

# Neetesh Sharma

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scholar.google.com/citations?user=o-a0IBwAAAAJ

## Current Position

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### Florida State University

Assistant Professor  
Civil & Environmental Engineering,  
FAMU-FSU College of Engineering

Tallahassee, FL  
August 2024 - Present

## Education

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### University of Illinois Urbana-Champaign, CGPA:3.94/4.0

Ph.D. in Civil Engineering with minor in Statistics

Advisor: Professor Paolo Gardoni

Program: Societal Risk and Hazard Mitigation

M.S. in Civil Engineering

Advisor: Professor Paolo Gardoni

Program: Construction Management

Urbana, IL

2016–2020

2014–2016

### National Institute of Technology, Tiruchirappalli, CGPA:9.3/10.0

B.Tech. in Civil Engineering

Tiruchirappalli, India

2006–2010

## Employment History

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### Adjunct Lecturer and Postdoctoral Scholar

Stanford University

Stanford, CA

October 2022 – July 2024

### Postdoctoral Research Associate

University of Illinois Urbana-Champaign

Urbana, IL

January 2021 – October 2022

### Intern

AXIS Specialty U.S. Services, Inc.

Champaign, IL

August 2021 – November 2021

### Graduate Research/Teaching Assistant

University of Illinois Urbana-Champaign

Urbana, IL

January 2015 – December 2020

### Data Science Intern

Farmer's Business Network, Inc.

San Carlos, CA

May 2019 – August 2019

### Assistant Manager (Construction)

National Thermal Power Corporation Ltd.

New Delhi, India

August 2010 – August 2014

## Research Interests

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Risk mitigation and disaster recovery; infrastructure and socioeconomic resilience; sustainability; reliability, decision making under uncertainty; performance assessment of deteriorating systems; modeling socioeconomic impacts of natural hazards; uncertainty quantification; statistical modeling and machine learning; project management and optimization.

## Awards and Honors

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- **Travel Fellowship for Catastrophe Modeling and Data Workshop, NYC** 2023  
National Science Foundation
- **Travel Fellowship for 2022 SimCenter Symposium, Austin, TX** 2022  
NHERI SimCenter  
University of California, Berkeley
- **CERRA Student Recognition Award** 2019  
for the paper "Recovery Optimization of Interdependent Infrastructure: A Multi-Scale Approach,"  
13th International Conference on Applications of Statistics and Probability in Civil Engineering
- **Conference Travel Fellowship** 2016  
Department of Civil and Environmental Engineering  
University of Illinois at Urbana-Champaign
- **Gold Medal** 2010  
Department Rank 1 in Civil Engineering  
National Institute of Technology Tiruchirappalli, India
- **Outstanding Student of Civil Engineering** 2010  
RECAL, NIT Tiruchirappalli Alumni Association  
National Institute of Technology Tiruchirappalli, India
- **Dr. M Shanmugham Endowment Award** 2010  
National Institute of Technology Tiruchirappalli, India

## Publications

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- Published journal papers (8), First author (4), Accepted (2), In preparation (2)
- h-index (11), Citations (735)

### Journal Papers.....

#### *Published*

- [J-8] Tabandeh, A., **Sharma, N.**, and Gardoni, P. (2023). "Seismic risk and resilience analysis of networked industrial facilities." *Bulletin of Earthquake Engineering*, DOI: 10.1007/s10518-023-01728-5.
- [J-7] Tabandeh, A., **Sharma, N.**, Iannacone, L., and Gardoni, P. (2022). "Numerical Solution of the Fokker-Planck Equation using Physics-based Mixture Models." *Computer Methods in Applied Mechanics and Engineering*, 399, 115424.
- [J-6] Tabandeh, A., **Sharma, N.**, and Gardoni, P. (2021). "Uncertainty Propagation in Risk and Resilience Analysis of Hierarchical Systems." *Reliability Engineering and System Safety*, 219, 108208.
- [J-5] **Sharma, N.**, and Gardoni, P. (2021). "Mathematical Modeling of Interdependent Infrastructure: An Object-Oriented Approach for Generalized Network-System Analysis." *Reliability Engineering and System Safety*, 217, 108042.
- [J-4] Iannacone, L., **Sharma, N.**, Tabandeh, A., and Gardoni, P. (2021). "Modeling Time-Varying Reliability and Resilience of Deteriorating Infrastructure." *Reliability Engineering and System Safety*, 217, 108074.

- [J-3] **Sharma, N.**, Nocera, F., and Gardoni, P. (2021). "Classification and Mathematical Modeling of Infrastructure Interdependencies." *Sustainable and Resilient Infrastructure*, 6(1-2), 4–25.
- [J-2] **Sharma, N.**, Tabandeh, A., and Gardoni, P. (2020). "Regional Resilience Analysis: A Multi-Scale Approach to Optimize the Recovery of Interdependent Infrastructure." *Computer-Aided Civil and Infrastructure Engineering*, 35(12), 1315-1330.
- [J-1] **Sharma, N.**, Tabandeh, A., and Gardoni, P. (2018). "Resilience Analysis: A Mathematical Formulation to Model Resilience of Engineering Systems." *Sustainable and Resilient Infrastructure*, 3(2), 49–67.

*To be published*

- [J-12] **Sharma, N.**, and Baker, J. W. (2023). "Scenario selection optimization for multi-hazard analysis." (in preparation).
- [J-11] **Sharma, N.**, Kamouh, O., Nogal, M., and Gardoni, P. (2023). "Impact of Crew Productivity and Worker Fatigue on Regional Resilience of Infrastructure." (in preparation).
- [J-10] Yu, J., **Sharma, N.**, and Gardoni, P. (2023). "Functional Connectivity Analysis for modeling flow in infrastructure." *Reliability Engineering and System Safety* (accepted).
- [J-9] Yu, Y-C., **Sharma, N.**, and Gardoni, P. (2023). "Protocol for the validation of models for regional risk analysis." *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering* (accepted).

**Book/Chapters**.....

- [B-3] Ayyub, B. M., Butry, D., Davis, C. A., Malushte, S. R., Medina, R.A., Reda Taha, M., Van de Lindt, J. W., Brett, C. R., Daghash, S., Field, C., Fung, J., Gardoni, P., McNeil, S., Moreu, F., Mostatavi, A., Saadat, Y., **Sharma, N.**, Soga, K., Soliman, E., Sutley, E. J., Tabandeh, A., Thomas, D., Vugrin, E., and Wright, R. N. (2021). *Hazard-Resilient Infrastructure: Analysis and Design*. Reston, VA: American Society of Civil Engineers.
- [B-2] **Sharma, N.**, Tabandeh, A., and Gardoni, P. (2019). "Regional Resilience Analysis: A Multi-Scale Approach to Model the Recovery of Interdependent Infrastructure." In *Handbook of Sustainable and Resilient Infrastructure*, Edited by P. Gardoni, Routledge.
- [B-1] **Sharma, N.**, and Gardoni, P. (2019). "Modeling the Time-Varying Performance of Electrical Infrastructure During Post Disaster Recovery Using Tensors." In *Handbook of Sustainable and Resilient Infrastructure*, Edited by P. Gardoni, Routledge.

**Conference Proceedings and Presentations**.....

- [C-11] **Sharma, N.**, and Baker, J. W. (2024). "Selecting Earthquake Scenarios for Regional Risk Analysis, ." In *Proceedings of the 18th World Conference on Earthquake Engineering (WCEE18)*, (submitted).
- [C-10] **Sharma, N.**, and Gardoni, P. (2023). "Modeling the economic impact of utility damage." In *Proceedings of the 14th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP14)*, Dublin, Ireland.
- [C-9] Yu, J., **Sharma, N.**, and Gardoni, P. (2023). "Functional Connectivity Analysis (FCA): An efficient method to model infrastructure functionality." In *Proceedings of the 14th International Conference on Applications of*

*Statistics and Probability in Civil Engineering (ICASP14)*, Dublin, Ireland. [CERRA Student Recognition Award]

- [C-8] Yu, Y-C., **Sharma, N.**, and Gardoni, P. (2023). "Validating the Current State of Practice for Risk (and Resilience) Analysis." In *Proceedings of the 14th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP14)*, Dublin, Ireland.
- [C-7] **Sharma, N.** and Gardoni, P. (2022). "High-fidelity performance of interdependent infrastructure." In *Proceedings of the 13th International Conference on Structural Safety & Reliability (ICOSSAR 2021-2022)*, Shanghai, China.
- [C-6] **Sharma, N.**, Tabandeh, A., Gardoni, P., and Murphy, C. (2022). "Modeling and Evaluating the Impact of Natural Hazards on Communities and their Recovery." In *Proceedings of the European Conference on Safety and Reliability (ESREL 2022)*, Dublin, Ireland.
- [C-5] **Sharma, N.**, Nocera, F., and Gardoni, P. (2022). "Quantifying the resilience of interdependent infrastructure." In *Proceedings of ASCE Lifelines Conference 2021-2022*, Los Angeles, USA.
- [C-4] Tabandeh, A., Nocera, F., **Sharma, N.**, and Gardoni, P. (2021). "Digital Twins of Infrastructure." In *Proceedings of the 31st European Safety and Reliability Conference*, Angers, France, DOI: 10.3850/978-981-18-2016-8\_222-cd.
- [C-3] **Sharma, N.**, and Gardoni, P. (2021). "Quantitative modeling of regional resilience." *Engineering Mechanics Institute Conference*, New York, NY.
- [C-2] **Sharma, N.**, Tabandeh, A., and Gardoni, P. (2019). "Recovery Optimization of Interdependent Infrastructure: A Multi-Scale Approach." In *Proceedings of the 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP13)*, Seoul, Korea. [CERRA Student Recognition Award]
- [C-1] **Sharma, N.**, Gardoni, P., and Tabandeh, A. (2016). "A Stochastic Formulation to Model Resilience of Engineering Systems." *Engineering Mechanics Institute Conference*, Nashville, TN.

**Poster Presentations**.....

- [P-3] **Sharma, N.**, Baker, J. W. (2023). Long-term economic impacts of utility damage. *PEER Annual Meeting*, Berkeley, CA.
- [P-2] **Sharma, N.**, Tabandeh, A., and Gardoni, P. (2019). Regional Resilience Analysis: Modeling, Optimization, and Uncertainty Quantification. *Colorado State University*, Fort Collins, CO.
- [P-1] Ellingwood, B., Nozhati, S., Chong, E.K.P., Sarkale, Y., van de Lindt, J.W., Gardoni, P., Nocera, F., **Sharma, N.**, Peacock, W.G., Rosenheim, N., Goldberg D., and Kruse, J.B. (2018). Scalable Decision Model to Achieve Local and Regional Resilience of Interdependent Critical Infrastructure Systems and Communities. *Critical Resilient Interdependent Infrastructure Systems and Processes: A CRISP/RIPS Grantees Workshop*, Arlington, VA.

## Research Experience

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### Stanford University

### Postdoctoral Scholar

#### *Socio-economic resilience*

2022–Present

- Modeling the impact of damage to physical systems and infrastructure service disruption on the regional economy
- Modeling the interdependency mechanisms among the structural, functional, and socio-economic recoveries of disaster-affected communities

#### *Earthquake scenario selection for regional risk assessment*

2022–Present

- Selecting earthquake scenarios while preserving the joint distributions of regional ground-motion intensities and impacts

### University of Illinois at Urbana-Champaign

### Postdoctoral Research Associate

#### *Disaster Preparedness Planning* (Mississippi Emergency Management Agency)

2021–2022

- Developed estimates of expected structural damage, infrastructure functionality loss, and economic losses due to earthquake hazards originating from the New Madrid Seismic Zone in the central USA

#### *Risk-Based Community Resilience Planning* (NIST-funded Center of Excellence)

2020–2022

- Developed a general mathematical formulation for high-fidelity analysis of infrastructure and rigorous mathematical modeling of infrastructure interdependencies
- Developed a multi-fidelity approach to uncertainty quantification in high-dimensional problems such as regional resilience analysis
- Developed physics-based recovery models for deteriorating water infrastructure

#### *Insured loss prediction for business interruption due to hurricanes* (Office of Risk Management and Insurance Research at University of Illinois)

2020–2021

- Developed automated approaches to generate infrastructure inventory, functionality models, and financial valuation
- Developed a mathematical formulation for estimating value at risk and insured losses subject to natural hazards

### University of Illinois at Urbana-Champaign

### Graduate Research Assistant

#### *Risk-Based Community Resilience Planning* (NIST-funded Center of Excellence)

2016–2020

- Developed the first orthogonal classification of infrastructure interdependencies
- Developed a multi-scale approach for the post-disaster recovery modeling and optimization of interdependent infrastructure
- Implemented the proposed approach for the regional resilience optimization of the Memphis Metro Statistical Area

#### *Scalable Decision Model to Achieve Local and Regional Resilience of Interdependent Critical Infrastructure Systems and Communities* (NSF-funded)

2016–2020

- Developed a new mathematical formulation for the recovery modeling and resilience analysis of deteriorating engineering systems
- Implemented the proposed approach for the interdependent recovery of power and transportation infrastructure of Clatsop County, Oregon

## Teaching Experience

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### Stanford University

**Adjunct Lecturer**

Disaster Resilience Seminar (CEE 209S)

Fall 2022, Fall 2023

### University of Illinois at Urbana-Champaign

**Graduate Teaching Assistant**

Undergraduate course on Systems Engineering and Economics (CEE 201)

Fall 2020

Undergraduate course on Engineering risk and uncertainty (CEE 202)

Spring 2020, Fall 2019

Undergraduate course on Introduction to Computer Science (CS 101)

Fall 2016, Spring 2016, Fall 2015

Undergraduate course on Discrete Mathematics (CS 172)

Spring 2015

## Professional Service

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### Conference Organization

*ASCE UCLA Lifelines 2022 Conference*

February 2022

- Co-chair for two sessions on Risk and Resilience of Interdependent Infrastructure

### Journal Reviewer

Earthquake Spectra

Scientific Reports

Probabilistic Engineering Mechanics

Operations Research Forum

Reliability Engineering & System Safety

Natural Hazards Review

Structure and Infrastructure Engineering

Sustainable and Resilient Infrastructure

Journal of Infrastructure Systems

## Industrial Experience

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### AXIS Specialty U.S. Services, Inc.

**Intern**

*Catastrophe risk modeling*

Fall 2021

- Developed insurance claims datasets to validate models for direct damage and business interruption loss from floods, hurricanes, and wildfires

### Farmer's Business Network, Inc.

**Data Science Intern**

*Credit risk modeling*

Summer 2019

- Developed a machine learning model to estimate the probability of default on farm loan repayments

*Supply chain optimization*

Summer 2019

- Identified numbers and locations of warehouses for optimal delivery times of farm inputs across the US

*Crop insurance*

Summer 2019

- Developed a novel mathematical formulation for crop insurance pricing

**NTPC, Ltd.**

**Assistant Manager (Construction)**

*Power plant construction*

2011–2014

- Led the construction of turbine-generator support deck and chimney at Kudgi Super Thermal Power Project (5x800MW with a total project cost of \$2.9 billion)

*Familiarization to power sector economics*

2010–2011

- Received training in finance, contracts, procurement, safety, total quality management, 5S and 6Sigma at Power Management Institute, Noida, India