Hesam Talebiyan, PhD — Curriculum Vitae

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Education

Rice University
Houston, TX
Doctor of Philosophy in Civil Engineering,
Aug 2016–Aug 2021
- Thesis: Interdependent restoration of infrastructure networks with humans in the loop
- Advisor: Prof. Leonardo Duenas-Osorio
- GPA = 3.85, Honor: 2020 Robert P. and Eleanor Warden Shubinski Award

Sharif University of Technology
Tehran, Iran
Master of Science in Earthquake Engineering,
Sep 2013–Jan 2016
- Thesis: Optimal seismic risk mitigation by prioritization of structures for retrofit
- GPA = 89.3%, Advisor: Dr. Mojtaba Mahsuli

Sharif University of Technology
Tehran, Iran
Bachelor of Science in Civil Engineering,
Sep 2008–July 2013
- Project: Study of maximum acceleration in regular steel frames using endurance time method
- GPA = 86.1%

Research and Professional Experience

Moody's Analytics, RMS
Newark, CA
Data Scientist/Emerging Risks Modeler
Sep 2022–Present
- Design of Liability risk models to predict the number of lawsuits after catastrophic events using tree-based models
- Quality control and uncertainty quantification of complex computational and statistical models, e.g. TR risk models
- Coordinated with the product team to determine what features and data resolution clients need

Rice University, NIST CoE for Community Resilience
Houston, TX
Postdoctoral Associate
Sep 2021–Sep 2022
- End-to-end mitigation and restoration decision models
- Interaction of decision models for buildings and utility systems
- Integrated physical and socio-economic models of community resilience

Rice University
Houston, TX
Research Assistant
Aug 2016–Aug 2021
- Decentralized decision-making for real-world interdependent infrastructure networks
- Game-theoretic methods for decentralized decision-making: Auctions and Bayesian games
- Bayesian Hierarchical models of network dynamics: application to infrastructure networks
- Congestion and observability in cyber-physical systems
- Databases of synthetic and realistic infrastructure networks
- Funded by ARL's MURI and NSF's CRISP 2.0, and NIST CoE Community Resilience

Sharif University of Technology
Tehran, Iran
Research Assistant
Sep 2014–Jan 2016
- Models for prediction of damage cost and retrofit cost of masonry structures
- Risk analysis on schools of Iran and prioritized them based on optimal mitigation of risk
- Novel sensitivity method based on Monte Carlo sampling to prioritize buildings
- Database of retrofit plans for school in Iran including structural properties of retrofit plan

Kasra Consulting Enginees
Tehran, Iran
Structural Design Engineer
Apr 2013–Dec 2013
- Design of commercial and residential structure of various steel and concrete buildings

Software Developments

- **Rtx: Reliability — Risk — Resilience tools [link]**
  Contribution: reliability sensitivity analysis using sampling and masonry damage and retrofit cost models
- **Interdependent Networked Community Resilience Modeling Environment (IN-CORE) [link]**
  Contribution: optimization-based centralized and decentralized decision support tools

Other Projects

- **Risk-based Prioritization of School Buildings for Seismic Retrofit**
  Collaboration with Research and Technical Department of National Organization for School Development, Renovation and Equipping, Tehran, Iran
- **Pluvial Flood Modeling and risk communication**
  NSF grant proposal in collaboration with researchers from computer science and political science at Rice University, Houston, Tx

Teaching Experience

- **Rice University** **Houston, TX**
  Co-lecturer *Aug 2021–Dec 2021*
  - Graduate: Modeling and Analysis of Networked Systems

- **Rice University** **Houston, TX**
  Teaching Assistant *Jan 2020–May 2020*
  - Undergraduate: Uncertainty and Risk-Based Decisions for Infrastructure Systems

- **Sharif University of Technology** **Tehran, Iran**
  Teaching Assistant *Sep 2013–Dec 2014*
  - Graduate: Dynamic of Structure, Earthquake Engineering Seminar
  - Undergraduate: Mechanics of Material, Statics

- **Self-employed** **Tehran, Iran**
  Private Tutor *Jan 2014–July 2015*
  - Undergraduate: Statics, Mechanics of Material, Analysis of Structure I & II

Publications

Refereed journal articles

[1] **H. Talebiyan** and Dueñas-Osorio, "Auctions for resource allocation and decentralized restoration of interdependent networks," *Reliability Engineering & System Safety*, p. 109301, Sep 2023.

[2] **H. Talebiyan**, K. Leelardcharoen, L. Dueñas-Osorio, B. J. Goodno, and J. I. Craig, "Congestion and observability across interdependent power and telecommunication networks under seismic hazard," *Earthquake Spectra*, p. 875529302110266, aug 2021.

[3] **H. Talebiyan** and L. Duenas-Osorio, "Decentralized Decision Making for the Restoration of Interdependent Networks," *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, vol. 6, no. 2, p. 04020012, 2020.

[4] **H. Talebiyan** and M. Mahsuli, "Sampling-Based Reliability Sensitivity Analysis Using Direct Differentiation," *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*, vol. 6, no. 2, 2020.

[5] **H. Talebiyan** and M. Mahsuli, "Risk-Based Prioritization of a Building Portfolio for Retrofit," *Journal of Structural Engineering*, vol. 144, no. 1, p. 04017181, 2018.

[6] H. Nasrazadani, M. Mahsuli, **H. Talebiyan**, and H. Kashani, "Probabilistic Modeling Framework for Prediction of Seismic Retrofit Cost of Buildings," *Journal of Construction Engineering and Management*, vol. 143, no. 8, p. 04017055, 2017.

Under review

[7] **H. Talebiyan** and L. Duenas-Osorio, "Interdependent network restoration games with incomplete information and bounded rationality," *Risk Analysis*, 2022.

Conference proceedings

[8] **H. Talebiyan** and L. Dueñas-Osorio, "Accelerating Utility Restoration Planning with Ensemble Statistical Models," in *13th International Conference on Structural Safety & Reliability (ICOSSAR 2021-2022)*, (Shanghai, China), 2022.

[9] A. Beck, **H. Talebiyan**, E. J. Cha, and L. Duenas-Osorio, "Comparative Retrofit Prioritization Schemes for Electric Power Networks: Application to the community in Seaside, OR," in *8th International Symposium on Reliability Engineering and Risk Management (ISRERM)*, (Hannover, Germany), 2022.

[10] R. Paredes, **H. Talebiyan**, and L. Dueñas-Osorio, "Path-Dependent Reliability and Resiliency of Critical Infrastructure via Particle Integration Methods," in *13th International Conference on Structural Safety & Reliability (ICOSSAR 2021-2022)*, (Shanghai, China), 2022.

[11] S. Alemzadeh, **H. Talebiyan**, S. Talebi, L. Duenas-Osorio, and M. Mesbahi, "Resource Allocation for Infrastructure Resilience using Artificial Neural Networks," in *2020 IEEE 32nd International Conference on Tools with Artificial Intelligence (ICTAI)*, (virtual), pp. 617–624, IEEE, nov 2020.

[12] **H. Talebiyan** and L. Duenas-Osorio, "Probabilistic Assessment of Decentralized Decision-making for Interdependent Network Restoration," in *13th International Conference on Applications of Statistics and Probability in Civil Engineering, ICASP13* (J. Song, ed.), (Seoul, South Korea), 2019.

[13] **H. Talebiyan**, H. Nasrazadani, and M. Mahsuli, "Probabilistic Prediction of Retrofit Cost of Masonry Buildings," in *7th International Conference of Seismology and Earthquake Engineering (SEE7)*, (Tehran, Iran), 2015.

Working papers

[14] **H. Talebiyan**, A. D. González, L. Dueñas-Osorio, J. Wu, and J. W. Baker, "Interdependent Infrastructure Network of Shelby County, TN: A Restoration-oriented Database." 2022.

[15] A. Beck, **H. Talebiyan**, E. J. Cha, and L. Duenas-Osorio, "Socially-Aware Retrofit Prioritization for Utility Networks: Application to the community in Seaside, OR." 2022.

[16] **H. Talebiyan** et al., "A Building and Utility Intervention Decision Support Model with Socio-economic Constraints: Application to Lumberton, NC." 2022.

Other publications

[17] **H. Talebiyan**, *Interdependent Restoration of Infrastructure Networks with Humans in the Loop: decentralized and strategic decision processes*. Phd dissertation, Rice University, 2021.

[18] S. Alemzadeh, **H. Talebiyan**, S. Talebi, L. Duenas-Osorio, M. Mesbahi, L. Dueñas-Osorio, and M. Mesbahi, "Deep Learning-based Resource Allocation for Infrastructure Resilience," *Arxiv*, pp. 1–14, 2020.

[19] **H. Talebiyan**, *Optimal seismic risk mitigation by prioritization of structures for retrofit*. Ms thesis, Sharif University of Technology, Tehran, Iran, 2016.

Oral Presentations

1. **H. Talebiyan** & L. Duenas-Osorio (2022), "Accelerating Utility Restoration Planning with Ensemble Statistical Models," Presented at *ICOSSAR 2021-2022*, virtual.

2. S. Alemzadeh, **H. Talebiyan**, S. Talebi, L. Duenas-Osorio, & M. Mesbahi (2020), "Resource Allocation for Infrastructure Resilience using Artificial Neural Networks," Presented at *ICTAI 2020*, virtual.

3. **H. Talebiyan**, A. Gonzalez, & L. Duenas-Osorio (2020), "Interdependent Infrastructure Network of Shelby County, TN: A Recovery-oriented Database," Presented at *INFORMS 2020*, virtual.

4. **H. Talebiyan** & L. Duenas-Osorio (2019), "Probabilistic Assessment of Decentralized Decision-making for Interdependent Network Restoration," Presented at *ICASP13*, Seoul, South Korea.

5. **H. Talebiyan** & L. Duenas-Osorio (2019), "Auction-based Resource Allocation for Interdependent Network Restoration," Presented at *INFORMS 2019*, Seattle, WA.

6. **H. Talebiyan** & L. Duenas-Osorio (2018), "Bayesian Hierarchical Models for Decentralized Decision-making across Interdependent Network Restoration," Presented at *INFORMS* 2018, Phoenix, AZ.

7. **H. Talebiyan** & L. Duenas-Osorio (2018), "Multi-agent decision-making for interdependent network restoration via decentralized optimization," Presented at *IISE Annual Conference & Expo*, Orlando, FL.

8. **H. Talebiyan**, S. Alemzadeh, L. Duenas-Osorio, & M. Mesbahi (2018), "Optimization and Control of Restoration Strategies across Interdependent Networks," Presented at *NSF CRISP/RIPS Workshop*, Washington, D.C.

Poster Presentations

1. **H. Talebiyan**, S. Perry, J. Patil, K. Shepherd, J. Wheeler, D. Subramanian, R. Stein, R. Wilson, L. Duenas-Osorio, & G. Woods, (2019), "Flood-Radar: A user-informed local pluvial flood forecasting tool," Presented at *SSPEED Conference*, Houston, TX.

2. **H. Talebiyan** & L. Duenas-Osorio, (2018), "Decentralized decision-making for Interdependent Infrastructure Resilience," Presented at *Lloyd's day at Houston*, Houston, TX.

3. **H. Talebiyan** & L. Duenas-Osorio, (2018), "Decentralized Decision-making for the Restoration of Real-world Interdependent Networks," *Rice Data Science Conference*, Houston, TX.

4. S. Alemzadeh, **H. Talebiyan**, M. Mesbahi & L. Duenas-Osorio, (2018), "Optimization and Control of Restoration Strategies Across Interdependent Networks," Presented at *NSF CRISP/RIPS Workshop*, Washington, D.C.

5. **H. Talebiyan**, H. Nasrazadani & M. Mahsuli, (2015), "Probabilistic prediction of retrofit cost for masonry structures," Presented at *SEE7*, Tehran, Iran.

Service

Journals
Reviewer   *Jul 2019–Present*
- Structures (Elsevier)
- Journal of Infrastructure Systems (ASCE)
- Environment Systems and Decisions (Springer)
- Natural Hazards Review (ASCE)

Academic and Professional Institutions
Member
- Earthquake Engineering Research Institute
- American Society of Civil Engineers
- The Institute for Operations Research and the Management Sciences
- Institute of Industrial and Systems Engineers

Educational Research and Improvement Working Group   **Tehran, Iran**
Chief Secretary   *Jul 2013–Oct 2013*
- Researched on different accreditation organizations for universities in the world such as ABET
- The working group is affiliated with Sharif University of Technology