Ragheb Rahmaniani

Curriculum Vitae — February 2019

Personal information

USA Visa:	O1A	Webpage:	@RaghebRahmaniani
Email:	Ragheb.Rahmaniani@gmail.com	Scholar:	@RaghebRahmaniani
Phone:	+1 (412)-608-8472	Github:	@Ragheb2464

Education

2017 – 2018 **Visiting Scholar** at Georgia Institute of Technology.

I was working on new decomposition-based exact algorithms and developing a black-box optimization solver for *Multi-Stage Stochastic Dynamic Integer Programming* problems.

▷ **Advisor**: Prof. Shabbir Ahmed.

▷ **Topics**: Stochastic/Dynamic/Integer Programming, Decomposition, Duality.

▷ **Applications**: Energy, Networks, Strategic Planning, Software.

2013 – 2018 **Ph.D. in Industrial Engineering** at Polytechnique of Montreal.

The coursework was focused on the theory and methodologies of *Operations Research*. My research was on developing novel high-performance algorithms for general MILP problems.

▷ **Advisor**: Prof. Michel Gendreau.

▷ **Co-Advisors**: Prof. Teodor Gabriel Crainic and Prof. Walter Rei

▷ **Thesis**: On high-performance Benders-decomposition-based exact methods with application to mixed-integer and stochastic problems.

▷ **GPA**: 4.0/4.0.

▷ **Applications**: LPs, MILPs, MINLP, Transportation and Logistics, Scheduling, Networks.

2011 – 2013 **M.Sc. in Industrial Engineering** at Iran University of Science and Technology.

The coursework had a strong focus on System Engineering and Mathematical Optimization with additional courses in Statistics and Probability. In my research, I applied the statistical and operational research techniques to propose new methodologies in evaluating the performance of public R&D institutes.

▷ **Advisor**: Prof. Mohammad-Ali Shafia.

▷ **Thesis**: R&D performance measurement in the public sector: An Operations Research Perspective.

▷ **GPA**: 16.23/20.0

▷ **Applications**: Management, Analytics, Markov Process, Balanced Scorecards.

2007 – 2011 **B.Sc. in Industrial Engineering** at Iran University of Science and Technology.

The coursework had a strong focus on Mathematics, Optimization, Project Management, Technology Management, with additional courses in Mechanics.

▷ **Advisor**: Prof. Mohammad-Saidi Mehrabad.

▷ **Final Project**: Robust hub location-allocation problems and meta-heuristic solution approaches.

▷ **GPA**: 17.45/20.0

▷ **Applications**: Transportation.

Work experience

2018–NOW

Full Time Applied Research Scientist at Optimized Markets, Inc. I am responsible for designing, implementing, and validating mathematical models and solution algorithms, software design and development and testing, configuring for delivery through a third party cloud service, and monitoring and managing pilot projects. I also interact with the customers regarding design requirements as well as providing them help and technical support. My duties also include conducting research, publishing papers, and presenting at conferences.

2017–2018

Part Time Optimization Software Developer at department of Industrial and Systems Engineering at Georgia Institute of Technology. I was responsible of re-designing, improving, testing, and extending an optimization package for the multi-stage stochastic integer problems. I was also responsible for using the solver on new problems and provide analytical insights.

2017–2018

Graduate Research Assistant at Centre Interuniversitaire de Recherche sur les Reseaux d'Entreprise, la Logistique et le Transport (CIRRELT). I was responsible of reviewing online resources to gather information, check facts, proofread, and edit research documents and grant proposals to ensure accuracy. I was also creating presentation slides and posters to help my advisers present our research findings to clients and colleagues at meetings and conferences.

2012–2013

Teacher Assistant at department of Industrial Engineering at Kurdistan University. I was helping Prof. Ghaderi with the following courses:

1. *Industrial Plants Layout Planning*: I was responsible for holding problem solving sessions, giving and correcting assignments, taking quizzes;
2. *Engineering Economics*: I was responsible of holding problem solving sessions, giving and correcting assignments, taking the midterm and instructing the course for 2 sessions.

2012

I was involved in a project entitled *Feasibility Study and Financial Appraisal to Construct an Export Terminal in Karaj Province* for 2 months. I was responsible of providing finical appraisal reports using COMFAR software, analyze the results, and write reports.

2011–2012

Part Time Statistical Analyst at Department of Future Trades of Mobin Sarmayeh. I was responsible of gathering, cleaning, and analyzing stock data using statistical and neural network software, e.g., Python, Excel, SPSS, and CLEMENTINE.

2010–2012

Part Time Undergraduate Academic Consulter at University of Science and Technology. I was helping undergrade students with their academic curricula by providing advices on the courses according to their interests and goals.

2010

Summer Intern at Absal Inc. I was responsible of detecting the bottlenecks on the Air Conditioning assembly line and propose alternative layouts in order to maximize the daily outputs.

2009

I was involved in a project entitled *Sources of Delays in the Railway Transportation System: Investigation, Identification, and Solution Strategies* for a full summer. My responsibilities were to write an up-to-date report and a synthesis of the rail freight transportation in the European countries and highlight the main differences with the rail management system at Iran.

Journal Publications

Exact Solution Algorithms

1. **Rahmaniani, R.**, Ahmed, S., Crainic, T.G., Gendreau, M., and Rei, W., "The Benders Dual Decomposition method", *To appear in Operations Research.*
2. **Rahmaniani, R.**, Crainic, T.G., Gendreau, M., and Rei, W., "Accelerating the Benders decomposition method: Application to stochastic network design problems", *SIAM Journal on Optimization*, 2018, Vol. 28(1), pp: 875–903.
3. **Rahmaniani, R.**, Crainic, T.G., Gendreau, M., and Rei, W., "The Benders decomposition algorithm: A literature review", *European Journal of Operational Research*, 2017, Vol. 259(3), pp: 801-817.

Meta-Heuristic Solution Algorithms

1. Ghaderi A. and **Rahmaniani, R.**, "Meta-heuristic solution approaches for robust single allocation p-hub median problem with stochastic demands and travel times", *The International Journal of Advanced Manufacturing Technology.* 2016, Vol. 82(9-12), pp: 1627-1647.
2. **Rahmaniani, R.** and Ghaderi A., "An algorithm with different exploration mechanisms: Experimental results to capacitated facility location/network design problem", *Expert Systems with Applications.* 2015, Vol. 42(7), pp: 3790-3800.
3. **Rahmaniani, R.**, Rahmaniani G., and Jabbarzadeh, A., "Variable neighborhood search based evolutionary algorithm and several approximations for balanced location–allocation design problem", *The International Journal of Advanced Manufacturing Technology.* 2014, Vol. 72(1-4), pp: 145-159.
4. Ghaderi, A., Jabal-ameli, M.S., Barzinpour, F., and **Rahmaniani, R.**, "An Efficient Hybrid Particle Swarm Optimization Algorithm for Solving the Uncapacitated Continuous Location-Allocation", *Networks and Spatial Economics.* 2012, Vol. 12(3), pp: 421-439.

Mathematical Modeling

1. **Rahmaniani, R.** and Ghaderi, A., "A combined facility location and network design problem with multi-type of capacitated links", *Applied Mathematical Modeling.* 2013, Vol. 37(9), pp: 6400–6414.
2. **Rahmaniani, R.**, Saidi-Mehrabad, M., and Ashouri, H., "Robust Capacitated Facility Location Problem: Optimization Model and Solution Algorithms", *Journal of Uncertain Systems.* 2013, Vol. 7(1), pp: 22-35.

Parallel Computing

1. **Rahmaniani, R.**, Crainic, T.G., Gendreau, M., and Rei, W., "Asynchronous Benders decomposition method". *Publication CIRRELT-2018-07*, Centre de recherche sur les transports, Université de Montréal, Montréal, QC, Canada.

Nonlinear Optimization

1. **Rahmaniani, R.**, Sadjadi, S.J., Shafia, M.A., and Rahmaniyan, N., "The optimal pricing model in an uncertain and competitive environment: using possibilitic geometric programming approach". *African Journal of Business Management.* 2012, Vol 6 (46), pp: 11565-11574.

Conference Presentations (Proceedings/Abstracts)

1. **Rahmaniani, R.**[1], Ahmed, S., Crainic, T.G., Rei, W., and Gendreau, M., "A decomposition method for mixed-integer problems", *INFORMS Optimization Society Conference*, Denver, USA, (March 2018).
2. **Rahmaniani, R.**[2], Crainic, T.G., Rei, W., and Gendreau, M., "Parallel Benders decomposition method for two-stage stochastic integer programs", *INFORMS Annual Meeting*, Houston, USA, (October 2017).
3. **Rahmaniani, R.**, Crainic, T.G., Rei, W., and Gendreau, M., "An efficient branch-and-Benders-cut method for two-stage stochastic network design problems", *Triennial Symposium on Transportation Analysis* (TRISTAN IX), Aruba, (June 2016), pp: 62-63.

[1] Session Chair
[2] Session Chair

4. **Rahmaniani, R.**[3], Crainic, T.G., Gendreau, M., and Rei, W., "Parallel L-shaped method to solve stochastic capacitated network design problem", *CORS/INFORMS International Conference*, Montréal-Canada, (June 2015).

5. **Rahmaniani, R.**, Saidi-Mehrabad, M., Rahmaniani, M. and Barzinpour, F., "Minimizing the transportation cost of delivery companies with uncertain demands and length edge", *The 8th International Industrial Engineering Conference, Tehran-Iran*, (February 2012), pp: 189-195.

6. Shafia, M. A., **Rahmaniani, R.**, Rezai, A., and Rahmaniani, M., "Robust optimization model for the capacitated facility location and transportation network design problem", *International Conference on Industrial Engineering and Operations Management*, Istanbul-Turkey, (July 2012), pp: 68-74.

7. **Rahmaniani, R.**, Ghaderi, A., Jabal-Ameli, M.S., and Bevrani, B., "Stochastic Maximum Covering Facility Location and Network Design", *The 4th International Conference of Iranian Operations Research Society*, Gilan-Iran, (March 2011), pp: 297-300.

Invited Talks

1. The Benders decomposition method and stochastic network design problems, CIRRELT/GERAD/MORSC Joint Seminars, Montreal, Canada, February 2017.

Articles in Progress

1. **Rahmaniani, R.**, Hewit, M., Rei, W., Wong, R., "On the generation of the Pareto-optimal cuts".
2. **Rahmaniani, R.**, "Fast and accurate decomposition heuristics for MILPs".
3. **Rahmaniani, R.**, "Redesigning the Benders decomposition for high dimensional integer programs".
4. **Rahmaniani, R.**, and Ahmed, S., "The Benders dual decomposition method for problems with integer second-stage variables".

Reviewer for Journals and Conferences

Operations Research, Mathematics of Operations Research, SIAM Journal on Optimization, Annals of Operations Research; Journal of the Operational Research Society; Applied Mathematical Modeling; Expert Systems with Applications; Soft Computing; Mathematical Problems in Engineering; African Journal of Business Management; 3rd International Conference on Industrial Engineering and Operations Management (IEOM, 2012).

Honors and Awards

2016	International Internship Fellowship, FRQNT.
2016	Excellence Award (Bourses d'excellence), CIRRELT.
2014	Excellence Award (Bourses d'excellence), CIRRELT.
2012–2013	Graduate Students Fellowship, National R&D Institute, Iran.
2012–2013	M.Sc. Exceptional Researchers Award, University of Science and Technology.
2011–2013	Member of National Elites Foundation (Bonyad Melli Nokhbegan), Iran.
2009–2011	B.Sc. Exceptional Talents Award, University of Science and Technology.
2007–2011	Ranked 1^{th} in undergraduate studies for all semesters.
2007	Ranked in the top 1% among more than 400,000 competitors in National University Entrance Exam, Iran.

[3]Session Chair

Selected Coursework

Mathematical Programming, Graph Theory, Integer Programming, Stochastic Optimization, Operations Research I and II, Decision Making with Multiple Criteria, Statistical Methods, Advanced Engineering Economy, Logistics and Transportation Network Design, Numerical Analysis, Project Management, Principles of Simulation.

Software and Systems

Programming Languages

C++17, C, Python, Ruby on Rails, JavaScript

Cloud Computing

AWS

Optimization APIs

CPLEX, GUROBI, GAMS, BARON, CBC

Parallelization Libraries

Message Passing Interface, Boost Threads, Protocol Buffers

Data Visualization

Tableau

Useful Libraries

DOCOPT, SPDLOG, OPENPYXL, TikZ, OSI

Writing and Presentation Tools

LaTeX, Microsoft Office

Development and Tooling

Cmake, bazel, Bash scripting, cpplint, clang-format, valgrind, gdb

Developed Software

BCompose	Highly efficient general-purpose decomposition-based solver for general MILPs written in C, C++, and Python. This package has over 100 tunable modules and it can used to solve a given problem with various exact solution algorithms. Binary files of this package are available upon request.
SDDiP	I collaborated on developing this solver for multi-stage stochastic integer problems. My modifications in this package resulted in more than 10x speedups on a standard testbed. I could also fix some serious memory leaks and unsafe threadings.

Language Skills

ENGLISH (fluent), FRENCH (advanced intermediate), KURDISH (native in both Sorani and Howrami), FARSI (native)

Extracurricular activities

Music	Playing an instrument in a band is a great example of a teamwork which requires paying attentions to many small details. I play Santour professionally. Santour has a crystal sound which gives the joyful feelings of being at the sea. I compose pieces for this instrument and teach it whenever I have time.
Sports	I am passionate about group activities, e.g., volleyball, soccer, badminton, and hiking. I am also good at swimming and running. For me, going to gym is one of the best ways to conclude a productive day.

References

Available upon request.