Curriculum Vitae

Personal information

Surname and name: Scatamacchia Rosario

Date of birth: March 13, 1982; *Nationality*: Italian.

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Education

January 2014 - March 2017
Ph.D. in **Operations Research**, *Doctoral Program in Computer and Control Engineering (29th cycle)*, Politecnico di Torino, Turin, Italy. Final grade: Ph.D. title awarded cum laude.

September 2004 - July 2007
Master of Science in **Engineering and Management**, Politecnico di Torino, Turin, Italy.
Final grade: 110 cum laude/110.

September 2001 - December 2004
Bachelor of Science in **Engineering of the Enterprise Organization**, Politecnico di Torino, Turin, Italy.
Final grade: 110 cum laude/110.

Positions and research activities

November 2018 – On going

Position: Assistant professor with time contract (non tenure-track, RTD-a position in the Italian university) in Operations Research at Politecnico di Torino, Department of Management and Production Engineering.

Main activities: Study of theoretical and algorithmic frameworks for combinatorial optimization problems in graph theory, scheduling and resource allocation. Development of algorithms and decision-making tools for different projects, with a focus on applications in the energy sector. Mid/long term research lines are devoted to the interdisciplinary use of combinatorial optimization methods with machine learning techniques and methods from statistical inference and physics, with the aim of identifying and exploiting possible synergies between different fields.

July 2017 – October 2018

Position: Postdoctoral fellowship in Combinatorial Optimization at Politecnico di Torino, Department of Management and Production Engineering.

Main activities: Development of exact and approximation algorithms and methods for their performance analysis. The research activities concerned the study of mathematical programming techniques for deriving both theoretical results and algorithms for scheduling and resource allocation problems.

January 2017 - June 2017

Position: Research collaboration at Politecnico di Torino, Department of Computer and Control Engineering.

Main activities: Design of exact approaches and approximation algorithms for knapsack problems. The pursued research extended the activities carried out during the Ph.D. years.

January 2014 - March 2017

Position: Ph.D. in Operations Research (scholarship funded by TIM company) at Politecnico di Torino, Department of Computer and Control Engineering.

Main activities:
The main research line focused on knapsack problems. The provided scientific contributions were both from a theoretical and a practical perspective. The main contributions were approximation algorithms and valuable exact solution approaches for direct applications of practical interest or when the considered problems arise as sub-problems in broader contexts.

A research activity was devoted to the study of problems and algorithms in graph theory. The activity was a follow up of a research collaboration (from September 2013 to December 2013) with the Computer Science Department of Università di Torino (Turin, Italy).

I was also involved in industrial research projects (with TIM company) in the energy sector and for smart city applications within the Internet of Things paradigm. The activities concerned the development of solution approaches based on statistical inference models and combinatorial algorithms.

Visiting research periods

November 2018 - December 2018 (3 weeks)

University: Ecole Polytechnique de l'Université de Tours, OR, Scheduling and Transportation group, Tours, France.

Main activities: Joint research activities with Prof. Vincent T'kindt and other members of the research team on topics in combinatorial optimization, in particular on the design of exact approaches for scheduling problems.

October 2018 - November 2018 (6 weeks)

University: Technical University of Denmark, Management Engineering department, Copenhagen, Denmark.

Main activities: Research collaboration with Prof. David Pisinger and other colleagues of the department. The activities concerned the development of dynamic programming algorithms, column generation and branch and bound approaches for knapsack-type optimization problems with applications in airport and wind power industries.

January 2016 - March 2016; September 2016 - December 2016; June 2017 (24 weeks)

University: Karl-Franzens University of Graz, Statistics and Operations Research department, Graz, Austria.

Main activities: Research collaboration with Prof. Ulrich Pferschy and members of the Statistics and Operations Research department. The activities focused on the development of approximation and dynamic programming algorithms for knapsack problems, in connection with the research lines carried out during the Ph.D. years.

Teaching activities

I have been entitled (with renewal on a three-year basis) to support teaching courses in the following sector codes (SSD) at Politecnico di Torino:

- Operations Research, Sector code: MAT/09. Academic years: from 2014-2015;
- Applied Economics, Sector code: SECS-P/06. Academic years: 2017-2018, 2018-2019, 2019-2020.

Since 2016, I have been giving exercise classes and lectures of an Operations Research course, held by Prof. Federico Della Croce, for undergraduate students in Engineering and Management at Politecnico di Torino.
The quality of the teaching activities is assessed by questionnaires (anonymously) filled by the students of the course. The outcome is a teacher index which averages the scores of a series of questions, whose answers are evaluated by a Likert scale with following values:
1 - Definitely No; 2 - More No than Yes; 3 - More Yes than No; 4 - Definitely Yes (best value).

I obtained the following teacher index values:
Academic year 2019-2020 (on line teaching): 3.51/4.00 (teaching hours: 72, questionnaires: 137);
Academic year 2018-2019: 3.94/4.00 (teaching hours: 50, questionnaires: 127);
Academic year 2017-2018: 3.94/4.00 (teaching hours: 55, questionnaires: 113);
Academic year 2016-2017: 3.79/4.00 (teaching hours: 43, questionnaires: 166);
Academic year 2015-2016: 3.64/4.00 (teaching hours: 30, questionnaires: 90).

I am the teacher of the PhD course "Graphs and Combinatorial Optimization" for PhD students of Politecnico di Torino at Politecnico di Torino (academic years 2018/2019 and 2020/2021). Teaching hours: 20. A description of the course is available at:
https://didattica.polito.it/pls/portal30/gap.pkg_guide.viewGap?p_cod_ins=01UEPRP&p_a_acc=2021&p_header=S&p_lang=IT

Other work activities

August 2008 - February 2013

Position: Transportation consultant at TRT Trasporti e Territorio (website: http://www.trt.it), Milan, Italy.

Main activities:
- Development of financial plans, cost-benefit analysis, risk analysis for the evaluation of transportation projects.
- Involvement in European research projects for economic regulation in transportation sector.
- Development of trend analysis and forecasting models for logistics studies.

January 2008 - April 2008

Position: Professional collaborator at Politecnico di Torino, Department of Management and Production Engineering, for a project for urban mobility policies in Piemonte region in Italy.

Main activities: Database management and statistical analysis of freight transportation traffics.

Awards and other information

I obtained the Italian national scientific qualification ("abilitazione scientifica nazionale ASN") as associate professor in Operations Research (sector code: 01/A6, validity: up to 05 May 2029).

Awards:

2017:

- Winner of the Best Dissertation Award of the Ph.D. Program in Computer and Control Engineering (29th cycle) at Politecnico di Torino (short video presentation available at: http://www.phd-dauin.polito.it/dissertationaward.html (2017 edition)).
- Winner of a Quality Award 2016 for best Ph.D. students of Politecnico di Torino (29th cycle of doctoral programs, third Ph.D. year).

2016:

Winner of a Quality Award 2015 for best Ph.D. students of Politecnico di Torino (29th cycle of doctoral programs, second Ph.D. year).

Additional information:

Reviewer for the following international journals:
- *Computers & Operations Research,* ISSN: 0305-0548
- *European Journal of Operational Research*, ISSN: 0377-2217
- *INFORMS Journal on Computing,* ISSN: 1091-9856
- *Journal of Combinatorial Optimization*, ISSN: 1382-6905
- *Optimization Letters,* ISSN: 1862-4472
- *Transportation Science*, ISSN: 0041-1655

Volunteer experience

Essex @ Brockton Alternative Attendance Program (TDSB), Toronto, Canada, April 2013 - July 2013

Responsible to prepare menu, cook for Nutrition Program, and teach youth Italian recipes.

CasAmica Onlus, Milan, Italy, November 2010 - February 2013

Active member of a non-profit organization that offers hospitality and assistance to patients receiving treatment at hospitals in Milan and to their relatives.

Publications

Papers published or accepted for publication in international journals

- P. Hosteins, R. Scatamacchia. The stochastic critical node problem over trees. *Networks*, 76: 381-401, 2020. DOI: 10.1002/net.21948.

- F. Della Croce, R. Scatamacchia. An exact approach for the bilevel knapsack problem with interdiction constraints and extensions. *Mathematical Programming*, 183: 249-281, 2020. DOI: 10.1007/s10107-020-01482-5.

- F. Della Croce, R. Scatamacchia. The Longest Processing Time rule for identical parallel machines revisited. *Journal of Scheduling*, 23: 163-176, 2020. DOI: 10.1007/s10951-018-0597-6.

- F. Della Croce, G. Dragotto, R. Scatamacchia. On fairness and diversification in WTA and ATP tennis tournaments generation. *Annals of Operations Research*, (published on line) 2020. DOI: 10.1007/s10479-020-03517-8.

- A. Alfieri, S. Zhou, R. Scatamacchia, S.L. van de Velde. Dynamic programming algorithms and Lagrangian lower bounds for a discrete lot streaming problem in a two-machine flow shop. *4OR*, (published on line) 2020. DOI: 10.1007/s10288-020-00449-8.

- F. Della Croce, R. Scatamacchia, V. T'kindt. A tight linear time 13/12-approximation algorithm for the P2||Cmax problem. *Journal of Combinatorial Optimization*, 38: 608-617, 2019, DOI: 10.1007/s10878-019-00399-w.

- F. Della Croce, U. Pferschy, R. Scatamacchia. On approximating the Incremental Knapsack Problem. *Discrete Applied Mathematics*, 264: 26-42, 2019, DOI: 10.1016/j.dam.2019.02.016.

- R. Aringhieri, A. Grosso, P. Hosteins, R. Scatamacchia. Polynomial and pseudo-polynomial time algorithms for different classes of the Distance Critical Node Problem, *Discrete Applied Mathematics*, 253: 103-121, 2019, DOI: 10.1016/j.dam.2017.12.035.

- F. Della Croce, U. Pferschy, R. Scatamacchia. New exact approaches and approximation results for the Penalized Knapsack Problem. *Discrete Applied Mathematics*, 253: 122-135, 2019, DOI: 10.1016/j.dam.2017.11.023.

- F. Della Croce, U. Pferschy, R. Scatamacchia. Approximating the 3-period Incremental Knapsack Problem. *Journal of Discrete Algorithms.* 52-53: 55-69, 2018, DOI: 10.1016/j.jda.2018.11.005.

- U. Pferschy, R. Scatamacchia. Improved dynamic programming and approximation results for the knapsack problem with setups. *International Transactions in Operational Research*, 25: 667-682, 2018, DOI: 10.1111/itor.12381.

- F. Della Croce, F. Salassa, R. Scatamacchia. A new exact approach for the 0-1 Collapsing Knapsack Problem. *European Journal of Operational Research*, 260: 56-69, 2017, DOI: 10.1016/j.ejor.2016.12.009.

- F. Della Croce, F. Salassa, R. Scatamacchia. An exact approach for the 0-1 knapsack problem with setups. *Computers & Operations Research*, 80:61-67, 2017, DOI: 10.1016/j.cor.2016.11.015.

- R. Aringhieri, A. Grosso, P. Hosteins, R. Scatamacchia. A General Evolutionary Framework for different classes of Critical Node Problems. *Engineering Applications of Artificial Intelligence*, 55:128-145, 2016, DOI: 10.1016/j.engappai.2016.06.010.

- R. Aringhieri, A. Grosso, P. Hosteins, R. Scatamacchia. Local search metaheuristics for the critical node problem. *Networks*, 67:209-221 2016, DOI: 10.1002/net.21671.

Papers published in selective international conferences proceedings

- F. Della Croce, R. Scatamacchia. Lower Bounds and a New Exact Approach for the Bilevel Knapsack with Interdiction Constraints. Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics). Volume 11480 LNCS, 2019, Pages 155-167, 20th International Conference on Integer Programming and Combinatorial Optimization, IPCO 2019, DOI: 10.1007/978-3-030-17953-3_12.

- F. Della Croce, U. Pferschy, R. Scatamacchia. Approximation Results for the incremental knapsack problem. In: Brankovic L., Ryan J., Smyth W. (eds) Combinatorial Algorithms. IWOCA 2017. Lecture Notes in Computer Science, vol. 10765, pp. 75-87, 2018. DOI: 10.1007/978-3-319-78825-8_7.

- R. Aringhieri, A. Grosso, P. Hosteins, R. Scatamacchia. A preliminary analysis of the Distance Based Critical Node Problem. *Electronic Notes in Discrete Mathematics*, Proceedings of CTW'16 conference, 55:25-28, 2016, DOI: 10.1016/j.endm.2016.10.007.

- R. Aringhieri, A. Grosso, P. Hosteins, R. Scatamacchia. VNS solutions for the critical node problem. *Electronic Notes in Discrete Mathematics*, Proceedings of VNS'14 conference, 47:37-44, 2015. DOI: 10.1016/j.endm.2014.11.006.

Ph.D. dissertation

- R. Scatamacchia. Knapsack Problems with Side Constraints, Ph.D. thesis, Politecnico di Torino, 2017. DOI:10.6092/polito/porto/2667802
(free download at: https://iris.polito.it/retrieve/handle/11583/2667802/146407/ThesisRosarioScatamacchia.pdf)

Other publications

- S. Maffii, R. Parolin, R. Scatamacchia, (book in Italian), Guida alla valutazione economica di progetti di investimento nel settore dei trasporti. *Franco Angeli*, Milan, 2011.

- M. Brambilla, S. Maffii, R. Parolin, R. Scatamacchia. NORDIM Project, Guidebook on the methodology of project evaluation and appraisal. *European Commission - DG TREN*, Milan, 2010.

- S. Bosetti, C. Corrias, E. Delhaye, R. Scatamacchia, A. Sitran. Final Report, Ex-Post Evaluation of the Road Safety Action Programme 2001-2010. *European Commission - DG TREN,* Milan, 2009.

- R. Scatamacchia. ENACT project, D5, a) case study: The Piacenza - Brescia motorway, b) case study: The Brescia – Milano motorway. *European Parliament*, Milan, 2009.

Conferences

- Speaker at the GEO-SAFE Wildfire Conference - Addressing the Challenges of Bushfire Management, Melbourne, Australia, 11th -15th November 2019. Title of the presentation: A matheuristic approach for the Budget Constrained Fuel Treatment Scheduling. Authors: Federico Della Croce, Marco Ghirardi, Rosario Scatamacchia.

- Speaker at the 30th European Conference on Operational Research (EURO 2019), Dublin, Ireland, 23rd- 26th June 2019. Title of the presentation: Exact solution of the Interval Min-Max Regret Knapsack Problem. Authors: Federico Della Croce, Rosario Scatamacchia.

- Speaker at the International Conference on Optimization and Decision Science (XLIX annual meeting of AIRO-Italian Operations Research Society), Genova, Italy, 4th – 7th September 2019. Title of the presentation: *A New Exact Approach for the Bilevel Knapsack with Interdiction Constraints*. Authors: Federico Della Croce, Rosario Scatamacchia.

- Speaker at the International Conference on Optimization and Decision Science (XLVIII annual meeting of AIRO-Italian Operations Research Society), Taormina, Italy, 10th - 13th September 2018. Title of the presentation: *Improved approximation algorithms for the P2||Cmax problem*. Authors: Federico Della Croce, V. T'kindt, Rosario Scatamacchia.

- 5th International Symposium on Combinatorial Optimization (ISCO 2018), Marrakesh, Marocco, 11th – 13th April 2018. Title of the presentation: *A tight linear time 13/12-approximation algorithm for the P2||Cmax problem*. Authors: Federico Della Croce, V. T'kindt, Rosario Scatamacchia.

- 2017 INFORMS annual meeting, Houston, 22nd - 25th October 2017. Title of the presentation: *LPT Rule for Identical Parallel Machines Revisited.* Authors: Federico Della Croce, Rosario Scatamacchia.

- Speaker at the International Conference on Optimization and Decision Science (XLVII annual meeting of AIRO-Italian Operations Research Society), Sorrento, Italy, 4th - 7th September 2017. Title of the presentation: *Approximation results for the Incremental Knapsack Problem*. Authors: Federico Della Croce, Ulrich Pferschy, Rosario Scatamacchia.

- 28th International Workshop in Combinatorial Algorithms (IWOCA), Newcastle, Australia, 17th - 21st July 2017. Title of the presentation: *Approximation Results for the incremental knapsack problem.*
Authors: Federico Della Croce, Ulrich Pferschy, Rosario Scatamacchia.

- Speaker at the 46th Annual Conference of the Italian Operational Research Society (AIRO), Trieste, Italy, 6th - 9th September 2016. Title of the presentation: *Algorithms and solutions for a covering problem within the Internet of Things paradigm*. Authors: Gero Costanza, Federico Della Croce, Dario Mana, Rosario Scatamacchia.

- Speaker at the 45th Annual Conference of the Italian Operational Research Society (AIRO), Pisa, Italy, 7th - 10th September 2015. Title of the presentation: *Exact Algorithms for the 0-1 Penalized Knapsack Problem*. Authors: Federico Della Croce, Rosario Scatamacchia.

- Speaker at the 27th European Conference on Operational Research Society (EURO), Glasgow, Scotland, 12th - 15th July 2015. Title of the presentation: *A Unified Exact Approach for Knapsack Problems with Side Constraints*. Authors: Federico Della Croce, Fabio Salassa, Rosario Scatamacchia.

- Speaker as finalist of the Prix Jeune Chercheur at the "16ème conference ROADEF Société Française de Recherche Opérationnelle et Aide à la Décision", Marseilles, France, 25th -27th February 2015. Title of the presentation: *Exact solution of the 0-1 Collapsing Knapsack Problem.* Authors: Federico Della Croce, Fabio Salassa, Rosario Scatamacchia.

- Speaker at the 44th Annual Conference of the Italian Operational Research Society (AIRO), Como, Italy, 2nd - 5th September 2014. Title of the presentation: *An effective approach for the Knapsack problem with setup.* Authors: Federico Della Croce, Fabio Salassa, Rosario Scatamacchia.

I authorize the treatment of my personal data according to the Italian Law (D. Lgs. 196/2003).

Date: February 01, 2021

Rosario Scatamacchia