Ece Cigdem Karakoyun

Email (work): karakoyun@ese.eur.nl
Links: LinkedIn, EUR, My website

Academic Appointments

Sep 2023 – present	Erasmus University Rotterdam (EUR), Netherlands **Assistant Professor of Operations Research** at the Erasmus School of Economics, Department of Econometrics

Education

Sep 2017 – Jun 2023	Bilkent University, Ankara, Türkiye **Ph.D. in Industrial Engineering** Thesis: "Energy Operations Management for Renewable Power Producers in Electricity Markets" Advisors: Assoc. Prof. Ayse Selin Kocaman, Assoc. Prof. Emre Nadar
Sep 2015 – Jun 2017	Bilkent University, Ankara, Türkiye **M.Sc. in Industrial Engineering** Thesis: "A Newsvendor Approach to an Energy Imbalance Mechanism in a Day-Ahead Electricity Market" Advisors: Assoc. Prof. Ayse Selin Kocaman, Assoc. Prof. Kemal Goler
Sep 2010 – Jun 2015	Bilkent University, Ankara, Türkiye **B.Sc. in Industrial Engineering**

Research

Research Interests

- Operations of low-carbon emerging technologies (e.g., renewable energy sources, energy storage, and hybrid systems)
- Electricity markets
- Energy demand-side management
- Optimization under uncertainty
- Stochastic dynamic programming/Markov decision processes

Papers

- "Optimal Hour-Ahead Commitment and Storage Decisions of Wind Power Producers" with Harun Avci, Woonghee Tim Huh, Ayse Selin Kocaman, and Emre Nadar. 2025. Forthcoming in *International Journal of Production Economics*
- "Optimization of Pumped Hydro Energy Storage Systems Under Uncertainty: A Review" with Parinaz Toufani, Emre Nadar, Olav B Fosso, and Ayse Selin Kocaman. 2023. *Journal of Energy Storage*
- "Deviations from Commitments: Markov Decision Process Formulations for the Role of Energy Storage" with Harun Avci, Ayse Selin Kocaman, and Emre Nadar. 2022. *International Journal of Production Economics*

Working Papers

- "Structural Results for Pumped Hydro Energy Storage Systems" with Harun Avci, Parinaz Toufani, Ayse Selin Kocaman, and Emre Nadar.
- "Probabilistic Forecasting and Curtailment-Aware Trading in the Dutch Balancing Market" with Misha Dol, Rommert Dekker, and Phyllis Wan
- "A Hybrid Modelling Framework for Long-Term Electricity Price Forecasting: A Case Study of the Netherlands" with Alexander Neutel
- "The Impact of an Energy Imbalance Penalty Mechanism on a Day-Ahead Electricity Market" with Ayse Selin Kocaman and Kemal Guler

Research in Progress

- "Managing Resilient Hydrogen-Renewable Microgrids: A Multi-Time Scale Optimization Framework" with Ehsan Aghamohammadzadeh, Yashar Ghiassi-Farrokhfal, and Merieke Stevens
- "Day-Ahead Bidding Decisions of an Energy Storage Operator" with Stefan Minner, Ayse Selin Kocaman, and Emre Nadar
- The Cost of Commitment: Power Purchase Agreements and Bidding in a Real-Time Market" with Ayse Selin Kocaman and Emre Nadar
- "Optimal Operations of Renewable Energy Communities Under Different Ownership Structures" with Olga Kuryatnikova, Klaus Heine, and Leonie Reins
- "Extreme Power Price Dynamics in Electricity Markets: A Profit Optimization Strategy for Battery Energy Storage Systems" with Clementine van Biesen, Rommert Dekker, and Ronald Huisman

Funding

- "Twinning for Optimized Decision Intelligence in Data-Intensive Environments," European Research Executive Agency, HORIZON Coordination and Support Actions, 1,488,125 €; of which 373,125 € to EUR; PI: R. Dekker, Participant, 2024–2027
- "Markov Decision Process Approaches for the Profitability Analysis of Open-Loop and Closed-Loop Pumped Hydro Energy Storage Facilities," The Scientific and Technological Research Council of Türkiye - 3501 (TUBITAK - 3501), National Young Researchers Career Development Program (CAREER), Ph.D. scholarship holder, Researcher, 2021–2023
- "Markov Decision Processes and Multi-Stage Stochastic Programs for energy commitment decisions of a hybrid system with pumped hydro storage," The Scientific and Technological Research Council of Türkiye - 1001 (TUBITAK - 1001), The Support Program for Scientific and Technological Research Projects, Ph.D. scholarship holder, Researcher, 2018–2020

Scientific Qualifications

- University Teaching Qualification (UTQ; in Dutch, Basis Kwalificatie Onderwijs, BKO), March 2025

  Program aimed at developing and proving the pedagogical skills of lecturers in university education, recognized by all Dutch universities

Awards

- 2024 Serhat Özyar Young Scientist of the Year Honorary Award, granted for my PhD thesis (Energy Operations Management for Renewable Power Producers in Electricity Markets), Jan 2025

Awarded to young researchers who completed their doctorate in Türkiye, whose work has the potential to address fundamental scientific challenges on the national agenda.

- Outstanding Scholarly Achievement Award in Ph.D, Bilkent University, June 2024
- Outstanding Teaching Assistance Award, Bilkent University, June 2023

Visiting Positions

- Visiting Researcher, Technical University of Munich, Chair of Logistics and Supply Chain Management, Germany, May 2022 – August 2022

Talks

- "Optimal Hour-Ahead Commitment and Storage Decisions of Wind Power Producers"
  - EURO 2024 Conference, Denmark, July 2024
  - POMS International Conference, Türkiye, June 2024
  - EUR, Netherlands, January 2023
  - Eindhoven University of Technology, Netherlands, January 2023
  - EURO 2022 Conference, Finland, July 2022
  - MSOM Annual Conference, Germany, June 2022
  - POMS Annual Conference, Virtual, April 2022
- "Deviations from Commitments: Markov Decision Process Formulations for the Role of Energy Storage"
  - INFORMS Annual Meeting, Virtual, October 2021
  - National Congress on Operations Research and Industrial Engineering, Türkiye, July 2021
- "Integration of Pumped Hydro Energy Storage and Wind Energy Generation: A Structural Analysis"
  - MSOM Annual Conference, Virtual, June 2021
  - POMS Annual Conference, Virtual, May 2021
  - National Congress on Operations Research and Industrial Engineering, Türkiye, June 2019
- "The Impact of an Energy Imbalance Penalty Mechanism on a Day-Ahead Electricity Market"
  - National Congress on Operations Research and Industrial Engineering, Türkiye, June 2018
- "A Hybrid Approach to Forecast Wind Speed Time Series: Application to Real Data"
  - 1st International Engineering and Natural Sciences Student Congress - Innovation and Engineering, Türkiye, April 2015

Teaching Experiences

- Coordinator and Lecturer, Stochastic Models and Inventory Control, EUR, 2025–2026 Fall, 2024–2025 Fall
- Lecturer, Seminar Logistic Case Studies, EUR, 2025–2026 Fall, 2024–2025 Fall, 2023–2024 Fall
- Coordinator and Lecturer, Advanced Inventory Supply Chain Management, EUR, 2023–2024 Fall
- Lecturer, Engineering Economic Analysis, Bilkent University, 2022–2023 Fall
- Lecturer, Engineering Economic Analysis, Bilkent University, 2022–2023 Fall
- Teaching Assistant, Introduction to Modelling and Optimization, Bilkent University, 2019–2022
- Teaching Assistant, Production System Design-Synthesis/Practice, Bilkent University, 2015–2018

- Student Assistant, Engineering Economic Analysis, Bilkent University (Undergraduate), 2014–2015
- Student Assistant, A Process Outlook for Industrial Engineering, Bilkent University (Undergraduate), 2014–2015

Supervision

Ph.D. Students

- Ehsan Aghamohammadzadeh (Rotterdam School of Management, from 2024). Topic: Managing Resilient Hydrogen-Renewable Microgrids. Co-supervisor: Yashar Ghiassi-Farrokhfal, Promotor: Merieke Stevens
- Tobias Kers (EUR, ESE, from 2024). Topic: Real-Time Battery Energy Storage Operations. Promotors: Rommert Dekker and Wilco van den Heuvel

M.Sc. Students

- Beatriz Valle-Inclan Guia, "Optimal Multi-Use Policies for Battery Energy Storage Systems in Renewable Energy Integration"
- Eva van Joolen, "Smart Sharing: Optimizing Household Access to Energy Storage Systems"
- (In progress) Donna Zegwaart, "Anticipatory Action for Multi-Hazard Management" [Collaboration with The Netherlands Red Cross]
- Doga Aksen, 2025, "Data-Driven Offshore Wind Power Forecasting: A Machine Learning Approach" [Collaboration with TenneT]
- Amber Dassen, 2025, "A Stochastic Programming Approach to Optimising Battery Configuration and Operation for Residential Photovoltaic Energy Systems"
- Gijs Margadant, 2025, "Dynamic Condition-Based Maintenance and Inventory Policy Optimization Using Remaining Useful Life Predictions and Partially Observable Monte Carlo Planning" [Collaboration with Konecranes]
- Alexander Neutel, 2025, "Quantitative Modeling of Long-Term Electricity Price Profiles in the Netherlands: Impacts of Renewable Integration on Market Dynamics" [Collaboration with Quo Mare]
- Julian Tribble, 2025, "Price Spikes, Volatility, and Cross-Market Dynamics in Electricity Markets: A Hybrid Modeling Approach"
- Diede Verkaik, 2025, "Transmission Dynamics and Antimicrobial Resistance in Helicobacter pylori: A Simulation-Based Approach" [Collaboration with Erasmus MC]
- Clementine van den Biesen, 2024, "Extreme Power Price Dynamics in Electricity Markets: A Profit Optimization Strategy for Battery Storage"

B.Sc. Students

- Wolf Bekkers, 2024, "An Approximate Dynamic Programming Approach for Scheduling Home Energy Management Systems"
- Milan van den Diepstraten, 2024, "Improving Efficiency of Electric Water Heaters for Demand Response Optimization"
- Sophie van Groesen, 2024, "Optimal Demand Response Management for a Battery-PV Prosumer"
- Celine Kornet, 2024, "Optimal Appliance Operation with Multiple Operational Time Slots and Seasonal Scheduling"

Services & Engagement

- Referee: IISE Transactions, Renewable and Sustainable Energy Reviews
- Memberships: Center for Energy Systems Intelligence (CESI), Erasmus Research Institute of Management (ERIM) – Associate Member, Production and Operations Management Society

- Others:
  - Workshop chair, ACM e-Energy 2025, Rotterdam, Netherlands
  - Research seminar co-coordinator at the Econometric Institute of Erasmus University Rotterdam
  - Co-organizer of a session on "Sustainable Operations" at the Netherlands Operations Management and Logistics Conference 2024, Netherlands
  - Organizer of a session on "Energy Transition and Operations" at the EURO 2024 Conference, Denmark

Skills

Methods:

- Advanced: Stochastic programming, dynamic programming, stochastic control, approximate dynamic programming/reinforcement learning, inventory control theory, hierarchical optimization
- Others: Machine learning, forecasting, stochastic processes

Tools: Python, MATLAB, R, Mathematica, GAMS, CPLEX, FICO Xpress, Excel Solver
Languages: Turkish (native), English (fluent), Dutch (level A1.1)

Other Experiences

- Mentor, Bilkent University Information Office for Prospective Students, 2015–2016, Bilkent University
  - Responsible for the training of guide student candidates
  - Member of the guide students' selection committee
- Guide student, Bilkent University Information Office for Prospective Students, 2013–2016, Bilkent University
  - Guidance in campus tours to high school groups
  - Information service to prospective university students and their families during the selection period
  - Reached students via educational fairs and gave information about the university
- Intern, Department of Service Training and Quality Systems, VESTEL, Manisa, Türkiye, 2014
- Intern, Department of Consumer Product Management, Interactive and Entertainment Services Team, TURKCELL, Istanbul, Türkiye, 2014
- Intern, Department of Production Planning and Control, TAI (Turkish Aerospace Industries), Ankara, Türkiye, 2013