

SHANGJIA DONG

PERSONAL INFORMATION

Dept. of Civil and Environmental Engineering, DuPont 344B
Disaster Research Center, Graham 166B
University of Delaware
Newark, DE 19716

✉ sjdong@udel.edu
🎓 [Google Scholar](#)
💻 www.dongresearch.com

PROFESSIONAL EXPERIENCE

University of Delaware
Assistant professor in *Civil and Environmental Engineering*
Core Faculty in *Disaster Research Center (DRC)*
Faculty Member in *Sociotechnical Systems Center (SSC)*

Newark, Delaware
2020.8 – Present

Texas A&M University
Postdoctoral Research Associate, PI: Ali Mostafavi

College Station, Texas
2018.9 – 2020.7

Oregon State University
Graduate Research Assistant PI: Haizhong Wang

Corvallis, Oregon
20013.10 – 2018.9

EDUCATION

Oregon State University
Ph.D. in Civil Engineering (Transportation)
Minor in Computer Sciences

Corvallis, Oregon
2015.11 – 2018.9

- Dissertation: Percolation Modeling of Transportation Network Robustness Towards a Resilient Infrastructure System: From a Single Network to Interdependent Networks
- Advisor: Prof. Haizhong Wang

M.S. in Civil Engineering (Transportation)

2013.10 – 2015.11

- Thesis: Stochastic Characterization of Highway Capacity and Its Applications
- Advisor: Prof. Haizhong Wang

University of Electronic Science and Technology of China
B.S. in Information and Computational Science
Dual B.S. in Finance

Chengdu, Sichuan
2009.9 – 2013.6

REFEREED JOURNAL ARTICLES

* *represents research conducted under my supervision*

- J1. **Dong, S.**, Malecha, M., Farahmand, H., Mostafavi, A., Berke, P.R. and Woodruff, S.C., 2021. Integrated infrastructure-plan analysis for resilience enhancement of post-hazards access to critical facilities. *Cities*, 117, p.103318. doi.org/10.1016/j.cities.2021.103318
- J2. Farahmand, H., **Dong, S.** and Mostafavi, A., 2021. Network analysis and characterization of vulnerability in flood control infrastructure for system-level risk reduction. *Computers, Environment and Urban Systems*, 89, p.101663. doi.org/10.1016/j.compenvurbsys.2021.101663
- J3. Li, Z., Yu, H., Zhang, G., **Dong, S.** and Xu, C.Z., 2021. Network-wide traffic signal control optimization using a multi-agent deep reinforcement learning. *Transportation Research Part C: Emerging Technologies*, 125, p.103059. doi.org/10.1016/j.trc.2021.103059
- J4. Esmalian, A. *, **Dong, S.**, and Mostafavi, A., 2021. Susceptibility Curves for Humans: Empirical Survival Models for Determining Household-level Disturbances from Haz-

- ards-induced Infrastructure Service Disruptions. *Sustainable Cities and Society*. 1026-94. doi.org/10.1016/j.scs.2020.102694
- J5. Esmalian, A.*, **Dong, S.**, Coleman, N. and Mostafavi, A., 2021. Determinants of risk disparity due to infrastructure service losses in disasters: a household service gap model. *Risk analysis*. doi.org/10.1111/risa.13738
 - J6. **Dong, S.**, Yu, T., Farahmand, H. and Mostafavi, A., 2020. A Hybrid Deep Learning Model for Urban Flood Prediction and Situation Awareness using Channel Network Sensors Data. *Computer-Aided Civil and Infrastructure Engineering* doi.org/10.1111/mice.12629
 - J7. **Dong, S.**, Yu, T., Farahmand, H., and Mostafizi, A., 2020. Probabilistic Modeling of Cascading Failure Risk in Interdependent Channel and Road Networks in Urban Flooding. *Sustainable Cities and Society* doi.org/10.1016/j.scs.2020.102398
 - J8. **Dong, S.**, Li, Q., Farahmand, H., Mostafavi, A., Berke, P. and Vedlitz, A., 2020. Institutional Connectedness in Resilience Planning and Management of Interdependent Infrastructure Systems. *ASCE Journal of Management in Engineering*. [doi.org/10.1061/\(ASCE\)ME.1943-5479.0000839](https://doi.org/10.1061/(ASCE)ME.1943-5479.0000839)
 - J9. **Dong, S.**, Mostafizi, A., Wang, H., Gao, J. and Li, X., 2020. Measuring the topological robustness of transportation networks to disaster-induced failures: A percolation approach. *ASCE Journal of Infrastructure System*. [doi.org/10.1061/\(ASCE\)IS.1943-555X.0000533](https://doi.org/10.1061/(ASCE)IS.1943-555X.0000533)
 - J10. **Dong, S.**, Wang, H., and Mostafizi, A. and Song, X., 2020. A network-of-networks percolation analysis of cascading failures in spatially co-located road-sewer infrastructure networks. *Physica A: Statistical Mechanics and Its Application*, p.122971. doi.org/10.1016/j.physa.2019.122971
 - J11. **Dong, S.**, Esmalian, A., Farahmand, H. and Mostafavi, A., 2020. An Integrated Physical-Social Analysis of Disrupted Access to Critical Facilities and Community Service-loss Tolerance in Urban Flooding. *Computers, Environment and Urban Systems*. 80, 101443. doi.org/10.1016/j.compenvurbsys.2019.101443
 - J12. **Dong, S.**, Wang, H., Mostafavi, A. and Gao, J., 2019. Robust component: a robustness measure that incorporates access to critical facilities under disruptions. *Journal of the Royal Society Interface*, 16(157), p.20190149. doi.org/10.1098/rsif.2019.0149
 - J13. **Dong, S.**, Yu, T., Farahmand, H. and Mostafavi, A., 2019. Bayesian Modeling of Flood Control Networks for Failure Cascade Characterization and Vulnerability Assessment. *Computer-Aided Civil and Infrastructure Engineering*. doi.org/10.1111/mice.12527
 - J14. *Farahmand, H., **Dong, S.**, Mostafavi, A., Berke, P., Woodruff, S., Hannibal, B. and Vedlitz, A., 2019. Institutional Congruence for Resilience Management in Interdependent Infrastructure Systems. *International Journal of Disaster Risk Reduction*. doi.org/10.1016/j.ijdr.2020.101515
 - J15. *Li, Q., **Dong, S.** and Mostafavi, A., 2019. Modeling of Inter-organizational Coordination Dynamics in Resilience Planning of Infrastructure Systems: A Multilayer Network Simulation Framework. *Plos ONE*. doi.org/10.1371/journal.pone.0224522
 - J16. *Li, Q., **Dong, S.** and Mostafavi, A., 2019. A Meta-Network Framework for Analysis of Actor-Plan-Task-Infrastructure Networks in Resilience Planning and Management. *ASCE Natural Hazards Review* 21 (2). [doi.org/10.1061/\(ASCE\)NH.1527-6996.0000376](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000376)
 - J17. Mostafizi, A., Wang, H. and **Dong, S.**, 2019. Understanding the Multimodal Evacuation Behavior for a Near-Field Tsunami. *Transportation Research Record*, p.1-13. doi.org/10.1177/0361198119837511
 - J18. Mostafizi, A., Wang, H., Cox, D. and **Dong, S.**, 2019. An agent-based vertical evacuation model for a near-field tsunami: Choice behavior, logical shelter locations, and life safety. *International journal of disaster risk reduction*, 34, pp.467-479. doi.org/10.1016/j.ijdr.2018.12.018

- J19. **Dong, S.**, Mostafizi, A., Wang, H. and Li, J., 2018. A stochastic analysis of highway capacity: Empirical evidence and implications. *Journal of Intelligent Transportation Systems*, 22(4), pp.338-352. doi.org/10.1080/15472450.2017.1396898
- J20. Mostafizi, A., **Dong, S.** and Wang, H., 2017. Percolation phenomenon in connected vehicle network through a multi-agent approach: Mobility benefits and market penetration. *Transportation Research Part C: Emerging Technologies*, 85, pp.312-333. doi.org/10.1016/j.trc.2017.09.013
- J21. Anderson, J.C. and **Dong, S.**, 2017. Heavy-vehicle driver injury severity analysis by time of week: a mixed logit approach using HSIS crash data. *Institute of Transportation Engineers. ITE Journal*, 87(9), p.41. [HSIS Highway Safety Data Best paper award](https://doi.org/10.1080/08958463.2017.1396898)
- J22. Mostafizi, A., Wang, H., Cox, D., Cramer, L.A. and **Dong, S.**, 2017. Agent-based tsunami evacuation modeling of unplanned network disruptions for evidence-driven resource allocation and retrofitting strategies. *Natural Hazards*, 88(3), pp.1347-1372. doi.org/10.1007/s11069-017-2927-y
- J23. Wang, H., Liu, L., **Dong, S.**, Qian, Z. and Wei, H., 2016. A novel work zone short-term vehicle-type specific traffic speed prediction model through the hybrid EMD-ARIMA framework. *Transportmetrica B: Transport Dynamics*, 4(3), pp.159-186. doi.org/10.1080/21680566.2015.1060582
- J24. **Dong, S.**, Wang, H., Hurwitz, D., Zhang, G. and Shi, J., 2015. Nonparametric modeling of vehicle-type-specific headway distribution in freeway work zones. *Journal of Transportation Engineering*, 141(11), p.05015004. [doi.org/10.1061/\(ASCE\)TE.1943-5436.0000788](https://doi.org/10.1061/(ASCE)TE.1943-5436.0000788)
- J25. Wang, H., Liu, L., Qian, Z., Wei, H. and **Dong, S.**, 2014. Empirical Mode Decomposition-Autoregressive Integrated Moving Average: Hybrid Short-Term Traffic Speed Prediction Model. *Transportation Research Record*, 2460(1), pp.66-76. doi.org/10.3141/2460-08
- J26. Chen, L., Li, B., **Dong, S.** and Pan, H., 2013. A combined CFAHP-FTOPSIS approach for portfolio selection. *China Finance Review International*, 3(4), pp.381-395. ISSN: 2044-1398

REFERRED
CONFERENCE
PROCEEDINGS

* represents research conducted under my supervision

- C1. *Li, Q., **Dong, S.** and Mostafavi, A., 2019. Community Detection in Actor Collaboration Networks of Resilience Planning and Management in Interdependent Infrastructure Systems. *ASCE Construction Research Congress 2020*. Tempe, AZ. doi.org/10.1061/9780784482858.073
- C2. *Farahmand, H., **Dong, S.** and Mostafavi, A., 2019. Vulnerability Assessment in Co-Located Flood Control and Transportation Networks. *ASCE Construction Research Congress 2020*. Tempe, AZ. doi.org/10.1061/9780784482858.081
- C3. *Esmalian, A., **Dong, S.** and Mostafavi, A., 2019. Empirical Assessment of Household Susceptibility to Hazards-Induced Prolonged Power Outages *ASCE Construction Research Congress 2020*. Tempe, AZ. doi.org/10.1061/9780784482858.100
- C4. *Li, Q., **Dong, S.** and Mostafavi, A., 2019. Modeling of Inter-Organizational Coordination Dynamics in Resilience Planning: A Multilayer Network Simulation Framework. *In Computing in Civil Engineering 2019: Smart Cities, Sustainability, and Resilience* (pp. 515-522). Reston, VA: American Society of Civil Engineers. doi.org/10.1061/9780784482445.066
- C5. **Dong, S.**, Mostafizi, A., Wang, H. and Bosa, P., 2016. Post-disaster Mobility in Disrupted Transportation Network: Case Study of Portland, Oregon. In *Seventh China-Japan-US Trilateral Symposium on Lifeline Earthquake Engineering*, Shanghai, China, ASCE. doi.org/10.1061/9780784480342.068

- C6. **Dong, S.**, Wang, H. and Li, J., 2015. Short-Term Forecasting of Highway Capacity through Wavelet Transform and Dynamic Neural Time Series: A Stochastic Analysis (No. 15-5048). *Transportation Research Board 94rd Annual Meeting*, Washington, DC.
- C7. Wang, H., Li, J., Yu, Y. and **Dong, S.**, 2014. Modeling and Analysis of Bottleneck Breakdown on Freeways with Multiple On-Ramps: a Copula Approach (No. 14-0987). *Transportation Research Board 93rd Annual Meeting*, Washington, DC.
- C8. **Dong, S.**, Wang, H., Hurwitz, D. and Heaslip, K., 2014. Vehicle-type Specific Headway Distribution in Freeway Work Zone: A Nonparametric Approach (No. 14-4355). *Transportation Research Board 93rd Annual Meeting*, Washington, DC.

TECHNICAL
PROJECT
REPORTS

- R1. **Dong, S.**, Farahmand, H., and Mostafavi, A.. 2019. Flood Control System - Before and After Harvey. *ASCE IRD - Post-Harvey Resilience Investigation Report*
- R2. Farahmand, H., Sherer, B., **Dong, S.**, and Mostafavi, A.. 2019. Residents and Infrastructure during Disaster Recovery: Priorities, and Attitude Implications for Resilient Planning and Management. *ASCE IRD - Post-Harvey Resilience Investigation Report*
- R3. **Dong, S.**, Mostafizi, A. and Wang, H. 2017. Understanding Interdependencies Between Systems Towards Resilient Critical Lifeline Infrastructure in the Pacific Northwest. *Pacific Northwest Transportation Consortium*.
- R4. McMullen, S. Wang, H., Ke, Y., Vogt, R. and **Dong, S.**, 2016. Road Usage Charge Economic Analysis. No. *FHWA-OR-RD-16-13*.

CONFERENCE
PRESENTATION

- P1. Assessment and Modeling of Water Infrastructure Resilience, *ASCE Infrastructure Resilience Division (IRD) Research Forum: Enabling Resilient and Sustainable Communities*, Reston, VA., 2019
- P2. Assessing and Modeling of the Societal Impacts of Infrastructure Disruptions in Disasters, *ASCE Infrastructure Resilience Division (IRD) Research Forum: Enabling Resilient and Sustainable Communities*, Reston, VA., 2019
- P3. Understanding Interdependencies between Systems towards Resilient Critical Lifeline Infrastructures, 2016. *Engineering Mechanics Institute and Probabilistic Mechanics & Reliability Conference (EMI & PMC)*. Nashville, TN.
- P4. Post-Earthquake Mobility: Portland, *PacTrans Regional Transportation Conference Presentation Competition*. Seattle, WA. (2nd Place), 2015
- P5. Stochastic Modeling of Lifeline Infrastructure Interdependency: A Copula Approach, *2nd Annual Oregon State University College of Engineering Graduate Student Research Exposition*. Portland, OR., (1st Place), 2015
- P6. Short-term Forecasting of Highway Capacity through Wavelet Transform and Dynamic Neural Time Series: A Stochastic Analysis, *Transportation Research Board 94rd Annual Meeting*. Washington D.C., 2015
- P7. A Time-Series Analysis of Highway Capacity: Case Study of Georgia 400, *Traffic Flow Theory and Characteristic Committee Summer Symposium*. Portland, OR., 2014
- P8. Modeling and Analysis of Bottleneck Breakdown on Freeway with Multiple On-Ramps: a Copula Approach, *Transportation Research Board 93rd Annual Meeting*. Washington D.C., 2014
- P9. Vehicle-Type Specific Headway Distribution in Freeway Work Zones: A Nonparametric Approach, *Transportation Research Board 93rd Annual Meeting*. Washington D.C., 2014

INVITED TALKS

- T1. Risk and Resilience Modeling in the Human-Disaster-Built Environment Nexus, *University of Delaware, Department of Civil and Environmental Engineering, Disaster Research Center*, Newark DE. November 2019
- T2. Anatomy of Coupled Human-Infrastructure Systems Resilience to Urban Flooding: Integrated Assessment of Social, Institutional, and Physical Networks, *Urban Flooding Open Knowledge Network (UFOKN)*, Raleigh, NC. November 2019
- T3. An Integrated Physical-Social Analysis on Disrupted Access to Critical Facilities in Urban Flooding, *Oregon State University, School of Civil and Construction Engineering*, Corvallis OR. June 2019
- T4. Disrupted Access to Critical Facilities and Its Societal Impacts in Urban Flooding, *ASCE Infrastructure Resilience Division (IRD) 2019 Research Forum: Enabling Resilient and Sustainable Communities*, Reston, VA. May 2019
- T5. Towards a Smart and Resilient City of Connected Autonomous Vehicle and Interdependent Infrastructure Networks, *University of Hawaii at Manoa, Department of Civil and Environmental Engineering*, Honolulu HI. April 2019
- T6. Towards a Resilient and Sustainable Urban System: Percolation Modeling of Interdependent Infrastructure Networks, *Ohio State University, Department of Civil, Environmental, and Geodetic Engineering*, Columbus, OH. February 2019
- T7. Complex Infrastructure Network Modeling and Simulation, *Texas A&M University, Zachry Department of Civil and Environmental Engineering, CVEN 641*, College Station, TX. March 2019
- T8. Post-disaster Mobility in Disrupted Transportation Network: Case Study of Portland, Oregon. *Portland Metro*. Portland OR. June 2016
- T9. Network-Wide Impacts Of Connected Vehicles On Mobility: An Agent-Based Modeling Approach, *U.S. DOT T3e Webinar*, Online. August 2016

SELECTED RESEARCH PROJECTS

UDRF #21A00986 Integrated Household Vulnerability and Flood Risk Analysis for Equitable Transportation Access to Emergency Medical Services

Principle Investigator

2021.6 – Present

NSF #1832662 CRISP 2.0 Type 2: Anatomy of Coupled Human-Infrastructure Systems Resilience to Urban Flooding: Integrated Assessment of Social, Institutional, & Physical Networks

Leading Postdoctoral Researcher

2018.9 – 2020.8

NSF #1760258 RAPID: Assessment of Risks and Vulnerability in Coupled Human-Physical Networks of Houston's Flood Protection, Emergency Response, and Transportation Infrastructure in Harvey

Leading Postdoctoral Researcher

2018.9 – 2020.8

NSF #1846069 CAREER: Household Network Modeling and Empathic Learning for Integrating Social Equality into Infrastructure Resilience Assessment

Leading Postdoctoral Researcher

2019.2 – 2020.8

NSF #1563618 An Integrated Social Science and Agent-based Modeling Approach to Improve Life Safety from Near-field Tsunami Hazards

Resilience Modeler

2016.6 - 2018.9

TEACHING

Instructor

Fall 2020, CIEG641 Risk Analysis, University of Delaware

Guest Lecturer

Spring 2019, CVEN 641 Construction Engineering Systems, Texas A&M University

Teaching Assistant

Spring 2014, CE491 Transportation Engineering, Oregon State University

Winter 2014, CE392 Introduction to Highway Engineering, Oregon State University

Fall 2013, ENGR 211 Statics, Oregon State University

ADVISING & MENTORING

Committee Member

- Maryam Shaygan, Ph.D. Candidate (UD) 2020.10 – Present
Research: Equilibrium Analysis in Mixed Traffic Environments
- Wanxin Li, Ph.D. Candidate (UD) 2020.10 – Present
Research: Frontiers in Blockchain for Secure Information Sharing in Connected Vehicle Environments
- Di Yuan, Ph.D. Student (UD) 2020.10 – Present
Research: Connected Autonomous Vehicles (CAVs)

Research Adviser

- Hamed Farahmand, Ph.D. Candidate (TAMU) 2018.9 – 2020.8
Research: Resilience assessment of coupled flood control and roadway network
- Qingchun Li, Ph.D. Candidate (TAMU) 2018.9 – 2020.8
Research: Network analysis of human system governing inter-dependent infrastructures
- Amir Esmalian, Ph.D. Candidate (TAMU) 2018.9 – 2020.8
Research: Social impact of infrastructure service disruption
- Xinyu Gao, Ph.D. Student (TAMU) 2019.8 – 2020.8
Research: Disaster impacted network mobility behavior
- Tianbo Yu, M.S. Student (TAMU) 2019.2 – 2020.8
Research: Probabilistic graph modeling of flood control network
- Conner Lutz, Undergraduate Student (TAMU) 2019.5 – 2019.9
Research: Infrastructure network and critical facility mapping

HONORS & AWARDS

- 1st Place, Highway Safety Information System Research Paper Competition 2017
- 1st Place, OSU College of Engineering Graduate Student Research Exposition 2015
- 2nd Place, PacTrans Student Conference Student Research Poster Competition 2015
- Richard and Lilo Smith Fellowship Award Recipient 2015

PROFESSIONAL SERVICES

University of Delaware

- Undergraduate Showcase Recruitment Committee, Department of Civil and Environmental Engineering (CEE), 2020.8 - Present
- Graduate Policy Committee, Department of Civil and Environmental Engineering (CEE), 2021.9 - Present
- Qualifier Committee, DISA program, Disaster Research Center (DRC), 2020.10 - Present
- Space Committee, DISA program, Disaster Research Center (DRC), 2021.9 - Present

Grant Proposal Review

- National Science Foundation (NSF) Reviewer and Panelist, 2020
- Transportation Consortium of South-Central States (Tran-SET) Reviewer, 2020

Conference Committee

- Co-chair, The 20th COTA International Conference of Transportation, Professionals on Advanced Transportation, Enhanced Connection ([CICTP](#)), 2020
- Area Editor, COTA International Symposium on Emerging Trends in Transportation ([ISETT](#)), 2019

Journal Reviewer

- [Journal of the Royal Society Interface](#)
- [Journal of Transportation Engineering](#)
- [Journal of Modern Transportation](#)
- [Journal of Traffic and Transportation Engineering](#)
- [Journal of Management in Engineering](#)
- [Journal of Infrastructure Systems](#)
- [Sustainability](#)
- [Scientific Reports](#)
- [Advances in Mechanical Engineering](#)
- [International Journal of Environmental Research and Public Health](#)
- [International Journal of Disaster Risk Reduction](#)
- [IEEE Transactions on Vehicular Technology](#)
- [IEEE Transactions on Intelligent Transportation Systems](#)
- [Journal of Ambient Intelligence & Humanized Computing](#)
- [Frontiers Built Environment](#)
- [Plos ONE](#)
- [Journal of Emergency Management](#)

Conference Reviewer

- Complex Network ([2018](#))
- Transportation Research Board ([TRB](#)) Annual Meeting (2014, 2015, 2016, 2017, 2018)
- Chinese Overseas Transportation Association ([COTA](#)) [CICTP](#) (2015, 2016, 2017)
- ASCE Construction Research Congress ([CRC](#)) (2020)
- International Symposium on Emerging Trends in Transportation ([ISETT](#)) (2019)