Najmaddin Akhundov, Ph.D.

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Professional Experience

- **Assistant Professor** *Nov 2024 - Present*
  Department: Decision Sciences and Marketing
  School: Robert B. Willumstad School of Business
  University: Adelphi University, Garden City, New York

- **Post-Doctoral Research Associate** *Jan 2023 - Aug 2024*
  Program: Supply Chain & Logistics Technology
  University: University of Houston, Texas

- **Research Assistant** *Aug 2017 - Dec 2022*
  Department: Industrial and Systems Engineering
  University: University of Tennessee *(2018-2022)*

  Department: Mechanical and Industrial Engineering
  University: New Jersey Institute of Technology *(2017-2018)*

- **Course Instructor** *Sep 2015 - May 2017*
  Department: Industrial Engineering
  University: Baku Engineering University, Azerbaijan

- **Consulting Service** *Nov 2015 - Aug 2017*
  Project: Optimal Personnel Scheduling
  Company: MADO Restaurant Chains, Azerbaijan *(2015-2016)*
  Note: This project led to a publication in the journal of *INFORMS Applied Analytics*.

  Project: Vehicle Routing for Daily Bread Delivery
  Company: Delta Group LTD, Azerbaijan *(2016-2017)*

- **Research Assistant** *Jan 2013 - Aug 2015*
  Department: Systems Design Engineering
  University: University of Waterloo, Canada

- **Project Commissioning and Certification** *Jul 2011 - Aug 2012*
  Department: Quality Control
  Company: ENCOTEC Engineering and Consulting Technologies, Azerbaijan

Education

- **University of Tennessee** Knoxville, TN
  Ph.D., Industrial & Systems Engineering *Aug 2018 – Dec 2022*
  Academic Advisor: Dr. James Ostrowski.

- **New Jersey Institute of Technology** Newark, NJ
  Ph.D., Industrial Engineering (transfer to UT) *Sep 2017 – Jun 2018*
  Academic Advisor: Dr. Esra Büyüktahtakın.

- **University of Waterloo** Ontario, Canada
  M.S., Systems Design Engineering *Jan 2013 – Aug 2015*
  Academic Advisor: Dr. Fatih Safa Erenay and Dr. Samir Elhedhli.

- **Baku Engineering University** Baku, Azerbaijan
  B.S., Industrial Engineering (with Distinction) *Sep 2006 – May 2011*
  Academic Advisor: Dr. Parviz Hasanaov.

Awards and Honors

- Best Publication Award in Natural Resources. Awarded for the IJOC paper "A Multistage Stochastic Programming Approach to the Optimal Surveillance and Control of the Emerald Ash Borer in Cities", *2022*.
- Honourable Mention for the Harvey J. Greenberg Research Award given by the INFORMS Computing Society, *2022*.
- Graduate Fellowship, University of Tennessee, *2018 - 2022*.
- The Best Graduate Presentation, The 2018 Dana Knox Student Research Showcase, *2018*.
- Study Abroad Fellowship, The Ministry of Education of Azerbaijan Republic, *2013 - 2015*.
- Merit-Based Scholarship for Undergraduate Students,"Azercell Telecom MMC", *2009 - 2011*.
- Full Scholarship for Undergraduate Studies, Baku Engineering University, *2006 - 2011*.

Publications

[P1] Meng, L., Zhu, X., **Akhundov, N.**, Dong, Z. S., Saeed, A., Ahmed, W. (2026). Dynamic pricing optimization for waste recycling networks: a spatiotemporal incentive framework. *Transportation Research Part E: Logistics and Transportation Review, 214, 105056.*

[P2] Dong, Z. S., Zhou, Y., **Akhundov, N.**, Yang, H., Lim, G. (2026). Sustainable urban logistics: Optimizing multi-compartment fleet routing for enhanced recycling efficiency. *Cleaner Logistics and Supply Chain, 20, 100345.*

[P3] Tahirov, N., **Akhundov, N.**, Emde, S., Glock, C. H. (2024). Configuration of last-mile distribution networks for an encroaching manufacturer.*Annals of Operations Research, 1-42.*

[P4] **Akhundov, N.**, Ostrowski, J. (2024). Exploiting symmetry for the job sequencing and tool switching problem. *European Journal of Operational Research, 316(3), 976-987.*

[P5] **Akhundov, N.**, Bakhshi, M., Ostrowski, J. (2023). Convex hull pricing as a risk mitigation device in unit commitment. *Energy Systems, 1-22.*

[P6] **Akhundov, N.**, Coble, J., Deakins, E., Gallaher, T., Khojandi, A., Mandelli, D., Ostrowski, J. (2023). "Economic Risk-Informed Maintenance Planning and Asset Management". *U.S. Department of Energy, Office of Scientific and Technical Information. Technical Report, 19-17087.*

[P7] **Akhundov, N.**, Tahirov, N., Glock, C. H. (2022). "Optimal Scheduling of Waitstaff with Different Experience Levels at a Restaurant Chain". *INFORMS Journal on Applied Analytics, 52(4), 324-343.*

[P8] Kıbış, E. Y., Büyüktahtakın, İ. E., Haight, R. G., **Akhundov, N.**, Knight, K., Flower, C. E. (2021). A multistage stochastic programming approach to the optimal surveillance and control of the emerald ash borer in cities. *INFORMS Journal on Computing, 33(2), 808-834.*

[P9] Onal, S., **Akhundov, N.**, Büyüktahtakın, I. E., Smith, J., Houseman, G. R. (2020). An integrated simulation-optimization framework to optimize search and treatment path for controlling a biological invader. *International Journal of Production Economics, 222, 107507.*

[P10] Deakins, E., Gallacher, T., **Akhundov, N.**, Mandelli, D., Khojandi, A., Coble, J., Ostrowski,J. (2023). "An Integer Programming Method for Maintenance Schedule Optimization in Nuclear Power Plants". *Nuclear Technology.* (Accepted)

[P11] **Akhundov, N.**, Ostrowski, J. (2025)."Symmetry Breaking Cut Generation for the Unit Commitment Problem". *Energy Systems.* (under review)

[P12] **Akhundov, N.**, Abdullah, H., Lee, S., Dong, J. (2025)."Optimizing Circular Waste Networks for Sustainable Management". *Manufacturing & Service Operations Management.* (under review)

Conference Talks

[C1] **Najmaddin Akhundov**, James Ostrowski. "Exploiting Symmetry in the Unit Commitment Problem". *IISE Annual Conference*, Seattle, Washington, May 2022.

[C2] Sevilay Onal, **Najmaddin Akhundov**, İ. Esra Büyüktahtakın, Jennifer Smith, Gregory R. Houseman, "Detection and Control Operations Management of an Agricultural Invader Through Integrated Simulation-Optimization". *POMS Conference*, Washington, DC, May 2019.

[C3] **Najmaddin Akhundov**. "Application of Mathematical Programming for Effective Restaurant Management: A Scheduling Project". *INFORMS Computing Society*, Knoxville, Tennessee, January 2019.

[C4] **Najmaddin Akhundov**, Esra Buyuktahtakin. "Optimal Search and Treatment Strategies for Controlling an Aggressive Invader in North America". *INFORMS Computing Society*, Knoxville, Tennessee, January 2019.

Funded Research and Industry Projects

[1] **Reverse Logistics for Sustainable Waste Management** *Houston, Texas*
Funded by: Shell USA Inc *Jan 2023 - Dec 2023*
Accepted Proposal Title: Reverse Logistics Networks for Shell Plastic Circularity

- Achieved a 49% cost reduction by implementing transportation centers and optimizing vehicle routes.
- Realized an additional 17% cost reduction through the decentralization of waste management operations.(please see [P12] for details)

[2] **Maintenance Scheduling of Nuclear Power Plant** *Knoxville, Tennessee*
Funded by: US Office of Nuclear Energy *Aug 2021 - Sep 2022*
Contract: NE0008897

- The labor costs for maintenance activities have been reduced by 21% when compared to the previously employed methodology.
- The implementation of the new approach has enabled backlog scheduling to be utilized for component maintenance, resulting in a further 10% reduction in labor costs. (please see [P6] for details)

[3] **Job Scheduling in Flexible Manufacturing Systems** *Knoxville, Tennessee*
Funded by: US Department of Energy *Aug 2020 - Sep 2021*
Award: DE-SC0018175

- As the problem size grows, the proposed method proved its ability, solving up to 33% more instances than the state-of-the-art approach.
- The solution time for challenging instances, which can be resolved using presently known methods, has been enhanced by up to 48 times. (please see [P4] for details)

[4] **Optimal Scheduling of Power Generators** *Knoxville, Tennessee*
Funded by: US Department of Energy *Aug 2019 - Sep 2020*
Award: DE-SC0018175

- The computational time for solving unit commitment problems with identical generators was reduced by 84%.
- The resolution of challenging unit commitment instances within a 30-minute window was made achievable, a goal that was previously beyond reach when the conventional "3-bin" method's 2-hour time constraint was employed. (please see [P11] for details)

[5] **Energy Systems Risk Management** *Knoxville, Tennessee*
Funded by: US Department of Energy *Aug 2018 - Sep 2019*
Award: DE-SC0018175

- A novel pricing mechanism was employed to impose penalties on the costs linked to the misprediction of renewable energy supply. The proposed approach succeeded in lowering the daily energy production cost by $300,000.

- The new method has enabled the optimal generator schedule to be found within 5 minutes, whereas the problem could not be solved within 10 hours by its counterpart. (please see [P5] for details)

[6] **Optimal Search and Treatment Path (Sericea)** *Newark, New Jersey*
Funded by: US Department of Agriculture *Jan 2017 - Jun 2018*
Award: 2016-67013-24930

- A simulation-based optimization model was developed to find the best treatment strategy for a biological invader (Sericea) under a limited management budget.
- The proposed model allows managers to make a decision based on future environmental damage by considering all ecological variances. (please see [P9] for details)

[7] **Optimal Surveillance and Control (Emerald Ash Borer)** *Newark, New Jersey*
Funded by: US Forest Service *Aug 2017 - Dec 2017*
Award: CBET-1554018

- Spatio-temporal stochastic growth of the EAB infestation was taken into account to provide a managerial strategy for city managers to maximize the life span of ash trees.
- Optimal timing for surveillance, treatment, and removal of infested ash trees was determined within the budget limitations. (please see [P8] for details)

[8] **Delivery Route Optimization** *Baku, Azerbaijan*
Client: Delta Group *Sep 2016 - Aug 2017*

- A new routing plan was proposed for daily bread delivery to reduce logistic costs. Optimizing vehicle routes enabled a 16% reduction in daily transportation cost.

[9] **Staff Scheduling** *Baku, Azerbaijan*
Client: MADO Restaurant Chains *Nov 2015 - Aug 2016*

- The optimized waitstaff schedule enabled the restaurant to reduce overstaffing levels by approximately 40% and understaffing levels eliminated completely.
- By re-arranging employee shifts and day off the labor costs decreased by 20% while keeping the same service standards. (please see [P7] for details)

Proposal Writing Experience

- **The UH Energy Transition Institute** *Nov 2023*
  Grant Focus: Circular Economy for Materials and Plastics.
  Proposal Title: Optimizing Sustainable Recycling Strategies: A Comprehensive Evaluation of Centralized and Decentralized Approaches for Shell's Circular Economy Initiatives.
- **National Science Foundation (NSF 23-557)** *May 2023*
  Grant Focus: Global Centers (Track 2), Use-Inspired Research Addressing Global Challenges in Climate Change and Clean Energy.
  Proposal Title: Climate Smart Global Port Research Center (GATHER).
- **Federal Aviation Administration** *May 2022*
  Grant Focus: Applied Research in Public-Sector Airport-Related Aviation Issues.
  Administer: Transportation Research Board's Airport Cooperative Research Program.
  Proposal Title: Exploiting Symmetry in Aircraft Maintenance Routing Problem with Remaining Time Consideration.

Skills

- Software and Solver: Python, C++, R, MATLAB, Arena, AnyLogic, AMPL, GUROBI, CPLEX, Pyomo.
- Language: English (fluent), Turkish (fluent), Russian (intermediate), Azerbaijani (native).

Hobbies

- Outdoor: Picnicking, Camping, Volleyball, Landscape Photography.
- Indoor: Catan, Chess, Cooking, Documentaries.
- Water Sports: Swimming, Kayaking.

References

- Available upon request.