SHANGJIA DONG

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Education

Oregon State University **Corvallis, Oregon**
Ph.D. in Civil Engineering (Transportation), Minor in Computer Science *2015.11–2018.9*
Dissertation Topic: 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 Topic: Stochastic Characterization of Highway Capacity and Its Applications

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

Research Experience

Post-doctoral Researcher **College Station, Texas**
Texas A&M University, Urban Resilience, Networks, and Informatics Lab *2018.9–Present*

- Combined social vulnerability, emergency response, institutional-physical-social network interdependence, and disaster mitigation planning and policy-making into urban resilience management
- Led 1 NAS Gulf Research Program proposal and 1 Texas Sea Grant proposal in collaboration with Dr. Mostafavi, and mentored 4 junior Ph.D. students and 1 M.S. student to conduct research

Research Assistant **Corvallis, Oregon**
Oregon State University, School of Civil and Construction Engineering *2014.10–2018.9*

- Brought together techniques from Percolation theory, Hazards mapping, and Numerical Simulation to develop a network robustness assessment platform in both independent and interdependent systems, identify the critical threshold of robustness transition, and investigate the network mobility and accessibility in support of case studies in different disruption scenarios
- Involved in development of agent-based tsunami evacuation simulation platform and devise strategies to minimize the life loss through optimized network retrofitting scheme and vertical evacuation shelter distribution
- Worked on 1 NSF projects and 3 projects from government and institutional research consortium, published 10 technical papers, and collaborated with my advisor to develop 2 NSF funding proposals

Teaching Experience

Guest Lecturer
CVEN 641 Construction Engineering Systems, Texas A&M University, Zachry Dept. of CE *Spring 2019*

- Introduced fundamental networks science methods and tools to characterize and analyze the network dynamics
- Demonstrated the analysis process through case studies in organizational networks
- Presented research state-of-art in network science and applications in infrastructure network resilience study
- Developed course materials and taught lab sessions through different case studies. Course is taught by Dr. Ali Mostafavi

Lecturer and Active learner
CE590 Special topic: Engineering Education, Oregon State University, School of CCE *Winter 2016*

- Collaborated and prepare materials with other scholars to co-lecture twice on engineering education topics
- Developed curriculum, syllabus, rubric, and course materials for a future course and solely held one lecture
- Provided critics on other lecturers' teaching performance and also receiving feedback from others. Course is taught by Dr. Shane Brown

○ **Teaching Assistant**
CE392 Introduction to Highway Engineering, Oregon State University, School of CCE   *Winter 2014*

- Assisted lecture and recitation (75 students), held weekly office hours, graded homework, weekly quizzes, and exams, and provide feedback on improving the course materials based on students' performance. Course is taught by Dr. Chris Bell

○ **Recitation Lecturer and Teaching Asistant**
CE491 Transportation Engineering, Oregon State University, School of CCE   *Spring 2014*

- Delivered lectures on traffic flow (60 students), lectured recitations, prepare lab materials, held weekly office hours, and prepare homework, quiz, and exams. Course is taught by Dr. Haizhong Wang

○ **Recitation Lecturer and Teaching Asistant**
ENGR 211 Statics, Oregon State University, School of CCE   *Fall 2013*

- Lectured recitations for three classes (20 students each), hold weekly office hours, and graded homework. Course is taught by Kenny Martin

Publications

Referred Journal Articles

[1] **Shangjia Dong**, Alireza Mostafizi, Haizhong Wang, Jianxi A Gao, and Xiaopeng Li. *"Measuring the topological robustness of transportation networks to disaster-induced failures: A percolation approach"*. Journal of Infrastructure System. (2018) (Under 2nd round review)

[2] **Shangjia Dong**, and Haizhong Wang. *"A percolation-based robustness modeling framework fortransportation network under targeted attack and probabilistic infrastructure failures: Post-disaster accessibility to critical facilities"*. Journal of The Royal Society Interface. (2018). (Under 2nd round review)

[3] **Shangjia Dong**, Haizhong Wang, and Alireza Mostafizi. *"A network-of-networks percolation analysis of cascading failures in spatially co-located road-sewer infrastructure networks"*. Physica A: Statistical Mechanics and Its Application. (2018). (Under 2nd round review)

[4] **Shangjia Dong**, Haizhong Wang, Michael Olsen, Andre Barbosa, and Ben Leshchinsky. "Transportation network connectivity and mobility through percolation modeling of earthquake-induced hazards". Earthquake Spectra. (2018) (Under submission).

[5] **Shangjia Dong**, Alireza Mostafizi, Haizhong Wang, and Jia Li. *"A stochastic analysis of highway capacity: Empirical evidence and implications"*. Journal of Intelligent Transportation Systems 22, no. 4 (2018): 338-352. **pdf**

[6] **Shangjia Dong**, Haizhong Wang, David Hurwitz, Guohui Zhang, and Jianjun Shi. *"Nonparametric modeling of vehicle-type-specific headway distribution in freeway work zones"*. Journal of Transportation Engineering 141, no. 11 (2015): 05015004. **pdf**

[7] Alireza Mostafizi, Haizhong Wang, and **Shangjia Dong**. *"Understanding the Multimodal Evacuation Behavior for a Near-field Tsunami"*. Transportation Research Record: Journal of the Transportation Research Board (2019) (Accepted)

[8] Hamed Farahmand, **Shangjia Dong**, Ali Mostafavi, Philip R. Berke, Arnold Vedlitz, Sierra C. Woodruff, Bryce Hannibal. *"Congruence of Institutions in Management of Resilience in Interdependent Infrastructure Systems"* Natural Hazards. (2019) (Under Review)

[9] Amir Esmalian, **Shangjia Dong**, Natalie Coleman, and Ali Mostafavi. *"Determinants of Social Inequality due to Power Outage in Extreme Weather Events: A Household Service Gap Model"*. Risk Analysis. (2018). (Under Review).

[10] Qingchun Li, **Shangjia Dong**, and Ali Mostafavi. *"A meta-network framework for modeling coupled actors-institutions-infrastructure networks in urban resilience assessment"*. ASCE Natural Hazards Review. (2018). (Under 2nd round review).

[11] Alireza Mostafizi, Haizhong Wang, **Shangjia Dong,** and Dan Cox. *"An Agent-Based Model of Vertical Tsunami Evacuation Behavior and Shelter Locations: A Multi-Criteria Decision-Making Problem"*. International Journal of Disaster Risk Reduction. (2018). **pdf**.

[12] Alireza Mostafizi, Haizhong Wang, Dan Cox, Lori A Cramer, and **Shangjia Dong**. *"Agent-based tsunami evacuation modeling of unplanned network disruptions for evidence-driven resource allocation and retrofitting strategies"*. Natural Hazards. 88(3):1347–1372. (2017). **pdf**.

[13] Jason C. Anderson, and **Shangjia Dong**. *"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, no. 9 (2017): 41. (Best Paper Award **pdf**)

[14] Alireza Mostafizi, **Shangjia Dong**, and Haizhong Wang. *"Percolation phenomenon in connected vehicle network through a multi-agent approach: Mobility benefits and market penetration"*. Transportation Research Part C: Emerging Technologies, 85:312–333, (2017). **pdf**.

[15] Haizhong Wang, Lu Liu, **Shangjia Dong**, Zhen Qian, and Heng Wei. *"A novel work zone short-term vehicle-type specific traffic speed prediction model through the hybrid EMD–ARIMA framework."* Transportmetrica B: Transport Dynamics 4, no. 3 (2016): 159-186. **pdf**

[16] Haizhong Wang, Lu Liu, Zhen Qian, Heng Wei, and **Shangjia Dong**. *"Empirical mode decomposition-autoregressive integrated moving average: Hybrid short-term traffic speed prediction model"*. Transportation Research Record: Journal of the Transportation Research Board 2460 (2014): 66-76. **pdf**

Referred Conference Articles

[1] **Shangjia Dong**, Alireza Mostafizi, Haizhong Wang, and Peter Bosa. *"Post-disaster mobility in disrupted transportation network: Case study of Portland, Oregon"*. Seventh China-Japan-US Trilateral Symposium on Lifeline Earthquake Engineering. (2016). **pdf**.

[2] **Shangjia Dong**, Haizhong Wang, Michael Olsen, Andre Barbosa, and Ben Leshchinsky. *"An Integrative Framework to Measure the Impacts of Earthquake-induced Landslides on Transportation Network Mobility and Accessibility"*. Eighth China-Japan-US Trilateral Symposium on Lifeline Earthquake Engineering. (2018) (Accepted)

[3] **Shangjia Dong**, Haizhong Wang, and Jia Li. *"Short-Term Forecasting of Highway Capacity through Wavelet Transform and Dynamic Neural Time Series: A Stochastic Analysis"*. Transportation Research Board 94th Annual Meeting. Washington DC. No. 15-5048. (2015).

[4] Alireza Mostafizi, **Shangjia Dong**, and Haizhong Wang. *"Understanding the Multimodal Evacuation Behavior for a Near-field Tsunami"*. Transportation Research Board 98th Annual Meeting. Washington DC. No. 19-05051. (2019) (Accepted)

[5] Qingchun Li, **Shangjia Dong**, Ali Mostafavi. *"Modeling of Inter-organizational Coordination Dynamics in Resilience Planning: A Multilayer Network Simulation Framework"*. ASCE International Conference on Computing in Civil Engineering. (2019) (Accepted)

[6] Haizhong Wang, Jia Li, Yang Yu, and **Shangjia Dong**. *"Modelling and Analysis of Bottleneck Breakdown on Freeways with Multiple On-Ramps: a Copula Approach"*. Transportation Research Board 93rd Annual Meeting. Washington DC. No. 14-0987. (2014).

Techical Reports

[1] **Shangjia Dong**, Alireza Mostafizi, Haizhong Wang, *"Understanding Interdependencies Between Systems Towards Resilient Critical Lifeline Infrastructure in the Pacific Northwest"*. Pacific Northwest Transportation Consortium. (2017)

[2] Starr B. McMullen, Haizhong Wang, Yue Ke, Rachel Vogt, and **Shangjia Dong**. *"Road Usage Charge Economic Analysis"*. No. FHWA-OR-RD-16-13. (2016). **pdf**

Presentations

[1] Understanding Interdependencies between Systems towards Resilient Critical Lifeline Infrastructures, *Engineering Mechanics Institute and Probabilistic Mechanics & Reliability Conference (EMI & PMC)*. Nashville, TN. (2016)

[2] Network-Wide Impacts Of Connected Vehicles On Mobility: An Agent-Based Modeling Approach, *U.S. DOT T3e Webinar*. Corvallis, OR. (2016)

[3] Post-Earthquake Mobility: Portland, *PacTrans Regional Transportation Conference Poster Competition*. Seattle, WA. (2015) (2nd Place)

[4] Stochastic Modeling of Lifeline Infrastructure Interdependency: A Copula Approach, *2nd Annual Oregon State University College of Engineering Graduate Student Research Exposition*. Portland, OR. (2015) (1st Place)

[5] 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)

[6] A Time-Series Analysis of Highway Capacity: Case Study of Georgia 400, *Traffic Flow Theory and Characteristic Committee Summer Symposium*. Portland, OR. (2014)

[7] Modeling and Analysis of Bottleneck Breakdown on Freeways with Multiple On-Ramps: a Copula Approach, *Transportation Research Board 93rd Annual Meeting*. Washington D.C. (2014)

[8] Vehicle-Type Specific Headway Distribution in Freeway Work Zones: A Nonparametric Approach, *Transportation Research Board 93rd Annual Meeting*. Washington D.C. (2014)

Selected Projects

○ **NSF #1832662 CRISP 2.0 Type 2: Anatomy of Coupled Human-Infrastructure Systems Resilience to Urban Flooding: Integrated Assessment of Social, Institutional, & Physical Networks** (2018.9 - Present)
Principle Post-doctoral Researcher

- Leading infrastructure network research division (advising 3 Ph.D. Student, 1 M.S. student, and 1 undergraduate student) to analyze the network resilience in urban flooding
- Coordinating interdisciplinary meeting of different sub-research groups and building collaborative synergy
- Assessing the drainage network vulnerability and forecasting the network flooding probability in extreme weather events
- Examining the interdependency between physical infrastructure and organizations, and the congruence within and across systems
- Integrating infrastructure resilience analysis and human system vulnerability to inform policy and hazard mitigation plan making

○ **NSF CMMI #1563618: An Integrated Social Science and Agent-based Modeling Approach to Improve Life Safety from Near-field Tsunami Hazards** (2016.6 - 2018.9)
Resilience Molder

- Conducted the network vulnerability assessment to systematically characterize the importance of each link to the overall network resilience
- Quantified the impacts of unplanned network disruptions to the critical links on network resilience and retrofitting planning
- Created an evidence-driven retrofitting resource allocation framework
- Optimized vertical evacuation shelter site distribution to minimize the life loss during evacuation

CLiP program: Lifeline Network Resiliency And Recovery For Emergency Response

○ (2014.9 - 2018.9)
Principle Researcher

- Identified major arterial in Portland, Oregon that can be utilized in post-disaster recovery efforts
- Investigated bridge failure on network mobility and assess bridge critically
- Evaluate earthquake-induced hazards impacted network mobility and accessibility

PacTrans: Understanding Interdependence Between Systems Towards Resilient Critical

○ **Lifeline Infrastructure in the Pacific Northwest** (2015.12 - 2016.12)
Principle Researcher

- Identified the interdependent relationship among critical infrastructure system and develop network-of-networks analysis framework to characterize the network interactions
- Modeled the cascading failure between inter-connected systems and simulate the destructive effect of the cascading failure in different disruption scenarios

Characterizing the System Impact of Connected/Autonomous Vehicle in Transition Phase

○ (2016.6 - 2018.9)
Model developer

- Explored the impact of centralized information on network mobility (i.e. average network travel time) with mixed connected and non-connected vehicle
- Modeled the interdependence between infrastructure network and connected vehicle network using agent-based modeling approach
- Unveiled the mobility percolation phenomenon and identify the transition threshold in the connected vehicle network with varying market penetration and connection range

Honors and Awards

1st Place	Highway Safety Information System Research Paper Competition	2017
1st Place	Oregon ITE 25th Annual Bill Kloos Traffic Bowl	2016
2nd Place	ITE Western District Annual Meeting Traffic Bowl	2016
1st Place	OSU College of Engineering Graduate Student Research Exposition	2015
2nd Place	PacTrans Student Conference Student Research Poster Competition	2015
Recipient	Richard and Lilo Smith Fellowship Award	2015

Professional Services

Reviewers for Journal Manuscript Submissions

Journal of the Royal Society Interface (JRSIF)
Journal of Transportation Engineering (JTE)
Journal of Modern Transportation (JMTR)
Journal of Traffic and Transportation Engineerin (JTTE)
Advances in Mechanical Engineering (AIME)

Reviewers for Conference Manuscript Submissions

Complex Network 2018
Transportation Research Board (TRB) Annual Meeting (2014-2018)
Chinese Overseas Transportation Association (COTA) CICTP (2015-2017)