Shangjia Dong

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

University of Delaware — *Newark, Delaware*
Assistant professor in Civil and Environmental Engineering — *2020.08 – Present*
Core Faculty in Disaster Research Center (DRC)
Faculty Member in Sociotechnical Systems Center (SSC)

Texas A&M University — *College Station, Texas*
Postdoctoral Research Associate — *2018.09 – 2020.07*

Oregon State University — *Corvallis, Oregon*
Graduate Research Assistant — *20013.10 – 2018.09*

EDUCATION

Oregon State University — *Corvallis, Oregon*
Ph.D. in Civil Engineering (Transportation) — *2015.11 – 2018.09*
Minor in Computer Sciences

- Dissertation: Percolation Modeling of Transportation Network Robustness Towards a Resilient Infrastructure System: From a Single Network to Interdependent Networks

M.S. in Civil Engineering (Transportation) — *2013.10 – 2015.11*

- Thesis: Stochastic Characterization of Highway Capacity and Its Applications

University of Electronic Science and Technology of China — *Chengdu, Sichuan*
B.S. in Information and Computational Science — *2009.9 – 2013.6*
Dual B.S. in Finance

RESEARCH GRANTS

Awarded

- **Gulf Research Program** Early-Career Research Fellowship: Human Health and Community Resilience track

  Principle Investigator — *2023.07 - Present*

- **DelDOT #DCTR42241224000** Improve Acute Care Accessibility in Facing Changing Flood Risk

  Principle Investigator — *2023.10 – Present*

- **NSF #2209190** Large-scale CoPe: Coastal Hazards, Equity, Economic prosperity, and Resilience (CHEER)

  Senior Personnel *2022.09 – Present*

- **DelDOT #T202266002** Prioritizing Road Flood Mitigation for Access to Critical Services

  Principle Investigator *2022.09 – Present*

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

  Principle Investigator *2021.06 – Present*

REFEREED JOURNAL ARTICLES

* *represents my Ph.D. student*

J1. Rajput, A., Nayak, S., **Dong, S.**, and Mostafavi, A., 2023. Anatomy of Perturbed Traffic Networks during Urban Flooding. *Sustainable Cities and Society*. 104693. doi.org/10.1016/j.scs.2023.104693

J2. Horney JA, Scales SE, Gangwal U, **Dong, S.** 2023 Ensuring access to opioid treatment program services among Delawareans vulnerable to flooding. *Delaware Journal of Public Health. 9(2).* doi.org/10.32481/djph.2023.06.024

J3. Yuan, F., Lee, C., Mobley, W., Farahmand, H., Blessing, R., **Dong, S.**, Mosta favi, A. and Brody., S. 2023. Predicting Road Flooding Risk with Machine LearningApproachesUsingCrowdsourcedReportsandFine-grainedTrafficData. *Computational Urban Science*. doi.org/10.1007/s43762-023-00082-1

J4. **Dong, S.**, Gao, X., Mostafavi, A., Gao, J., and *Gangwal, U., 2023. Characterizing Resilience of Flood-disrupted Dynamic Transportation Network through the Lens of Link Reliability and Stability. *Reliability Engineering & System Safety*. doi.org/10.1016/j.ress.2022.109071

J5. *Gangwal, U., Siders, A., Horney, J., Michael, H., and **Dong, S.**, 2023. Critical Facility Accessibility and Road Criticality Assessment Considering FloodinducedPartialFailure.*SustainableandResilientInfrastructure*,doi.org/10.10 80/23789689.2022.2149184

J6. Hsu, C., Lee, C., Rajput, A., Fan, C., Yuan, F., **Dong, S.**, Esmalian, A., Farahmand H., Patrascu, F., Liu, C., Li, B., Ma, J., and Mostafavi, A., 2022. Quantitativemeasuresforintegratingresilienceintotransportationplanningpractice: Study in Texas. *Transportation Research Part D: Transport and Environment* https://doi.org/10.1016/j.trd.2022.103496

J7. *Gangwal, U., and **Dong, S.**, 2022. Critical facility accessibility rapid failure early-warning detection and redundancy mapping in urban flooding. *ReliabilityEngineering&SystemSafety*,108555.doi.org/10.1016/j.ress.2022.108555

J8. **Dong, S.**, Gao, X., Mostafavi, A., and Gao, J., 2022, Modest flooding can trigger Catastrophic road network collapse due to compound failure. (2022) *Communications Earth & Environment*, doi.org/10.1038/s43247-022-00366-0

J9. Yuan, F., Fan, C., Farahmand, H., Coleman, N., Esmalian, A., Lee, C.C., Patrascu, F.I., Zhang, C., **Dong, S.**, and Mostafavi, A., 2022. Smart flood resilience harnessing community scale big data for predictive flood risk monitoring rapid impact

assessment, and situational awareness. *Environmental Research: Infrastructure and Sustainability 22(2)*, doi.org/10.1088/26344505/ac7251

J10. Esmalian, A. Yuan, F., Rajput, A., Farahmand, H., **Dong, S.**, Li, Q., Gao, X., Fan, C., Lee, C., Hsu, C., Patrascu, F., and Mostafavi, A., 2022. Operationalizing resilience practices in transportation infrastructure planning and project development. *Transportation Research Part D: Transport and Environment*, doi.org/10.1016/j.trd.2022.103214

J11. Farahmand, H., Liu, X., **Dong, S.**, Mostafavi, A., and Gao, J., 2022. A Network Observability Framework for Sensor Placement in Flood Control Networks to Improve Flood Situational Awareness and Risk Management. *Reliability Engineering & System Safety*, 108366. doi.org/10.1016/j.ress.2022.108366

J12. **Dong, S.**, Yu, T., Farahmand, H., and Mostafavi, A. (2022). Predictive Multi-Watershed Flood Monitoring Using Deep Learning on Integrated Physical and Social Sensors Data. *Environment and Planning B: Urban Analytics and City Science*, doi.org/10.1177 /23998083211069140

J13. **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

J14. 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

J15. Li, Z., Yu, H., Zhang, G., **Dong, S.** and Xu, C., 2021. Network-wide traffic signal control optimization using a multi-agent deep reinforcement learning. *Transportation Research PartC:Emerging Technologies*,125,p.103059.doi.org/10.1016/j.trc.2021.103059

J16. Esmalian, A., **Dong, S.**, and Mostafavi, A., 2021. Susceptibility Curves for Humans: Empirical Survival Models for Determining Household-level Disturbances from Hazards-induced Infrastructure Service Disruptions. *Sustainable Cities and Society*. 1026-94. doi.org/10.1016/j.scs.2020.102694

J17. 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

J18. **Dong, S.**, Yu, T., Farahmand, H. and Mostafavi, A., 2020. A Hybrid Deep Learning Model for Urban Flood Prediction and Situation Awareness using ChannelNetworkSensorsData.*Computer-AidedCivilandInfrastructureEngineering* doi.org/10.1111/mice.12629

J19. **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

J20. **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

J21. **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

J22. **Dong, S.**, Wang,H.,andMostafizi,A.andSong,X.,2020.Anetwork-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

J23. **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

J24. **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

J25. **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

J26. Farahmand, H., **Dong, S.**, Mostafavi, A., Berke, P., Woodruff, S., Hannibal, B. and Vedlitz, A., 2019. Institutional Congruence for Resilience Management in InterdependentInfrastructureSystems.*InternationalJournalofDisasterRisk Reduction*. doi.org/10.1 016/j.ijdrr.2020.101515

J27. 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

J28. 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.*ASCENaturalHazardsReview21(2)*.doi.org/10.1061/(ASCE)N H.1527-6996.0000376

J29. 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.o rg/10.1177/0361198119837511

J30. 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/10.1 016/j.ijdrr.2018.12.018

J31. **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

J32. 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

J33. 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**

J34. 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

J35. 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

J36. **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

J37. 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.6676. doi.org/10.3141 /2460-08

INVITED TALKS T1. Disaster-resilient healthcare: Improving critical facility access equity in changing climate, *COTA International Conference of Transportation Professionals (CICTP 2023)* Beijing University of Technology (BJUT), Beijing, China. July 2023

T2. Risk and Resilience Modeling in the Human-Disaster-Built Environment Nexus, *COTA International Conference of Transportation Professionals (CICTP2023)* Beijing University of Technology (BJUT), Beijing, China. July 2023

T3. Improving Critical Facility Accessibility and Equity During Flooding, *International Research Symposium: Resilient City and Digital Transportation. Yangzhou University*, Yangzhou, China. July 2023

T4. Improving Critical Facility Accessibility and Equity in Coastal Communities, *Oregon State University Keiweit Center for Infrastructure and Transportation Research Seminar*, Corvallis, OR. April 2023

T5. Beyond Floodplain: Flood-disrupted Access to Critical Facilities, *Field Seminar, Delaware Floodplain: Impacts of Sea Level Rise, Severe Storms, and Hurricanes in a Low-Lying State*, Lewes DE. July 2022

T6. An Introduction of Network Science in Engineering Research, *NSF REU in Sustainable Resilient Transportation Systems Seminar*, Newark DE. June 2022

T7. Flood-disrupted Transportation Network and Community Well-being, *Delaware Coastal Flooding Workshop*, Newark DE. May 2022

T8. 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

T9. 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

T10. 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

T11. 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

T12. 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

T13. 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

T14. Complex Infrastructure Network Modeling and Simulation, *Texas A&M University, Zachry Department of Civil and Environmental Engineering, CVEN 641*, College Station, TX. March 2019

T15. Post-disaster Mobility in Disrupted Transportation Network: Case Study of Portland, Oregon. *Portland Metro*. Portland OR. June 2016

T16. Network-Wide Impacts Of Connected Vehicles On Mobility: An Agent-Based Modeling Approach, *U.S. DOT T3e Webinar*, Online. August 2016