph coloring**.

## ACADEMIC EXPERIENCE

**Lehigh University**, Dept. of Industrial and Systems Engineering, Bethlehem, PA, USA  
Postdoctoral Researcher under [Ted Ralphs](#) *February 2023 – Present*

## EDUCATION

**Università di Roma Sapienza** Dept. of Computer, Control, and Management Engineering, Rome, Italy  
Ph.D in [Operations Research](#) *November 2019 – January 2023*  
Thesis: [On Semidefinite Lift-and-Project of Combinatorial Optimization Problems](#)  
Advisors: Marianna De Santis, Fabrizio Rossi, Stefano Smriglio

**Alpen-Adria-Universität** Institut für Mathematik, Klagenfurt, Austria  
Visiting Ph.D student under [Angelika Wiegele](#) *February 2022 – July 2022*

**Università degli Studi dell'Aquila** Dept. of Inf. Eng., Computer Science and Mathematics, L'Aquila, Italy  
Master's degree in [Computer Science](#), *Magna Cum Laude* *July 2019*  
Bachelor's degree in [Computer Science](#), *Magna Cum Laude* *October 2017*

## REFEREED PUBLICATIONS

- [1] F. **Battista**, F. Rossi, and S. Smriglio. *Application of the Lovász-Schrijver Operator to Compact Stable Set Integer Programs*. In: *Mathematical Programming Computation* (2025). DOI: [10.1007/s12532-025-00298-8](https://doi.org/10.1007/s12532-025-00298-8).
- [2] F. **Battista** and M. De Santis. *Dealing with Inequality Constraints in Large-Scale Semidefinite Relaxations for Graph Coloring and Maximum Clique Problems*. In: *4OR. A Quarterly Journal of Operations Research* (2024), pp. 1–31. DOI: [10.1007/s10288-024-00569-5](https://doi.org/10.1007/s10288-024-00569-5).
- [3] F. **Battista**. *On Semidefinite Lift-and-Project of Combinatorial Optimization Problems*. PhD thesis. Università di Roma Sapienza, 2023. HDL: [11573/1668673](https://hdl.handle.net/11573/1668673). URL: <https://hdl.handle.net/11573/1668673>.

## WORKING PAPERS

- [4] F. **Battista** and T. K. Ralphs. *Improving Directions in Mixed Integer Bilevel Linear Optimization*. arXiv preprint. COR@L Laboratory, Lehigh University, 2025. URL: <https://doi.org/10.48550/arXiv.2511.03566>.
- [5] S. Fallah, F. **Battista**, and T. K. Ralphs. *A Branch-and-Bound Algorithm for Multiobjective Mixed Integer Linear Optimization*. Working paper. COR@L Laboratory, Lehigh University, 2025. *Submitted*.

SOFTWARE	[6] F. <b>Battista</b> , F. Rossi, and S. Smriglio. <i>SDP_lift_and_project</i> (2025). URL: <a href="https://github.com/febattista/SDP_lift_and_project">https://github.com/febattista/SDP_lift_and_project</a> . <i>Maintainer</i> .
	[7] F. <b>Battista</b> and M. De Santis. <i>ADAL-ineq</i> (2024). URL: <a href="https://github.com/febattista/ADAL-ineq">https://github.com/febattista/ADAL-ineq</a> . <i>Maintainer</i> .
	[8] S. DeNegre, T. Ralphs, and S. Tahernejad. <i>MiB-S Version 1.2</i> (2024). URL: <a href="https://github.com/coin-or/MiB-S">https://github.com/coin-or/MiB-S</a> . <i>Contributor</i> .
	[9] T. Ralphs, M. Güzelsoy, and A. Mahajan. <i>SYMPHONY Version 5.7</i> (2023). URL: <a href="https://github.com/coin-or/SYMPHONY/">https://github.com/coin-or/SYMPHONY/</a> . <i>Contributor</i> .
STUDENTS	<b>Doctoral Students Mentorship</b>
	• Shannon Kelley, Lehigh University, ISE, Advisor: Ted Ralphs 2023 – Present
	• Samira Fallah, Lehigh University, ISE, Advisor: Ted Ralphs 2023 – Present
	• Hesam Shaelaie, Lehigh University, ISE, Advisor: Ted Ralphs 2023 – Present
	• Suresh Bolusani, Lehigh University, ISE, Advisor: Ted Ralphs 2023 – Present
TEACHING EXPERIENCE	<b>Teaching Assistant</b>
	• <i>ISE 418 Integer Programming</i> , Ph.D. course, Lehigh University 2024
	• Operations Research Laboratory, B.Sc. course, Università Roma Sapienza 2020
	• Advanced Calculus, B.Sc. course, Università Roma Sapienza 2020
TALKS	
	[1] F. <b>Battista</b> , T. K. Ralphs, and S. Fallah. <i>The Restricted Value Function of MILPs and Its Construction with SYMPHONY</i> . In: <i>18th INFORMS Computing Society (ICS) Conference</i> (2025).
	[2] F. <b>Battista</b> and T. K. Ralphs. <i>A Branch-and-Cut Algorithm for Mixed-Integer Bilevel Linear Optimization Based on Improving Directions</i> . In: <i>International Symposium on Mathematical Programming</i> (2024).
	[3] F. <b>Battista</b> and T. K. Ralphs. <i>Exploiting Dual Functions in Mixed Integer Bilevel Linear Programs</i> . In: <i>INFORMS Annual Meeting</i> (2023).
	[4] F. <b>Battista</b> , F. Rossi, and S. Smriglio. <i>Application of the Lovász-Schrijver Operator to Representative Formulation for Graph Coloring Problem</i> . In: <i>International Symposium on Combinatorial Optimization</i> (2022).
	[5] F. <b>Battista</b> et al. <i>On Semidefinite Lift-and-Project Relaxations for Combinatorial Optimization Problems</i> . In: <i>University of Pavia</i> (2022).
	[6] F. <b>Battista</b> and M. De Santis. <i>Dealing with Inequalities in Large Scale Semidefinite Programs</i> . In: <i>International Conference on Optimization and Decision Science</i> (2021).
SERVICE	<b>Editorial Board (Associate Editor)</b>
	• <i>Operations Research</i> (Area: Data, Software, and Computation) 2025 – Present