Hesam Mahmoudi

Postdoctoral Research Fellow
Massachusetts General Hospital, Harvard Medical School, Harvard University
+1 (540) 391-1067 | hmahmoudi1@mgh.harvard.edu | LinkedIn | Scholar | ResearchGate

Education

Ph.D. in Management Systems Engineering 2019 – 2023
Grado Department of Industrial and Systems Engineering, Virginia Tech, US

M.Sc. in Management Science 2010 – 2013
Graduate School of Management and Economics, Sharif University of Technology, Tehran, Iran

B.Sc. in Electrical Engineering, Control Systems 1999 – 2004
Electrical Engineering Department, Sharif University of Technology, Tehran, Iran

Pre-university Certificate and High School Diploma 1995 – 1999
Allameh Helli School, under the supervision of the National Organization for Developing Exceptional Talents, Tehran, Iran

Academic Positions

Postdoctoral Research Fellow 2023 – present
Institute for Technology Assessment, Massachusetts General Hospital, Harvard Medical School, Harvard University
Supervisor: Dr. M.S. Jalali

- Adopting the dynamic model of the opioid epidemic in the US (SOURCE) for the case of Canada, in collaboration with Health Canada
- Developing age-period-cohort models to analyze trends in drug overdose mortality
- Developing dynamic models of decision-making behaviors among patients and prescribers of medications for opioid use disorder
- Simulating and analyzing policies and interventions on lung cancer screening and the emerging social disparities
- Conducted a systematic review of incorporation of human behavior models of the spread of COVID-19

Graduate Research Fellow 2019 – 2023
Grado Department of Industrial and Systems Engineering, Virginia Tech
Supervisor: Dr. N. Ghaffarzadegan
Dissertation: Essays on Dynamics of Experiential Learning and Capability Development in Cancer Research Innovation

- Developed a theoretical framework and model explaining the dynamic mechanisms of expert disagreement caused by experiential learning
- Analyzed mechanisms and consequences of endogenous heterogeneity among physicians' decisions
- Investigated the role of experiential learning and capability development in cancer research centers' innovation strategies in clinical trials

Graduate Research Fellow 2019 – 2023
Cognitive Understanding of Complexity in Engineering Students, funded by U.S. National Science Foundation, Grado Department of Industrial and Systems Engineering, Virginia Tech
Supervisor: Dr. K. Triantis

- Developed a novel tool to assess comprehension of complexity among engineering students and professional engineers
- Conducted critical reviews of self-reported assessment tools of systems thinking and common quantitative measures of evaluating mental maps

- Developed a systematic approach to addressing multidimensionality of comprehension of complexity

Master's Research Fellow 2009 – 2014
Graduate School of Management and Economics, Sharif University of Technology
- Developed guidelines to develop question sets to assess systems thinking
- Conducted critical reviews of systems thinking definitions and their impact on systems thinking assessment methods

Additional Training

New England Future Faculty Workshop Aug 2024
Workshop on navigating the academic job market, Organized by Northeastern University, Harvard Medical School, Boston University, and Bay Path University

Academic Aspire INFORMS Summer 2024
Summer program on navigating the academic job market, organized by University of Oklahoma

Cancer Health Disparities Ideation Minilab Fall 2023 - Spring 2024
Embracing the Complexity: Transdisciplinary Approaches to Advance the Science of Cancer Health Disparities, organized by National Cancer Institute

CSOL Academy Summer 2022
Summer school on organizational theory, learning, decision making, and adaptation, organized by the Carnegie School of Organizational Learning

TOM PhD Summer School Summer 2021
Summer School on computational organization science, organized by the Theoretical Organizational Models Society

Teaching Experience

Graduate Teaching Assistant 2019 – 2022
Grado Department of Industrial and Systems Engineering, Virginia Tech
ISE Graduate Seminar (Fall 2022), Fundamentals of Systems Engineering (Fall 2022), System Dynamics Modelling of Socio-Technical Systems (Fall 2021), Engineering Economy (Summer 2020), Industrial Cost Control (Spring 2019)

Supervisor Fall 2021 – Spring 2022
Undergraduate research project that received Outstanding Undergraduate Research Award at the Undergraduate research symposium, Virginia Tech

Mentor 2021 – 2022
Two cohorts of incoming PhD students in Management Systems Engineering, Virginia Tech

Guest Lecturer Fall 2022
Introduction to Systems Thinking, Design Research, Industrial Design Department, Virginia Tech

Instructor December 2016
Systems Thinking and Complexity, Youth Encounter on Sustainability (YES), myclimate Switzerland

Teaching Assistant Spring 2011
Graduate School of Management and Economics, Sharif University of Technology, System Dynamics

Teaching Assistant Spring 2005
Electrical and Computer Engineering Department, University of Alberta, Electrical Circuits

Publications

Peer-Reviewed Journal Papers

1. Liu, N., **Mahmoudi, H.**, Triantis, K., Ghaffarzadegan, N., 2024, A multi-dimensional index of evaluating systems thinking skills from textual data, Systems Research and Behavioral Science – Link .
2. Jalali, M.S., **Mahmoudi, H.**, 2024, In response to: "Never the strongest: reconciling the four schools of thought in system dynamics in the debate on quality" — beyond pragmatism, System Dynamics Review – Link.
3. Davis, K., Grote, D., **Mahmoudi, H.**, Perry, L., Ghaffarzadegan, N., Grohs, J., Hosseinichimeh, N., Knight, D., Triantis, K., 2023, Comparing self-report assessments and scenario-based assessments of systems thinking competence, Journal of Science Education and Technology – Link.
4. Haque, S., **Mahmoudi, H.**, Ghaffarzadegan, N., Triantis, K., 2023, Mental models, cognitive maps, and the challenge of quantitative analysis of their network representations, System Dynamics Review – Link.
5. Davis, K., Ghaffarzadegan, N., Grohs, J., Grote, D, Hosseinichimeh, N., Knight, D., **Mahmoudi, H.**, Triantis, K., 2020, The Lake Urmia Vignette: a tool to assess understanding complexity in socio-environmental systems, System Dynamics Review. 36:191-222 – Link.

Reviews and Revisions

1. **Mahmoudi, H.**, Chang, D., Lee, H., Ghaffarzadegan, N., Jalali, M.S., A Critical Assessment of Large Language Models for Systematic Reviews: Utilizing ChatGPT for Complex Data Extraction, under review at Campbell Systematic Reviews – Link.

Conference Presentations

1. Sadeghieh, T., Plouffe, R., **Mahmoudi, H.**, Graham, E., Johnson, K., Jalali, M.S., Adapting the SOURCE model for opioid-related deaths in Canada: a dynamic approach to policy development and analysis, International Conference of the System Dynamics Society, Burgen, Norway, August 2024.
2. **Mahmoudi, H.**, Ghaffarzadegan, N., Endogenous heterogeneity and organizational learning in cancer research centers' innovation strategy, International Conference of the System Dynamics Society, Chicago, USA, July 2023.
3. Mohsenirad, S., Trintis, K., Topcu, T., **Mahmoudi, H.**, Multi-effect evaluation of policy intervention in system dynamics: A data envelopment analysis approach, International Conference of the System Dynamics Society, Chicago, USA, July 2023.
4. Liu, N., **Mahmoudi, H.**, Ghaffarzadegan, N., Triantis, K., Fatigue dynamics in safety-critical monitoring roles: evidence from the Belgian railway network, International Conference of the System Dynamics Society, Chicago, USA, July 2023.
5. **Mahmoudi, H.**, Ghaffarzadegan, N., Endogenous heterogeneity and organizational learning in cancer research centers' innovation strategy, Society for Judgment and Decision Making Doctoral Symposium, June 2023.
6. **Mahmoudi, H.**, Ghaffarzadegen, N., Insights on our "War on Cancer": endogenous heterogeneity and organizational learning in cancer research centers' innovation strategy, Virginia Tech Cancer Research Alliance Retreat, Children's National Hospital Research Center, Washington DC, May 2023.
7. **Mahmoudi, H.**, Ghaffarzadegan, N., Agree to disagree: expert disagreement as a dynamic decision-making problem, INFORMS Annual Meeting, Indianapolis, Indiana, USA, October 2022.
8. Liu, N., **Mahmoudi, H.**, Triantis, K., Roets, B., Modelling the dynamics of mental workload and fatigue in safety-critical monitoring roles, INFORMS Annual Meeting, Indianapolis, Indiana, USA, October 2022.
9. **Mahmoudi, H.**, Ghaffarzadegan, N., Experts learn to disagree—and that's not a bad thing, Carnegie School of Organizational Learning (CSOL) conference, Pacific Grove, California, August 2022.

10. **Mahmoudi, H.**, Ghaffarzadegan, N., Experts learn to disagree—and that's not a bad thing, International Conference of the System Dynamics Society, Virtually and in Frankfurt, Germany, July 2022.
11. Haque, S., **Mahmoudi, H.**, Ghaffarzadegan, N., Triantis, K., How analyzing mental maps fail, International Conference of the System Dynamics Society, Virtually and in Frankfurt, Germany, July 2022.
12. Dehdarian, A., Dorani, K., **Mahmoudi, H.**, Khandan, M., What systems thinking means to different networks of researchers, International Conference of the System Dynamics Society, Virtually and in Frankfurt, Germany, July 2022.
13. Liu, N., **Mahmoudi, H.**, Triantis, K., Roets, B., Modelling the dynamics of mental workload and fatigue in safety-critical monitoring roles, The 40th International Conference of the System Dynamics Society, Virtually and in Frankfurt, Germany, July 2022.
14. **Mahmoudi, H.**, Ghaffarzadegan, N., A dynamic theory of divergence among physicians emerging from experiential learning, IISE Annual Conference & Expo 2022, Seattle, Washington, USA, May 2022.
15. Haque, S., **Mahmoudi, H.**, Ghaffarzadegan, N., Systems thinking and mental map classification, IISE Annual Conference & Expo 2022, Seattle, Washington, USA, May 2022.
16. **Mahmoudi, H.**, Ghaffarzadegan, N., Dynamic divergence among physicians emerging from customers' perception and physicians' experiential learning, INFORMS Annual Meeting, Virtually and in Anaheim, California, USA, October 2021.
17. **Mahmoudi, H.**, Ghaffarzadegan, N., What causes disagreement among physicians? Dynamics of customers' perception and physicians' experiential learning, International Conference of the System Dynamics Society, Virtually Chicago, USA, July 2021.
18. Liu, N., **Mahmoudi, H.**, Triantis, K., A multidimensional comprehension index of systems thinking, International Conference of the System Dynamics Society, Virtually Chicago, USA, July 2021.
19. **Mahmoudi, H.**, Ghaffarzadegan, N., What causes disagreement among physicians? An exploration of customers' perception and physicians' experiential learning, INFORMS Healthcare Conference 2021, Indianapolis, Indiana, USA, July 2021.
20. Liu, N., **Mahmoudi, H.**, Triantis, K., A multidimensional comprehension index of systems thinking, The 12th North American Productivity Workshop, vNAPW, June 2021.
21. **Mahmoudi, H.**, Liu, N., Triantis, K., Roets, B., A dynamic model of workload and fatigue as predictors of errors in safety critical monitoring roles: railway traffic controllers, 2020 INFORMS Annual Meeting, Virtually Philadelphia, Pennsylvania, USA, November 2020.
22. **Mahmoudi, H.**, Dorani, K., Dehdarian, A., Khandan, M., Mashayekhi, A.N., Does systems thinking assessment demand a revised definition of systems thinking, International Conference of the System Dynamics Society, Albuquerque, New Mexico, USA, July 2019.
23. Dorani, K. Mortazavi, A., Dehdarian, A., **Mahmoudi, H.**, Khandan, M., Mashayekhi, A.N., Developing question sets to assess systems thinking skills, International Conference of the System Dynamics Society, Cambridge, Massachusetts, USA, July 2015.

Honors and Awards

- Won 2nd place in the Paul E. Torgersen Research Excellence Award among PhD students in College of Engineering, $500, Virginia Tech — April 2023
- Awarded the College of Engineering COE fellowship, covering tuition and stipend, $25,000, Virginia Tech — Spring 2023
- Awarded the Fabrycky GTA Award for excellent GTA performance, $1000, Grado Department of Industrial and Systems Engineering, Virginia Tech — 2022 – 2023
- Received the Student Engineers Council's travel funding to present at the IISE Annual Meeting, $700, Virginia Tech — 2022

- Received Honorable Mention of the Lupina Young Researchers Award for the paper, What Causes Disagreement Among Physicians? Dynamics of Customers' Perception and Physicians' Experiential Learning, System Dynamics Society 2021
- Granted Membership of VTGrATE, the Virginia Tech Academy for Graduate Teaching Assistant Excellence 2019 – 2023
- Received the Student Chapter Scholarship to attend the 37th International Conference of the Systems Dynamics Society, $375 2019
- Ranked 12th among 40,000 participants, i.e., top 0.1%, in the Nationwide Graduate School Entrance Exam in Management Science and Business 2010
- Awarded the Highest Contribution by a Steering Member of the Global Education Program in International House, University of Alberta 2007
- Ranked 4th among 30 students in the Control Engineering cohort of the Electrical Engineering department, Sharif University of Technology 2004
- Ranked 246th among 350,000 participants, i.e., top 0.1%, in the Nationwide University Entrance Exam for B.Sc. degree 1999

Professional Service

Thread Chair, Reviewer, Session Chair 2019 – 2024
International Conference of the System Dynamics Society

Contributing Member 2022 – present
Health Policy Special Interest Group, System Dynamics Society

Contributing Member 2021 – present
Theoretical Organizational Models Society

Work Experience

Cofounder, Chairman, and Commercial Manager, Tom Kesht Alborz 2009 – 2019
Large scale Manufacturer and Distributor of Agricultural Organic-Based Fertilizers, Working Closely with Internationally Famed Company, BioFert Canada; $1,200,000 Annual Revenue in 2016

Manager and Member, Evaluation Subgroup, Asemaan Group 2009 – 2019
An NGO Concentrating on the Promotion of Systems Thinking Skills Among Primary School Students on a National Level

Cofounder, Financial Manager, ParsleyWorm and Spriss Games 2011 – 2019
Innovative Teams Working on Creating Interactive Digital Artworks and Smart Artistic Computer Games

Steering Member, Global Cultural Program 2006 – 2008
International House, International Center, University of Alberta

Research Assistant, Nano-Fabrication Lab and Applied Miniaturization Lab 2006 – 2007
Electrical and Computer Engineering Department, University of Alberta

Research Assistant, Robotics Lab 2003 – 2004
Electrical Engineering Department, Sharif University of Technology

Computer Skills

Professional Software: Vensim, R, MATLAB, Stata, JMP, SIMULINK, Endnote, Mendeley, Zotero

Language Skills

Persian: Native **English:** Fluent