Gülşah Karakaya

Business Administration Department,	Office:	H-123
Middle East Technical University	Phone:	(+90) 312 210 2015
06800, Ankara, Turkey	Email:	kgulsah@metu.edu.tr

Professional Experience

Assistant Professor — Jan. 2016 -
Department of Business Administration, Middle East Technical University

Part-time Instructor — Oct. 2015 - Dec. 2015
Department of Business Administration, Middle East Technical University

Postdoctoral Research Fellow — Feb. 2014 - Nov. 2014
Pillar of Engineering Systems and Design, Singapore University of Technology and Design

Research Assistant/Teaching Assistant — 2007 - 2013
Department of Industrial Engineering, Middle East Technical University

Undergraduate Assistant — 2006 - 2007
Department of Industrial Engineering, Middle East Technical University

Education

Ph.D. Industrial Engineering, December 2013
Middle East Technical University, Ankara, Turkey
Dissertation: Decision Support for Multi-Attribute Auctions
Advisor: Murat Köksalan

M.S. Industrial Engineering, July 2009
Middle East Technical University, Ankara, Turkey
Thesis: Approaches for Multi-Attribute Auctions
Advisor: Murat Köksalan

B.S. Industrial Engineering, June 2007
Middle East Technical University, Ankara, Turkey

Research Interests

Quantitative decision methods

Multiple criteria decision making

Combinatorial auctions

Feature selection

Evolutionary algorithms

Publications

Karakaya, G. and Köksalan, M., Finding preferred solutions under weighted Tchebycheff preference functions for multi-objective integer programs, to appear in *European Journal of Operational Research*.

Özarslan, A. and **Karakaya, G.**, Interactive approaches to multiple criteria sorting problems: entropy-based question selection methods, to appear in *International Journal of Information Technology & Decision Making*.

Tuncer Şakar, C., **Karakaya, G.**, Bilgin, E., Kılıç, L., and Kalyoncu, U., Predicting the response to biologic DMARDs in rheumatoid arthritis: Then what?, *Journal of*

Turkish Society for Rheumatology, 14(2), 87-93, 2022.

Karakaya, G. and Köksalan, M., Evaluating solutions and solution sets under multiple objectives, *European Journal of Operational Research*, 294(1), 16-28, 2021.

Özarslan, A. and **Karakaya, G.**, A new interactive approach to multiple criteria sorting problems: an application in energy sector, *Journal of The Faculty of Engineering and Architecture of Gazi University*, 36(4), 2239-2254, 2021.

Yıldırım, B.C., **Karakaya, G.**, and Gönül, M.S., Fibonacci series-based pairwise comparison scale for Analytic Hierarchy Process, *International Journal of Information Technology & Decision Making*, 20(3), 959-986, 2021.

Gör, B. and **Karakaya, G.**, Optimization of plate recognition sensor locations: a case study in Turkey, *Journal of Industrial Engineering*, 32(1), 147-163, 2021.

Karakaya, G. and Tuncer Şakar, C., A new interactive algorithm for continuous multiple criteria problems: a portfolio optimization example, *International Journal of Information Technology & Decision Making*, 20(1), 371-398, 2021.

Karakaya, G. and Köksalan, M., Interactive approaches for biobjective problems with progressively changing solution sets, *International Transactions in Operational Research*, 28, 356-375, 2021.

Karakaya, G. and Köksalan, M., Estimating the form of a decision maker's preference function and converging towards preferred solutions, *IISE Transactions*, 52(6), 651-664, 2020 .

Karakaya, G. and Tuncer Şakar, C., An interactive ranking-based multi-criteria choice algorithm with filtering: applications to university selection, *METU Studies in Development*, 46(June), 17-46, 2019.

Tuncer Şakar, C. and **Karakaya, G.**, An interactive approach with filtering to find a preferred solution of a decision maker, *Journal of the Faculty of Engineering and Architecture of Gazi University*, 34(4), 1987-2005, 2019.

Karakaya, G., Köksalan, M., and Ahipaşaoğlu, S.D, Interactive algorithms for a broad underlying family of preference functions, *European Journal of Operational Research*, 265(1), 248-262, 2018.

Özmen, M., **Karakaya, G.**, and Köksalan M., Interactive evolutionary approaches to multi-objective feature selection, *International Transactions in Operational Research*, 25, 1027-1052, 2018.

Taormina, R., Galelli, S., **Karakaya, G.**, and Ahipaşaoğlu, S.D., An information theoretic approach to select alternate subsets of predictors for data-driven hydrological models, *Journal of Hydrology*, 542, 18-34, 2016.

Karakaya, G. and Köksalan, M., An interactive approach for bi-attribute multi-item auctions, *Annals of Operations Research*, 245(1), 97-119, 2016.

Karakaya, G., Galelli, S., Ahipaşaoğlu, S.D., and Taormina, R., Identifying (quasi) equally informative subsets in feature selection problems for classification: a max-relevance min-redundancy approach, *IEEE Transactions on Cybernetics*, 46(6), 1424-1437, 2016.

Köksalan, M. and **Karakaya, G.**, An evolutionary algorithm for finding efficient solutions in multi-attribute auctions, *International Journal of Information Technology & Decision Making*, 13(3), 649-673, 2014.

Karakaya, G. and Köksalan, M., An interactive approach for multi-attribute auctions, *Decision Support Systems*, 51, 299-306, 2011.

CONFERENCE PRESENTATIONS

Gökalp, H.G. and **Karakaya, G.**, "Two multi-criteria decision making methods for selection of wide-body passenger aircraft," 18th International Balkan and Near Eastern Congress Series on Economics, Business and Management, Ohrid, Macedonia, November 2022.

Kurt, A., Türkün Kaya, B., and **Karakaya, G.**, "A new mathematical model based approach to multi-criteria stock selection problem," 41st YAEM National Conference, Denizli, Turkey, October 2022.

Köksalan, M. and **Karakaya, G.**, "Interactive approaches to converge preferred solutions under distance-based value functions," INFORMS Annual Meeting, Indiana, USA, October 2022.

Köksalan, M. and **Karakaya, G.**, "A new interactive algorithm for multiple criteria sorting problems under a variety of preference functions," 25th International Conference on MCDM, Portsmouth, UK, June 2022.

Karakaya, G. and Köksalan, M., "Interactive algorithms for finding preferred solutions under weighted Tchebycheff preference functions," 22nd Conference of the International Federation of Operational Research Societies (IFORS), Seoul, South Korea, August 2021.

Yeğin, M., Kentel, E., **Karakaya, G.**, and Demir, E., "Veri zarflama analizi ile Türkiye'de taşkın riskli alanların belirlenmesi," 40th YAEM National Conference, Istanbul, Turkey, July 2021.

Akbudak, Ö., Azizoğlu, M., and **Karakaya, G.**, "İki amaçlı sağlık projelerinin çizelgelenmesi için yaklaşımlar," 40th YAEM National Conference, Istanbul, Turkey, July 2021.

Ünsal, E.B. and **Karakaya, G.**, "A decision support system for employee scheduling problem in hospitality sector: a case study in a Turkish firm," 13th International Balkan and Near Eastern Congress Series on Economics, Business and Management, Tekirdağ, Turkey, October 2019.

Özarslan, A. and **Karakaya, G.**, "An interactive sorting approach based on information theoretic measure," 25th International Conference on MCDM, Istanbul, Turkey, June 2019.

Karakaya, G. and Köksalan, M., "Comparison of solutions under a weighted Tchebycheff function," 25th International Conference on MCDM, Istanbul, Turkey, June 2019.

Özarslan, A. and **Karakaya, G.**, "Alternatiflerin sınıflandırılması için yeni bir etkileşimli yaklaşım," 39th YAEM National Conference, Ankara, Turkey, June 2019.

Karakaya, G. and Tuncer Şakar, C., "A filtering-enabled interactive algorithm to find preferred solutions of the decision maker," INFORMS Annual Meeting, Phoenix,

USA, November 2018.

Köksalan, M. and **Karakaya, G.**, "Estimating the form of a decision maker's preference function and converging to preferred solutions," INFORMS Annual Meeting, Phoenix, USA, November 2018.

Yıldırım, B.C., **Karakaya, G.**, and Gönül, M.S., "Analitik hiyerarşi süreci için yeni ikili karşılaştırma ölçeği," 38th YAEM National Conference, Eskişehir, Turkey, June 2018.

Tuncer Şakar, C. and **Karakaya, G.**, "Karar vericinin tercih ettiği çözümü bulmak için filtreleme yardımlı interaktif bir yöntem," 38th YAEM National Conference, Eskişehir, Turkey, June 2018.

Özmen, M., **Karakaya, G.**, and Köksalan, M., "Interactive evolutionary approaches to multi-objective feature selection," INFORMS Annual Meeting, Houston, USA, October 2017.

Aydın Aktaş, A., **Karakaya, G.**, and Gönül, M.S., "Sağlık turizmi ve destek mekanizmaları: dünya örnekleri ile Türkiye uygulamalarının kıyaslanması," 37th YAEM National Conference, Istanbul, Turkey, July 2017.

Karakaya, G., Köksalan, M., and Ahipaşaoğlu, S.D., "Interactive algorithms for a wide variety of preference functions," INFORMS Annual Meeting, Nashville, USA, November 2016.

Köksalan, M., Özmen, M., and **Karakaya, G.**, "An interactive evolutionary approach to multi-objective feature selection," 28th European Conference on Operational Research, Poznan, Poland, July 2016.

Karakaya, G., Galelli, S., Ahipaşaoğlu, S.D., and Taormina, R., "Identifying quasi equally informative subsets in multi-objective feature selection problems for classification," 28th European Conference on Operational Research, Poznan, Poland, July 2016.

Özmen, M., **Karakaya, G.**, and Köksalan, M., "A preference-based approach to multi-objective feature selection," INFORMS Annual Meeting, Philadelphia, USA, November 2015.

Karakaya, G. and Köksalan, M., " İki amaçlı çok ürünlü açık arttırmalar için etkileşimli bir yaklaşım," 35th YAEM National Conference, Ankara, Turkey, September 2015.

Karakaya, G. and Köksalan, M., "An interactive approach for bi-attribute multi-item auctions under quasiconvex preference functions," 23rd International Conference on MCDM, Hamburg, Germany, August 2015.

Karakaya, G., Galelli, S., and Ahipaşaoğlu, S.D., "A minimum redundancy/maximum relevance input variable selection approach to identify equally informative subsets for hydrological models," World Environmental and Water Resources Congress, Austin, USA, May 2015.

Karakaya, G., Taormina, R., Galelli, S., and Ahipaşaoğlu, S.D., "An entropy-based input variable selection approach to identify equally informative subsets for data-driven hydrological models," European Geosciences Union (EGU) General Assembly

2015, Vienna, Austria, April 2015.

Karakaya, G. and Köksalan, M., "Decision Support for Multi-attribute Multi-item Reverse Auctions," 22nd International Conference on MCDM, Málaga, Spain, June 2013.

Karakaya, G. and Köksalan, M., "An Approach for Multi-attribute Multi-item Reverse Auctions," International IIE Conference and 33rd YAEM National Conference, Istanbul, Turkey, June 2013.

Karakaya, G. and Köksalan, M., "Decision Support for Multi-attribute Multi-item Reverse Auctions," 21st International Symposium on Mathematical Programming (ISMP), Berlin, Germany, August 2012.

Karakaya, G. and Köksalan, M., "An Interactive Approach for Multi-attribute Multi-item Reverse Auctions," 21st International Conference on MCDM, Jyväskylä, Finland, June 2011.

Karakaya, G. and Köksalan, M., "An Approach for Multi-attribute Reverse Auctions," 20th International Conference on MCDM, Chengdu, China, June 2009.

SEMINARS   "A Max-relevance Min-redundancy Approach to Identify Quasi Equally Informative Subsets in Multi-objective Feature Selection," Department of Industrial Engineering, Middle East Technical University, Ankara, Turkey, May 2016.

"A Max-relevance Min-redundancy Approach to Feature Selection," Pillar of Engineering Systems and Design, Singapore University of Technology and Design, Singapore, November 2014.

"Decision Support for Multi-attribute Reverse Auctions," Department of Industrial Engineering, Middle East Technical University, Ankara, Turkey, April 2012.

"An Interactive Approach for Multi-attribute Multi-item Reverse Auctions," Pre-conference of the 21st International Conference on MCDM, Helsinki, Finland, June 2011.

"Approaches for Multi-attribute Reverse Auctions," Department of Industrial Engineering, Middle East Technical University, Ankara, Turkey, May 2010.

"Approaches for Multi-attribute Auctions," Aalto University School of Science and Technology, Helsinki, Finland, October 2010.

AWARDS   METU Development Foundation Young Researcher Award   2017

SUTD Postdoctoral Research Fellowship   2014

METU Graduate Course Performance Award   2011

Ph.D. Scholarship, The Scientific and Technological Research Council of Turkey (TUBITAK)   2009 - 2013

M.S. Scholarship, The Scientific and Technological Research Council of Turkey (TUBITAK)   2007 - 2009

Bosch Engineering Scholarship   2005 - 2007

PROJECTS   An Agent-based Model for Flood Risk Mapping: Integration of Urbanization and Climate Change Effects (**Researcher**)

TÜBİTAK 2525 (BMBF)	Sep. 2021 -

Interactive Approaches for Estimating the Underlying Preference Function of a Decision Maker in Multi-criteria Problems (**Coordinator**)

METU Grant / YÖP-402-2018-2668	May 2018 - May 2019

Interactive Approaches for Finding Efficient Solutions in Multi-criteria Integer Optimization Problems (**Coordinator**)

METU Grant / BAP-08-11-2016-070	Jul. 2016 - Dec. 2016

Turkey Digital Index Research (**Researcher**)

Sponsored by Accenture	Aug. 2016 - Dec. 2016

Accenture Digital Index Project (**Researcher**)

Sponsored by Accenture	Feb. 2015 - Jul. 2015

Threat Assessment and Weapon Target Assignment Project (**Researcher**)

Sponsored by ASELSAN Electronic Industries Inc.	Jan. 2010 - Sep. 2013

THESES SUPERVISED

PhD Thesis

Ali Özarslan, "Information Theoretic Measure Based Interactive Approaches to Multi-criteria Sorting Problems," Sep. 2021.

MBA Theses

Hüseyin Gökalp Güneş, "Wide-body Aircraft Selection Using Multi-criteria Decision Making Methods," Jan. 2022.

Emre Berk Ünsal, "Development of a Decision Support System for Employee Scheduling Problem in Hospitality Sector: A Case Study in a Turkish Firm," Aug. 2019.

Burak Kartal, "Development of an AHP Based Supplier Evaluation System: A Case Study in a Turkish Defense Firm," Jun. 2019 (principal supervisor).

Boğaç Can Yıldırım, "A New Pairwise Comparison Scale for Analytic Hierarchy Process," Jan. 2019 (principal supervisor).

Buğra Gör, "Automatic License Plate Recognition System Location Selection," May 2018.

M.S. Theses in Industrial Engineering

Özlem Akbudak, "Discrete Time/Cost Trade-off Project Scheduling Problem - An Application to the Ministry of Health Projects," Apr. 2022 (co-supervisor).

Müberra Özmen, "Interactive Evolutionary Approaches to Multi-objective Feature Selection," Aug. 2016 (co-supervisor).

TEACHING EXPERIENCE

Courses Taught
(Department of Business Administration, Middle East Technical University)

BA 3504 Management Science (Undergraduate must course)	S18,S19,S20,S21,S22
BA 5503 Management Science (MBA must course)	F17,F18,F19,F21

BA 5501 Business Statistics	F16
(MBA elective course)	
BA 4519 Simulation & Quantitative Models in Business	F16,S19,S20,S21,S22
(Undergraduate elective course)	
BA 5504 Optimization Methods for Management	S16,S18,F20
(MBA elective course)	
BA 5602 Operations Management	S16
(MBA must course)	
BA 4517 Decision Analysis: Tools and Methods	F15,F17,F18,F19,F20,F21
(Undergraduate elective course)	

Courses Tutored
(Department of Industrial Engineering, Middle East Technical University)

IE 553 Linear Optimization	Fall 2013
(Graduate must course)	
IE 561 Stochastic Models	Fall 2013
(Graduate must course)	
IE 372 Simulation	Spring 2012, Spring 2013
(Undergraduate must course)	
IE 323 Production and Service Operations Planning I	Fall 2009, Fall 2012
(Undergraduate must course)	
IE 426 Topics in Production Management	Fall 2012
(Undergraduate elective course)	
IE 456 Network Routing	Spring 2012
(Undergraduate elective course)	
IE 265 Engineering Statistics I	Fall 2011
(Undergraduate must course)	
IE 424 Scheduling	Fall 2010, Fall 2011
(Undergraduate elective course)	
IE 454 Network Flows and Project Management	Fall 2008, Fall 2010
(Undergraduate elective course)	
IE 252 Operational Research II	Spring 2008, Spring 2009, Spring 2010
(Undergraduate must course)	
IE 453 Topics in Optimization	Spring 2010
(Undergraduate elective course)	
IE 439 Topics in Ergonomics	Spring 2009
(Undergraduate elective course)	
IE 333 Work Systems Analysis and Design	Fall 2008
(Undergraduate must course)	
IE 251 Operational Research I	Fall 2007
(Undergraduate must course)	

DEPARTMENTAL SERVICE

Vice-chair   Mar. 2016 - Oct. 2016, Aug. 2022 -
Department of Business Administration, Middle East Technical University

PhD in Quantitative Decision Methods - Program Coordinator   2016 -
Department of Business Administration, Middle East Technical University

REVIEWER

Amme İdaresi Dergisi
Computers & Operations Research
European Journal of Operational Research
Expert Systems With Applications
Group Decision and Negotiation
Information Systems Frontiers

International Journal of Information Technology & Decision Making
International Journal of Production Research
Journal of Global Optimization
Journal of Water Resources Planning and Management
Omega
Optimization
Turkish Journal of Electrical Engineering & Computer Sciences

Skills   Advanced user of: MATLAB, C/C++, CPLEX, GAMS, ARENA, Minitab, LaTeX

Membership   International Society on Multiple Criteria Decision Making (MCDM)
                Institute for Operations Research and Management Sciences (INFORMS)
                Operational Research Society, Turkey
                Board Member of the INFORMS MCDM Section   2019 - 2021