

Vahid Eghbal Akhlaghi

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EDUCATION

<u>Ph.D. in Business Analytics:</u> University of Iowa, Tippie College of Business, Iowa City, IA	May 2022
<u>Graduate Certificate in College Teaching</u> University of Iowa, Iowa City, IA	May 2022
<u>M.Sc., Industrial Engineering:</u> Middle East Technical University, Department of Industrial Engineering, Turkey	Feb 2017
<u>B.S., Industrial Engineering:</u> University of Tabriz, Department of Industrial Engineering, Iran	Aug 2010

RESEARCH INTEREST

Methodology:

Mathematical Programming, Discrete Optimization, Spatial Data Mining, Network Theory, Complexity Theory

Application:

Humanitarian Logistics, Transportation, Supply Chain Management, Scheduling, Healthcare Accessibility, Sustainable Operations

RESEARCH EXPERIENCE

Ph.D. Thesis:

Advisor: Prof. Ann Campbell

Humanitarian Fuel Distribution and Flood Mitigation: My research focuses on major logistical problems related to natural disasters and the development of improved preparedness methods. Specifically, I work to optimize approaches for storing and distributing fuel after a disaster and identify the best roads and bridges to upgrade to enable quick travel through cities after a flood event. This type of work requires analyzing mapped information, managing geographic information in a database, mathematical modeling, and an understanding of the computational techniques needed to solve integer programs with tools such as Gurobi, Python, and ArcGIS.

M.S. Thesis:

Advisor: Prof. Hakan Gültekin, Prof. Sinan Gürel

Robotic Cell Scheduling: I studied the trade-off between the throughput rate and the energy consumption of robots in flexible machine robotic cells. The study was the first in the literature to simultaneously consider the energy consumption and the throughput rate. We used Lagrangian multipliers and Karush-Kuhn-Tucker optimality conditions for a two-machine robotic cell to determine the optimal robot move speeds analytically. For this strongly NP-Hard problem, in cases where energy consumption was not a concern, I have developed heuristic algorithms coded in C++ for cells consisting of m machines.

B.S. Capstone Project:

Sustainable Water Management Planning: I worked on a water supply management model, which optimizes three objectives (increasing water supply, reducing expenses, and reducing social hazard) through six decision variables. To solve this NLP optimization problem, MINOS solver in a GAMS environment was used. I obtained pareto optimal solutions by coding a multi-objective genetic algorithm in MATLAB.

Accepted Grant Writing (82,000 USD):

- *Green Robotic Cell Scheduling:* Assisted in writing a proposal for research funding accepted by The Scientific and Technological Research Council of Turkey (TUBITAK), Grant No. 215M845.

Graduate Research/Project Assistant:

- *Transportation Network mitigation for flood preparedness:* This research is sponsored by the Department of Transportation (DOT), 2020-2021
- *Green Robotic Cell Scheduling:* This research is based on the support of The Scientific and Technological Research Council of Turkey (TUBITAK), 2016-2017
- *Line Balancing in Production Lines Served by a Single/Dual Gripper Robot:* This research is based on the support of The Scientific and Technological Research Council of Turkey (TUBITAK), 2014-2016

PUBLICATIONS

Journal Papers:

- **Akhlaghi, V. E.**, Campbell, A. M. (2022). The Two-Echelon Island Fuel Distribution Problem. *European Journal of Operations Research (EJOR)*, <https://doi.org/10.1016/j.ejor.2022.01.030>.
- **Akhlaghi, V. E.**, Campbell, A. M., & de Matta, R. E. (2021). Fuel distribution planning for disasters: Models and case study for Puerto Rico. *Transportation Research Part E: Logistics and Transportation Review*, 152, 102403.
- Gürel, S., Gultekin, H., & **Akhlaghi, V. E.** (2019). Energy conscious scheduling of a material handling robot in a manufacturing cell. *Robotics and Computer-Integrated Manufacturing*, 58, 97-108.
- Gultekin, H., Coban, B., & **Akhlaghi, V. E.** (2018). Cyclic scheduling of parts and robot moves in m-machine robotic cells. *Computers & Operations Research*, 90, 161-172.
- Masehian, E., **Akhlaghi, V. E.**, Akbaripour, H., & Sedighizadeh, D. (2015). An Expert System for Intelligent Selection of Proper Particle Swarm Optimization Variants. *International Journal of Supply and Operations Management*, 2(1), 569-594.

Selected Working Papers:

- **Akhlaghi, V. E.**, Campbell, A. M., Demir, I., The Flood Mitigation Problem in a Road Network, *To be submitted to the Transportation Research Part B: Methodological journal.* (Latest version available upon request)
- **Akhlaghi, V. E.**, Gultekin, H., Balancing an Assembly Line Served by a Dual-Gripper Robot, *To be submitted to the OMEGA Journal.*

Refereed Conference Proceedings:

- **Akhlaghi, V. E.**, Campbell, A. M., De Matta, Renato E., Two-Tier Fuel Distribution Planning for Disasters on Islands, *TSL Conference, Second Triennial Conference*, Arlington, VA. May 27 – 29, 2020.

- **Akhlaghi, V. E.,** Gultekin, H and Coban, B, Shortest k-unit Cycle in a Multiple Part-Type Robotic Cell, *7th Multidisciplinary International Conference on Scheduling: Theory and Applications (MISTA 2015)*, 25 - 28 Aug 2015, Prague, Czech Republic, Pages 876-878, 2015.
- **Akhlaghi, V. E.,** Zarghami, M., Using Genetic Algorithm & Gradient-Based Approach at Programming Urban Water of Zahedan City, (In Persian), *National Conference of Permanent Developing Patterns Regarding Water Management*, Mashhad, Feb 2010.

Selected Term Projects:

- *Implementing Metaheuristics in Robotic Cell Scheduling problems with CRM Sequences* (Heuristic Search course project, University of Iowa).
- *Bicriteria Scheduling in a Multiple Part-Type Robotic Cell* (Multi-Objective Decision Making course project, Middle East Technical University).

PRESENTATIONS

Conference:

- *Use of Ships for Fuel Emergency Distribution on Islands*, INFORMS Annual Meeting, Anaheim, CA, October 24-27, 2021.
- *Using ships to supplement fuel supplies on islands for disaster recovery*, 13th Annual Conference on Health and Humanitarian Logistics (HHL), September 20-22, 2021.
- *Humanitarian Fuel Distribution On Islands Considering Road And Sea Transportation*, INFORMS Annual Meeting, Online, November 7-13, 2020.
- *An Intermodal Transportation Network for Humanitarian Fuel Distribution on Islands*, 12th Annual Conference on Health and Humanitarian Logistics (HHL), September 29-Oct 1, 2020.
- *Fuel Distribution Planning for Islands*, INFORMS Annual Meeting, Seattle, October 20-23, 2019
- *Energy conscious robot scheduling in robotic cell manufacturing*, INFORMS Annual Meeting, Nashville, November 13-16, 2016.
- *Green Scheduling in a Two-Machine Robotic Cell*, YAEM 2016, Yasar University, Izmir, July 13-15, 2016.
- *Comparison of CRM and k-Unit Cycles in Robotic Cells with Multiple Parts*, 28th European Conference on Operational Research, Poznan, July 3-6, 2016.
- *Bicriteria Scheduling in Single Gripper Robotic Cells*, YAEM 2015, Middle East Technical University, Ankara, September 9-11, 2015.
- *Bicriteria Scheduling in a Multiple Part-Type Robotic Cell*, 23rd International Conference on Multiple Criteria Decision Making, Helmut-Schmidt-University, Hamburg, August 3-7, 2015.
- *Genetic Algorithm Robust Parameter Tuning for a Robotic Cell Scheduling Problem*, 23rd International Conference on Multiple Criteria Decision Making, Helmut-Schmidt-University, Hamburg, August 3-7, 2015.
- *Application of MADM methods in System Dynamics simulation of Supply Chain systems*, 4th International Conference of Iranian Operations Research Society, University of Gilan, May 2011.
- *Comparing the Meta-heuristics and Gradient-Based Approaches in Multi-objective Urban Water Management*, 24th Conference of Europeans on Operational Research, Lisbon, July 2010.
- *Trend of Complex System Dynamics for Prioritizing the Options at Multiple Attribute Decision-Making Method*, (In Persian), 3rd International Conference of Iranian Operations Research Society, Amirkabir University of Technology, May 2010.

Invited Seminar:

- *Line balancing in production lines served by a single/dual gripper robot*, TOBB University of Economics and Technology, Ankara, Turkey, 2015.

TEACHING EXPERIENCE

Teaching Practicum:

- *BAIS 2800: Foundations of Business Analytics*, University of Iowa, one semester, Spring 2022
- *BAIS 3020: Computational Thinking (Programming using Python)*, University of Iowa, Fall 2021

Head Teaching Assistant (360 students and five TAs):

- *BAIS 3000: Operations Management*, University of Iowa, Fall 2019

Teaching Assistant:

- *BAIS 3000: Operations Management*, University of Iowa, Fall 2018, Spring 2018
- *BAIS 1500: Business Computing Essentials*, University of Iowa, Fall 2017 (695 students)
- *END 395: Operations Research II*, TOBB University of Economics and Technology, Fall 2015
- *IE 275: Production and Inventory Control I*, University of Tabriz, Spring 2010

Invited Workshop:

- *System Dynamics and System Thinking*, National Service, Iran, 2012
- *Role and Effect of Bottleneck on Productivity*, University of Tabriz, 2008

COMPUTER SKILLS

Programming:

Python, C++, MATLAB, R

Engineering Software:

Gurobi optimizer, CPLEX OPL, GAMS IDE, Lingo
ArcGIS, Vensim, Adobe Flash, SPSS, SOLIDWORKS

Miscellaneous:

Microsoft Office, LATEX

CERTIFICATES

- *Six Sigma Methodology Course*, Direct Assessment Services March 2008
- *Essential & Documentation and Internal Audit in ISO 9001:2000*, Alliance Int. R July 2007

SPECIAL HONORS AND GRANTS

- *Ballard & Seashore Merit-based Dissertation Fellowship*, University of Iowa, 2021
- *Dare to Discover Banner Campaign*, University of Iowa, Office of the Vice President, 2021
- *INFORMS 2020 Student Chapter Annual Award, Cum laude*, Vice President of the Chapter, 2020
- *Summer Research Fellowship*, University of Iowa Graduate College, 2020
- *Post-Comprehensive Research Award*, University of Iowa Graduate College, Spring 2020
- *3MT – Three-Minute Thesis Finalist Award*, University of Iowa Graduate College, 2019
- *Graduate Student Senate (GSS) Travel Funds Award*, University of Iowa Graduate College, 2019
- *Summer Research Fellowship*, University of Iowa, Department of Business Analytics, 2018-2019
- *Research Fellowship*, University of Iowa, Department of Business Analytics, Spring 2019
- *TUBITAK Research Scholarship Award*, 2014 and 2016

SERVICE & PROFESSIONAL ACTIVITIES

Journal Reviewer

- *Journal of Cleaner Production*
- *Journal of Numerical Algebra, Control and Optimization*
- *Journal of Computational Sciences*
- *Journal of Industrial and Management Organizations*

Leadership:

- *Elected Vice President*, University of Iowa INFORMS graduate student chapter, 2019-2020
- *Elected president*, Scientific Society of Industrial Engineering, University of Tabriz, 2007-2009
- *Executive and scientific committee member*, University of Tabriz 2nd seminar on “Industrial Engineering –productivity” with a lecture in “Human Resources Productivity,” 2008-2009

Session Chair:

- Humanitarian Operations and Disaster Management (Public Sector Operations Research (PSOR) track), INFORMS 2020 Annual meeting, Online, November 8-11, 2020
- Global and Discrete Optimization, 28th European Conference on Operational Research, Poznan, Poland, 2016
- Health Care Management under Emergency Aspects, 28th European Conference on Operational Research, Poznan, Poland, 2016
- Health Care Emergency Management, 28th European Conference on Operational Research, Poznan, Poland, 2016
- Information and Intelligent Systems, 28th European Conference on Operational Research, Poznan, Poland, 2016

Memberships/Professional Affiliations:

- *INFORMS*
- *Transportation Science and Logistics Society*
- *Scheduling Methods Application and Research Team (SMART)*
- *Iran Institute of Industrial Engineering*

INDUSTRIAL & PROFESSIONAL EXPERIENCES

- *Online Health Consultation National Center*, System Analysis Engineer, Iran, 2013
- *Samandehan Forouz*, Human Resource Engineer, Iran, 2013
- *Compulsory national service*, Researching “Application of System Dynamics Simulation in Knowledge Management Systems,” Iran, 2012
- *Compulsory national service*, Knowledge Management Engineer, Iran, 2011-2012
- *Bank Pasargad*, Cooperation in a Human Resources Competency Modelling Project, Iran, 2011
- *Mehrkhah Industrial Manufacturing Co., and Sina Holding Co.*, Cooperation in two Human Resources Performance Appraisal Projects, Iran, 2011
- *Mohitara Official Furniture Co.*, Tehran, Iran, Cooperation in a Business Plan Project, 2008

REFERENCES

Ann Melissa Campbell

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Patrick J. Johanns (*Teaching Reference*)

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