Arman Rouhani

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Maastricht, The Netherlands

Professional Summary

Analytical problem-solver with a PhD in Operations Research and with a strong background in design and analysis of optimization algorithms for challenging scheduling and allocation problems. Experienced in building decision-support models using mathematical programming (LP/MILP), implementing and solving (PuLP, Gurobi), and translating results into clear recommendations for non-technical stakeholders. Strong background in mathematical modeling, data analysis, and machine learning, with hands-on programming in Python, SQL, and C++. Interested in optimization, planning, and decision-making challenges in industry.

Projects

Measuring the Inefficiency of Decentralized Scheduling on Related Machines (PhD Project)

○ In this project we apply the LP primal-dual technique to measure the inefficiency resulting from selfish behavior of agents.

○ Paper (Discrete Optimization): An improved bound for the price of anarchy for related machine scheduling

○ GitHub: github.com/armanrhn/scheduling-games-primal-dual-poa

Fixed Order Scheduling with Deadlines (PhD Project)

○ In this project we develop exact and approximation algorithms for scheduling jobs with an imposed processing order on the minimum possible number of machines.

○ Paper (Operations Research Letters): Fixed order scheduling with deadlines

○ GitHub: github.com/armanrhn/fixed-order-scheduling-with-deadlines

Cost Preserving Dependent Rounding for Allocation Problems (PhD Project)

○ In this project we provide a dependent randomized rounding algorithm for many-to-many assignments on a bipartite graph that satisfies cost-preservation properties.

○ Paper (ICALP): Cost Preserving Dependent Rounding for Allocation Problems

Bi-objective Path Planning Problem (MSc Project)

○ In this project we provide an efficient algorithm for the bi-objective path planning problem that minimizes path length while maximizing distance from obstacles, aiming to compute Pareto-optimal paths.

○ Paper (TTCS): Path Planning with Objectives Minimum Length and Maximum Clearance

Persian Word Sense Disambiguation Based on Expert Systems (BSc Project)

○ In this project we develop a word sense disambiguation system for the Persian language using expert systems. The result is used in AvaNama application that converts speech/text to Persian Sign Language.

Skills

Languages: English (Fluent), Persian (Native), Azeri (Native), Dutch (A2), Arabic (Beginner)

Operations Research & Optimization: Python (PuLP, Pyomo, OR-Tools, CPLEX, Gurobi), Mathematical Programming, Algorithm Design, Stochastic Optimization, Scheduling

Programming Languages: Python (TensorFlow, NumPy, Pandas, SciPy, scikit-learn, Matplotlib), C++, Java, C#, JS, PHP, R

Data & Infrastructure: Git / GitHub, SQL, NoSQL, Power BI

Education

Maastricht University (UM) **Maastricht, The Netherlands**
Ph.D. in Operation Research September 2021-2025

Projects:
Approximate Mechanism Design Without Money for Facility Location Problem
Measuring the Inefficiency of Decentralized Scheduling on Related Machines
Fixed Order Scheduling with Deadlines
Cost Preserving Dependent Rounding for Allocation Problems
Projects Domain: Optimization, Operations Research, Algorithmic Game Theory
Supervisors: Dr. André Berger, Dr. Marc Schröder
Relevant Courses: (LNMB Programme): Algorithms & Complexity, Interior Point Methods,
Algorithmic Game Theory,a nd Randomized Algorithms

Institute for Advanced Studies in Basic Sciences (IASBS) **Zanjan, Iran**
M.Sc. (Master of Science) in Computer Science 2018-2021

GPA: 19.49/20.00, total 37 credits completed, class rank: 3 of 14
Thesis Title: Path Planning with Objectives Minimum Length and Maximum Clearance
Supervisor: Dr. Mansoor Davoodi Monfared
Relevant Courses: Advanced Algorithms, Approximation Algorithms, Computational Geometry,
and Robot Motion Planning

Institute for Advanced Studies in Basic Sciences (IASBS) **Zanjan, Iran**
B.Sc. (Bachelor of Science) in Information Technology Engineering 2014-2018

GPA: 18.21/20.00, total 210 credits completed, class rank: 3 of 46
Thesis Title: Persian Word Sense Disambiguation Based on Expert Systems
Supervisor: Dr. Mansoor Davoodi Monfared
Relevant Courses: Data Structures, Discrete Mathematics, Operations Research,
and Probability & Statistics

Publications

Journals:
- Andre Berger, **Arman Rouhani**, and Marc Schröder. "An improved bound for the price of anarchy for related machine scheduling". In: Discrete Optimization 58, (2025). DOI:10.1016/j.disopt.2025.100911.
- Andre Berger, **Arman Rouhani**, and Marc Schröder. "Fixed order scheduling with deadlines". In: Operations Research Letters 61, (2025). DOI: 10.1016/j.orl.2025.107306.

Book Chapters:
- Davoodi, M., Rouhani, A., Sanisales, M. (2020). Path Planning with Objectives Minimum Length and Maximum Clearance. In Topics in Theoretical Computer Science: Third IFIP WG 1. 8 International Conference, TTCS 2020, Tehran, Iran, July 1-2, 2020, Proceedings (Vol. 12281, p. 101). Springer Nature.

Conferences
- Lars Rohwedder, **Arman Rouhani**, and Leo Wennmann. "Cost Preserving Dependent Rounding for Allocation Problems". In: 52nd International Colloquium on Automata, Languages, and Programming (ICALP 2025). Schloss Dagstuhl–Leibniz-Zentrum für Informatik. 2025, pp. 127-1.

Research Interests

- Scheduling Problems
- Mathematical Modelling
- Robust Optimization
- Algorithmic Game Theory

- Approximation Algorithms
- Supply Chain Management
- Data-driven Decision Making
- Computational Complexity

Teaching Experience

Tutor:

○ **Statistics** (2026), Maastricht University: Totally 3 tutorial groups of 15 Business Engineering Bachelor's students. Covered topics include: Descriptive Statistics, Probability, Discrete and Continuous Random Variables, and Inferential Statistics. The students are also taught how to use R for data analysis and visualization in this course.

○ **Python Programming** (2025), Maastricht University: Totally 3 tutorial groups of 15 Econometrics & Operations Research Bachelor's students. In this course the fundamental programming in Java is taught, and students are trained to solve optimization problems using Python.

○ **Supply Chain Operations Management** (2025), Maastricht University: Totally 2 tutorial groups of 15 International Business Master's students. In this course, we concentrate on some key concepts that are used in making efficient. Covered topics include: Facility Location Problem, Sales & Operations Planning, Single Period Models, Supply Chain Collaboration, and Scheduling. At the end of the course, students presented a consultancy case at the Amsterdam office of Deloitte company.

○ **Operations Management** (2022, 2024, 2025), Maastricht University: Totally 13 tutorial groups of 15 International Business and Business Engineering Bachelor's students. Covered topics include: Forecasting, Simulation and Waiting Lines, Material Requirements Planning, Production and Assembly Lines, and Routing.

○ **Java Programming** (2021, 2022, 2023, 2024), Maastricht University: Totally 10 tutorial groups of 15 Econometrics & Operations Research Bachelor's students. In this course the fundamental programming in Java is taught, and students are trained to solve optimization problems using Java.

○ **Quantitative Methods II, Quantitative Methods III** (2022, 2026), Maastricht University: Totally 4 tutorial groups of 15 Economics and Business Economics Bachelor's students for QM II, and 3 tutorial groups of 15 International Business students for QM III. Covered topics include: Linear Programming, Integer Programming, Network Flows, Sensitivity Analysis, Inferential Statistics, Correlation and Linear Regression, and Inference for Regression models.

Teaching Assistant:

○ **Algorithm Design** (2018 - 2020), IASBS, Zanjan, Iran
○ **Data Structures** (2018 - 2020;), IASBS, Zanjan, Iran
○ **Artificial Intelligence** (2017), IASBS, Zanjan, Iran
○ **Data Structures** (2015), IASBS, Zanjan, Iran

Conferences and Schools

○ The 52nd EATCS International Colloquium on Automata, Languages, and Programming (Aarhus, Denmark)
   – Talk at ICALP: Cost Preserving Dependent Rounding for Allocation Problems - July 2025
○ The 17th International Symposium on Algorithmic Game Theory (SAGT) - (Amsterdam, The Netherlands)
   – Talk at SAGT: An improved bound for the price of anarchy for related machine scheduling - September 2024
○ 16th Workshop on Models and Algorithms for Planning and Scheduling Problems - (Kolding, Denmark)
   – Talk at MAPSP: Fixed order scheduling with deadlines - June 2024
○ 49th Conference on the Mathematics of Operations Research - January 2024 (Soesterberg, The Netherlands)
○ Dutch Seminar on Optimization - November 2023 (Paper talk given; Maastricht, The Netherlands)
○ 13th Day on Computational Game Theory - June 2023 (Amsterdam, The Netherlands)
○ 48th Conference on the Mathematics of Operations Research - January 2023 (Soesterberg, The Netherlands)
○ ALGO conference - September 2022 (Potsdam, Germany)
○ ALOP Autumn School on Bilevel Optimization - October 2020 (Online; Zanjan, Iran)
○ The Third IFIP International Conference on Topics in Theoretical Computer Science (Tehran, Iran)
   – Talk at TTCS: Path Planning with Objectives Minimum Length and Maximum Clearance - July 2020,
○ The International Conference on Contemporary Issues In Data Science (CIDAS) - March 2019, Zanjan, Iran

Extracurricular and Volunteer Experience

Robotics and Computational Geometry Research Laboratory (RoboCG), 2018-2019, Zanjan, Iran

RoboCG strives to be a leading developer of mathematical tools and algorithms for computational geometry and motion planning of robots, visualization, simulation, optimization, and theoretical analysis of algorithms.

-Key Responsibilities: Scientific presentations and organizing weekly sessions

-Directors: Dr. Bahram Sadeghi Bigham and Dr. Mansoor Davoodi Monfared

AvaNama, 2017-Present

AvaNama is a software for translating text and voice to Persian Sign Language, with the goal of improving communication between the deaf and hearing.

-Key Responsibilities: Team leadership, word sense disambiguation, and application development

-Website: www.avanama.org

Honors and awards

○ Selected as the **Special Talent** for Master of Science, Department of Computer Science and Information Technology, IASBS, Zanjan, Iran, August 2018

References

Dr. André Berger

Associate Professor at Quantitative Economics, School of Business and Economics, Maastricht University (UM), Maastricht, The Netherlands.

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Dr. Marc Schröder

Assistance Professor at Quantitative Economics, School of Business and Economics, Maastricht University (UM), Maastricht, The Netherlands.

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Dr. Mansoor Davoodi Monfared

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