

# Hesam Mahmoudi, PhD

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## Research Interests

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Systems Science, System Dynamics Simulation, Complexity Sciences, Healthcare Systems

## Education

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**Postdoctoral Research Fellow** 2023 – present

Massachusetts General Hospital, Harvard University

Supervisors: Dr. M.S. Jalali, Dr. Scott Gazelle, Dr. Chi-Fu Jeffrey Yang

- Opioid epidemic modeling and analytics
- Systems modeling for lung cancer screening and the emerging social disparities

**Ph.D. in Industrial and Systems Engineering** 2019 – 2023

Virginia Tech

Dissertation: “Essays on Dynamics of Experiential Learning and Capability Development in Cancer Research Innovation”; Winner of Torgersen Research Excellence Award.

Dissertation Advisor: Dr. Navid Ghaffarzadegan

**M.Sc. in Management Science** 2010 – 2013

Graduate School of Management and Economics, Sharif University of Technology, Tehran, Iran

**B.Sc. in Electrical Engineering** 1999 – 2004

Electrical Engineering Department, Sharif University of Technology, Tehran, Iran

## Honors and Awards

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- 2<sup>nd</sup> place in the Paul E. Torgersen Research Excellence Award for PhD dissertation among PhD students in Virginia Tech's College of Engineering, \$500. April 2023
- The Fabrycky GTA Award for excellent GTA performance, \$1000, Grado Department of Industrial and Systems Engineering, Virginia Tech 2022 – 2023
- Honorable Mention of the Lupina Young Researchers Award for best Health System Dynamics paper, 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

## Teaching Experience

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### Graduate Teaching Assistant

- Grado Department of Industrial and Systems Engineering, Virginia Tech (2019 – 2022)  
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)
- Graduate School of Management and Economics, Sharif University of Technology, System Dynamics (2011)

### Instructor

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

### Other

- Advising: Undergraduate research project on mental model analysis.
  - The student received Outstanding Undergraduate Research Award at Virginia Tech (Fall 2021 – Spring 2022)

- Guest lecturer: Introduction to Systems Thinking, Design Research, Industrial Design  
Department, Virginia Tech (2021-2022)

## Publications

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### 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*, 1-15 – [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*, 40: e1759 – [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*, 32: 793–813 – [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*, 39: 152-170 – [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](#).

### Manuscripts in Preparation

1. **Mahmoudi, H.**, Osi, A., Ghaffarzadegan, N., Experiential learning and specialization in stages of innovation: evidence from cancer treatment research, to be submitted in December 2024.
2. **Mahmoudi, H.**, Sadeghieh, T., Plouffe, R., Graham, E., Johnson, K., Jalali, M.S., Simulating the opioid crisis in Canada: adapting US models for policy insights, to be submitted in January 2025.
3. **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 PLOS Digital Health – [Link](#).
4. **Lee, H.**, Mahmoudi, H., Chang, D., Jalali, M.S., Review of human behavior integration in COVID-19 simulation models, under review at Public Health.

### Selected Conference Presentations

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1. **Mahmoudi, H.**, Ghaffarzadegan, N., Dynamic divergence among physicians emerging from experiential learning, Society for Medical Decision Making Annual Meeting, Boston, Massachusetts, October 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. **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.
4. **Mahmoudi, H.**, Ghaffarzadegan, 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.
5. **Mahmoudi, H.**, Ghaffarzadegan, N., Agree to disagree: expert disagreement as a dynamic decision-making problem, INFORMS Annual Meeting, Indianapolis, Indiana, USA, October 2022.
6. 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.

7. **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.
8. 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.
9. 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.
10. **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.
11. Haque, S., **Mahmoudi, H.**, Ghaffarzadegan, N., Systems thinking and mental map classification, IISE Annual Conference & Expo 2022, Seattle, Washington, USA, May 2022.
12. **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.
13. **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.
14. 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.
15. **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.
16. **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.
17. **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.
18. 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.

## Additional Training

<b>New England Future Faculty Workshop</b>	Aug 2024
Workshop on navigating the academic job market, Organized by Northeastern University, Harvard Medical School, Boston University, and Bay Path University	
<b>Academic Aspire INFORMS</b>	Summer 2024
Summer program on navigating the academic job market, organized by University of Oklahoma	
<b>Cancer Health Disparities Ideation Minilab</b>	Fall 2023 - Spring 2024
Embracing the Complexity: Transdisciplinary Approaches to Advance the Science of Cancer Health Disparities, organized by National Cancer Institute	
<b>CSOL Academy</b>	Summer 2022
Summer school on organizational theory, learning, decision making, and adaptation, organized by the Carnegie School of Organizational Learning	
<b>TOM PhD Summer School</b>	Summer 2021
Summer school on computational organization science, organized by the Theoretical Organizational Models Society	

## Professional Service

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<b>Thread Chair, Reviewer, Session Chair</b> International Conference of the System Dynamics Society	2019 – 2024
<b>Contributing Member</b> Health Policy Special Interest Group, System Dynamics Society	2022 – present
<b>Contributing Member</b> Theoretical Organizational Models Society	2021 – present

## Work Experience

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<b>Cofounder, Chairman, and Commercial Manager</b> , Tom Kesht Alborz	2009 – 2019
<b>Manager and Member</b> , Evaluation Subgroup, Asemaan Group	2009 – 2019
<b>Cofounder, Financial Manager</b> , Spriss Games	2011 – 2019
<b>Steering Member</b> , Global Cultural Program, International Center, University of Alberta	2006 – 2008

## Language Skills

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**Persian:** Native

**English:** Fluent

## References

### Dr. Navid Ghaffarzadegan

Associate Professor, Industrial and Systems Engineering, Virginia Tech; [navidg@vt.edu](mailto:navidg@vt.edu)

### Dr. Mohammad S. Jalali

Associate Professor, Institute for Technology Assessment, Massachusetts General Hospital, Harvard University; [msjalali@mgh.harvard.edu](mailto:msjalali@mgh.harvard.edu)

### Professor Konstantinos Triantis

John Lawrence Professor, Industrial and Systems Engineering, Virginia Tech; [triantis@vt.edu](mailto:triantis@vt.edu)

### Professor G. Scott Gazelle

Professor, Institute for Technology Assessment, Massachusetts General Hospital, Harvard Medical School, Harvard University; [gsgazelle@mgh.harvard.edu](mailto:gsgazelle@mgh.harvard.edu)