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*

  - Conducted research on multiple projects (NSF RAPID#1760258, NSF CRISP 2.0 Type 2 #1832662, NSF CAREER #1846069) on resilience investigation of coupled human-infrastructure network to inform the emergency response, hazard mitigation and resilience management
  - Authored and co-authored 7 Journal papers and 4 conference papers
  - Led writing of 1 NAS Gulf Research Program proposal ($1.5M, Not funded) and 1 Texas Sea Grant proposal (Under review, $300k) in collaboration with Dr. Mostafavi, contributed to 1 Belmont forum DR3 research proposal (Under review, $300k), and finished 1 NSF RAPID project report
  - Obtained formal training on grant proposal writing through a series of lectures and workshops
  - Engaged in TAMU CIRTL future faculty program and teaching excellence certificate
  - Guest-lectured one module (4 weeks) of a graduate-level course (16 Students)
  - Mentored 4 Ph.D. students, 1 M.S. student, and 1 undergraduate student to conduct research on interdisciplinary urban resilience topics

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

  - Developed a percolation modeling and simulation framework to investigate transportation network robustness in different disruption scenarios
  - Integrated network access to critical facilities in post-disaster network robustness evaluation and provided empirical evidence for resilience enhancement
  - Simulated cascading failure in co-located transportation and sewer network and revealed multiple phase transitions in the percolation process
  - Provided support on agent-based tsunami evacuation simulation platform development and devised strategies to minimize the life loss through optimized network retrofitting scheme and vertical evacuation shelter siting
  - Authored and co-authored 12 journal papers and 4 conference papers
  - Worked on 1 NSF projects and 3 projects from the government (ODOT) and institutional research consortium (PacTrans, CLiP)
  - Contributed to the development of 2 NSF (CMMI#1826407, CMMI#1563618), 2 PacTrans, and 1 CLiP funded project proposals

Teaching Experience

- **Teaching Excellence Participant**
  HELLO^2 Teaching Certificate Program, Texas A&M University *Fall 2019*
  - Learned methods on course & syllabus development, learning outcomes design, interactive class instrument, active learning, student motivation & engagement, and performance evaluation.
  - Interacted with teaching excellence instructional consultant on course development, assignment design and assessment (e.g. projects, exams, presentations)
  - Conducted classroom observation on course delivery methods
  - Practiced to develop student-centered teaching techniques in the design of courses, materials, assessments, and activities that advance effective teaching practices and promote diversity and inclusion of all students in the learning process

- **Guest Lecturer**
  CVEN 641 Construction Engineering Systems, Texas A&M University *Spring 2019*
  - Developed course module and instructed the lecture sessions and labs for 4 weeks (16 students).
  - Introduced fundamental network concepts and tools to characterize and analyze the network dynamics
  - Demonstrated the network analysis through case studies in organizational networks
  - Presented state-of-art research in network sciences and applications in infrastructure network resilience study
  - Received a student evaluation rate of 4.67 (out of 5). Course is taught by Dr. Ali Mostafavi

- **Lecturer and Active learner**
  CE590 Special topic: Engineering Education, Oregon State University *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 *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 *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 *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**, and Haizhong Wang. *"A percolation-based robustness modeling framework for transportation network under targeted attack and probabilistic infrastructure failures: Post-disaster accessibility to critical facilities"*. Journal of The Royal Society Interface. 15 (157) (2019). **pdf**

[2] **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. (2019) (In press)

[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). **pdf**

[4] **Shangjia Dong**, Amir Esmalian, Hamed Farahmand, and Ali Mostafavi. *"An Integrated Physical-Social Analysis of Disrupted Access to Critical Facilities and Community Service-loss Tolerance in Urban Flooding"*. Computers, Environment and Urban Systems. (2019) (Under 2nd round review)

[5] **Shangjia Dong**, Qingchun Li, Hamed Farahmand, Ali Mostafavi, Philip Berke, and Arnold Vedlitz. *"Institutional Connectedness in Resilience Planning and Management of Interdependent Infrastructure Systems"*. ASCE Journal of Management in Engineering. (2019) (Under review)

[6] **Shangjia Dong**, Tianbo Yu, Hamed Farahmand, Ali Mostafavi. *"Bayesian Modeling of Flood Control Networks for Failure Cascade Characterization and Vulnerability Assessment"*. Computer-Aided Civil and Infrastructure Engineering. (2019) (Under 2nd round review)

[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) **pdf**

[8] Qingchun Li, **Shangjia Dong**, and Ali Mostafavi. *"Modeling of Inter-organizational Coordination Dynamics in Resilience Planning of Infrastructure Systems: A Multilayer Network Simulation Framework"*. Plos ONE. (2019) (In press)

[9] 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 2nd round Review)

[10] **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**

[11] 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 2nd round Review).

[12] 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).

[13] 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**.

[14] 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**.

[15] 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**)

[16] 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**.

[17] 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**

[18] **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**

[19] 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**

[20] Li Chen, Benli Li, **Shangjia Dong**, and Heping Pan. *"A combined CFAHP-FTOPSIS approach for portfolio selection."* China Finance Review International 3, no. 4 (2013): 381-395. **pdf**

Referred Conference Articles

[1] Qingchun Li, **Shangjia Dong**, Ali Mostafavi. *"Network Analysis of Collective Action in Resilience Planning of Interdependent Infrastructure."* ASCE Construction Research Congress 2020. Tempe, AZ. (2019) (Accepted)

[2] Hamed Farahmand, **Shangjia Dong**, Ali Mostafavi. *"Vulnerability Assessment in Co-located Flood Control and Transportation Networks"*. ASCE Construction Research Congress 2020. Tempe, AZ. (2019) (Accepted)

[3] Amir Esmalian, **Shangjia Dong**, Ali Mostafavi. *"Empirical Assessment of Household Susceptibility to Hazards-induced Prolonged Power Outages"*. ASCE Construction Research Congress 2020. Tempe, AZ. (2019) (Accepted)

[4] **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**.

[5] **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).

[6] 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)

[7] 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)

[8] 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**, Ali Mostafavi, Philip Berke, Sierra Woodruff, Bryce Hannibal, and Arnold Vedlitz. *"Household Network Modeling and Empathic Learning for Integrating Social Equality into Infrastructure Resilience Assessment"*. NSF RAPID Final Report. (2019)

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

[3] 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] Assessment and Modeling of Water Infrastructure Resilience, *ASCE Infrastructure Resilience Division (IRD) Research Forum: Enabling Resilient and Sustainable Communities*, Reston, VA., (2019)

[2] Disrupted Access to Critical Facilities and Its Societal Impacts in Urban Flooding, *ASCE Infrastructure Resilience Division (IRD) Research Forum: Enabling Resilient and Sustainable Communities*, Reston, VA., (2019)

[3] Complex Infrastructure Network Modeling and Simulation, *Texas A&M University, Zachry Department of Civil and Environmental Engineering, CVEN 641*, College Station, TX. (2019)

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

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

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

[7] 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)

[8] 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)

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

[10] 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)

[11] 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
  - Led 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
  - Coordinated interdisciplinary meeting of different sub-research groups and building collaborative synergy
  - Assessed the drainage network vulnerability and forecasting the network flooding probability in extreme weather events
  - Examined the interdependency between physical infrastructure and organizations, and the congruence within and across systems
  - Integrated infrastructure resilience analysis and human system vulnerability to inform policy and hazard mitigation plan making

- **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**
  (2018.9 - Present)
  Principle Post-doctoral Researcher

  -Mapped, modeled and analyzed decision-making processes and human system networks in interdependent infrastructure systems
  - Examined the properties of the actor collaboration network and to analyze how they influence the land use planning and hazard mitigation
  - Evaluated the extent to which organizations have similar, agreed upon, or harmonized institutions (such as norms, values, and regulatory frameworks)
  - Assessed the extent to which infrastructure interdependence has been considered in hazard mitigation, infrastructure development, and resilience plans

- **NSF #1846069: CAREER: Household Network Modeling and Empathic Learning for Integrating Social Equality into Infrastructure Resilience Assessment**
  (2019.2 - Present)
  Principle Post-doctoral Researcher

  - Empirically characterized the influence of household-level socio-demographic characteristics, expectations, norms, and other factors on household's zone of tolerance when infrastructure disruptions occur
  - Analyzed the interplay between infrastructure networks and household social networks to examine the spatial patterns of risk disparity among different sub-populations at the urban scale

- **NSF #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-net -works 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

Area Editor, 2019 COTA International Symposium on Emerging Trends in Transportation (ISETT)
Active member, *2019*, The Resilience Community
Active member, *2018* ASCE Infrastructure Resilience Division
Events Director, *2017*Oregon State University ITE Student Chapter
Webmaster, *2016*, Oregon State University ITE Student Chapter
Events Coordinator, *2015* Oregon State University ITE Student Chapter

Review 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)
Journal of Management in Engineering (JME)
Journal of Infrastructure Systems (JIS)
Computer-Aided Civil and Infrastructure Engineering (CACIE)
Advances in Mechanical Engineering (AIME)
Frontiers Built Environment (FBE)

Reviewers for Conference Manuscript Submissions

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