İrfan Mahmutoğulları

Postdoctoral Researcher
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AREAS OF INTEREST

- Machine Learning, Data Science, Stochastic Programming, Robust Optimization, Contextual Optimization, Supply Chain Management, Combinatorial Optimization

EXPERIENCE

Postdoctoral Researcher   Oct 2022 – Present
*DTAI, Department of Computer Science, **KU Leuven***   *Leuven, Belgium*

- Doing research as a part of the EU-funded CHAT-Opt project (Promoter: Prof. Tias Guns)
- Leading Decision-Focused Learning subgroup of three postdocs and one Ph.D. student

Lecturer   Feb 2019 - Oct 2022
*Department of Industrial Engineering, **TED University***   *Ankara, Turkey*

- Served as the director of the Engineering Management (Mar 2019 - Nov 2022) and Industrial Engineering (Apr 2022 - Nov 2022) Master of Science programs
- Served as a member of the Graduate School Board (Mar 2019 - Nov 2022)

Research Fellow   Oct 2017 - Jul 2018
*The School of Industrial and Systems Engineering, **Georgia Institute of Technology***   *Atlanta, GA, USA*

- Funded by International Doctoral Research Grant (No: 2214) of the Scientific and Technological Research Council of Turkey (TUBITAK) to conduct research under the supervision of Prof. Shabbir Ahmed

Research and Teaching Assistant   Sep 2011 - Jan 2019
*Department of Industrial Engineering, **Bilkent University***   *Ankara, Turkey*

- Funded by Scholarship for Graduate Studies (Grant No: 2211) of the Scientific and Technological Research Council of Turkey (TUBITAK)

EDUCATION

Ph.D. in Industrial Engineering   Sep 2013 - Jan 2019
*Department of Industrial Engineering, **Bilkent University***   *Ankara, Turkey*

- Thesis title: Multi-stage Risk-Averse Mixed-integer Programming
- Advisors: Prof. Özlem Çavuş and Prof. M. Selim Aktürk
- Graduated with a full grade of 4.00 out of 4.00

M.S. in Industrial Engineering   Sep 2011 - Jun 2013
*Department of Industrial Engineering, **Bilkent University***   *Ankara, Turkey*

- Thesis title: Competitive Hub Location Problem
- Advisor: Prof. Bahar Yetiş Kara
- Graduated with a high honor grade of 3.81 out of 4.00

B.S. in Industrial Engineering   Sep 2007 - Jun 2011
*Department of Industrial Engineering, **Bilkent University***   *Ankara, Turkey*

- Graduated with a high honor grade of 3.73 out of 4.00

Publications

Journal Papers

- Perception-based Constraint Solving for Sudoku Images. Mulamba M., Mandi J., Mahmutoğulları A. İ. & Guns T., 2024. *Constraints*, Accepted for Publication.

- Risk-Averse Hub Location: Formulation and Solution Approach. Kargar K. & Mahmutoğulları A. İ., 2022. *Computers & Operations Research*, 143, 105760.

- Two Lagrangian Relaxation-based Heuristics for Vertex Coloring Problem. Mahmutoğulları A. İ., 2020. *Cumhuriyet Science Journal*, 41(2), 493-505.

- The Value of Multi-stage Stochastic Programming in Risk-averse Unit Commitment under Uncertainty. Mahmutoğulları A. İ., Ahmed S., Çavus Ö. & Aktürk M. S., 2019. *IEEE Transactions on Power Systems*, 34(5), 3667-3676.

- An Exact Solution Approach for Risk-averse Mixed-integer Multi-stage Stochastic Programming Problems. Mahmutoğulları A. İ., Çavuş Ö. & Aktürk M. S., 2019. *Annals of Operations Research*.

- Bounds on Risk-averse Mixed-integer Multi-stage Stochastic Programming Problems with mean-CVaR. Mahmutoğulları A. İ., Çavuş Ö. & Aktürk M. S., 2018. *European Journal of Operational Research*, 266(2), 595-608.

- Hub Location Under Competition. Mahmutoğulları A. İ. & Kara B. Y., 2016. *European Journal of Operational Research*, 250(1), 214-225.

- Hub Location Problem with Allowed Routing between non-hub Nodes. Mahmutoğulları A. İ. & Kara B. Y., 2015. *Geographical Analysis*, 47(4), 410-430.

  Under review

- Vulnerability Based Prioritization in Disaster Response Efforts. Mahmutoğulları A. İ., Sahin H. & Sahinyazan F.G. *INFOR: Information Systems and Operational Research*, Under the second round of revision.

- Synchronized Road Unblocking and Relief Material Distribution for Effective Disaster Response. Şahin H., Mahmutoğulları A. İ. & Kadan M. *Journal of Heuristics*, Under review.

  In progress

- Leveraging Contextual Information for Robustness in Vehicle Routing Problems. Mahmutoğulları A. İ. & Guns T. Target Journal: *INFORMS Journal on Computing.* Expected Submission in November 2024.

- Distributionally Robust Contextual Optimization. Mahmutoğulları A. İ. & Guns T. Target Journal: *Management Science.* Expected Submission in January 2025.

Peer-reviewed Conference papers

- An Efficient Structured Perceptron for NP-Hard Combinatorial Optimization Problems. Véjar B., Aglin G., Mahmutoğulları A. İ., Nijssen S., Schaus P. & Guns T., 2024, *Integration of Constraint Programming, Artificial Intelligence, and Operations Research CPAIOR 2024*, 21, 253-262.

Reviewer Duties for Journals

- Mathematical Programming, Transportation Research Series B: Methodological, European Journal of Operational Research, INFORMS Journal on Computing, Health Care Management Science, Annals of Operations Research, Socio-Economic Planning Sciences, RAIRO - Operations Research, Transactions on Machine Learning Research

Presentations / Talks / Conferences

- **Dagstuhl Seminar**: Machine Learning Augmented Algorithms for Combinatorial Optimization Problems, 2024, Wadern, Germany.

- **EURO 2024**: Invited Talk: Data Science Meets Optimization Stream, Copenhagen, Denmark

- **ORBEL 38**: The annual conference of the Belgian Operational Research Society, 2024, Antwerp, Belgium.

- **Workshop OR4Logistics**, FEB KU Leuven, 2023, Leuven, Belgium

- **Gluren bij de buren** LIM-workshop, KU Leuven Institute for Mobility, 2023, Leuven, Belgium.

- **ACP SUMMER SCHOOL** (Poster and Spotlight Presentations) on Machine Learning for Constraint Programming, 2023 Leuven, Belgium.

- **SMiLe 2023**: Spring workshop on Mining and Learning (Poster and Spotlight Presentations), 2023, Sint-Michielgestel, the Netherlands.

- **ORBEL 37**: The annual conference of the Belgian Operational Research Society, 2023, Liège, Belgium.

- **YAEM 39**: The annual conference of Operations Research and Industrial Engineering 2019, Ankara, Turkey.

- **MIP 2018**: Mixed Integer Programming Workshop (Poster presentation), Greenville, SC, USA.

- **INFORMS 2017** Annual Meeting, Houston, TX, USA.

- **INOC 2013**: International Network Optimization Conference 2013, Tenerife, Spain.

- **EWGLA 2013**: THE EURO Working Group on Locational Analysis XX, 2013, Ankara, Turkey.

- **EWGLA 2011**: THE EURO Working Group on Locational Analysis XIX 2011, Nantes, France.

TEACHING

TED University (Instructor)

- **Undergraduate Courses:**

  - IE332 - Mathematical Modeling & Optimization III (6 ECTS; 2019S, 2020S, 2021S, 2022S)
  - IE464 - Distribution Logistics (5 ECTS; 2018F, 2019F, 2020F, 2021F)
  - IE491-492 - Senior Project I - II (6+6 ECTS; 2019S&F, 2020S&F, 2021S&F, 2022S)

- **Graduate Courses:**

  - IE527 - Logistics (7.5 ECTS; 2018F, 2019F, 2020F)
  - IE547 - Modelling and Analysis of Uncertainty (7.5 ECTS; 2020F, 2021F)
  - EM590 - Graduation Project (12.5 ECTS; 2020S, 2021S)
  - EM591 - Pre-thesis seminar (5 ECTS; 2020S, 2020F, 2021S)
  - EM592 - Thesis I - II (30+30 ECTS; 2019F, 2020F, 2021S&F, 2022S)

Bilkent University (Teaching Assistant)

- **Undergraduate Courses:**

  - IE202 - Introduction to Modeling and Optimization (6.5 ECTS; 2013S)
  - IE303 - Modeling and Methods in Optimization (5 ECTS; 2011F, 2012F)
  - IE325 - Stochastic Models (5 ECTS; 2015F, 2016F)
  - IE400 - Principles of Engineering Management (5 ECTS; 2014F)
  - IE432 - Quantitative Risk Management (5 ECTS; 2015S, 2016S)

- **Graduate Courses:**

  - IE505 - Mathematical Programming (5 ECTS; 2013F)

THESIS SUPERVISION

- Investigating the Relationship Between Decision-Focused Learning and the Value of Stochastic Solution. Duygun E., 2025 (Expected). *Master of Science in Engineering, Computer Science, KU Leuven*. Promoter: Guns T., Supervisor: Mahmutoğulları A. İ.

- Robust Mathematical Optimization Using Quantile Predictions. Bernaerts G., 2024. *Master of Science in Engineering, Computer Science, KU Leuven*. Promoter: Guns T., Supervisor: Mahmutoğulları A. İ.

- Scalable Decision-Focused Learning for Vehicle Routing Problems. Michailidis K., 2023. *Master of Science in Engineering, Computer Science, KU Leuven*. Promoter: Guns T., Supervisor: Mahmutoğulları A. İ.

- The Problem of Simultaneous Routing of Road Cleaning and Relief Vehicles for an Effective Planning Method after Natural Disaster. Kadan M., 2022. *Master of Science in Industrial Engineering, TOBB University of Economics and Technology*. Supervisor: Şahin H., Co-supervisor: Mahmutoğulları A. İ.

Honors and Awards

- **Oct 2017 - Jul 2018**: The Scientific and Technological Research Council of Turkey (TUBITAK) International Doctoral Research Fellowship Program (Grant No: 2214).

- **Jun 2018**: Research Excellence Award in Ph.D. Studies, Bilkent Univerisity Department of Industrial Engineering.

- **Sep 2011 - Aug 2019**: The Scientific and Technological Research Council of Turkey (TUBITAK) Scholarship for Graduate Studies Program (Grant No: 2211).

- **Jun 2011**: B.S. Graduation with High Honor Degree.

- **Sep 2007 - June 2011**: Bilkent University Comprehensive Scholarship.

Software Skills

Optimization Softwares	:	Gurobi, CPLEX, JuMP
Programming Languages	:	Python, Java, Matlab

Organization

- Organization team member, ACP SUMMER SCHOOL 2023 on Machine Learning for Constraint Programming, July 2023, KU Leuven, Leuven, Belgium. https://school.a4cp.org/summer2023

- Local organizing committee member, Fifth International Conference on Set Optimization with Applications to Economics, Finance, Statistics and Game Theory, May 30 - June 3, 2022. Bilkent University, Ankara, Turkey. https://sites.google.com/view/sofa2022/

Certifications

- May 2020: Deep Learning Specialization of deeplearning.ai on Coursera

- Jul 2020: TensorFlow in Practice Specialization of deeplearning.ai on Coursera

Languages

- Turkish (Native)

- English (Advanced)

- Dutch (Basic)

References

Available upon request