

## EUN JEONG CHA

Assistant Professor  
Department of Civil and Environmental Engineering  
University of Illinois at Urbana-Champaign  
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### EDUCATION

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**Ph.D., Civil Engineering, Georgia Institute of Technology, Atlanta, GA**  
**M.S., Civil Engineering, Georgia Institute of Technology, Atlanta, GA**  
**B.S., Architectural Engineering, Seoul National University, Seoul, South Korea**

### POSITIONS HELD

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**Assistant Professor (1/2014-Present)**  
Department of Civil and Environmental Engineering  
University of Illinois at Urbana-Champaign

**Part-time Research Faculty (8/2013-12/2013)**  
Department of Mechanical Engineering  
Georgia Institute of Technology

**Postdoctoral Research Fellow (8/2012-8/2013)**  
Department of Civil and Environmental Engineering  
Georgia Institute of Technology

**Instructor (1/2012-12/2013)**  
Department of Civil and Environmental Engineering  
Georgia Institute of Technology

### COURSES TAUGHT

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**University of Illinois at Urbana-Champaign**  
CEE 574 Probabilistic Loads and Design  
CEE 360 Structural Engineering  
CEE 202 Engineering Risk and Uncertainty

**Georgia Institute of Technology**  
COE2001 Statics

### RESEARCH EXPERIENCE

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- Investigation of decision basis for target reliability index for structural design load specifications considering socio-economic impact of structural failure
- Quantification and modeling of uncertainty in structural loads caused by low-probability, high-consequence events including hurricanes and earthquakes
- Investigation of impact of climate change on hurricane risks to residential buildings
- Catastrophic loss modeling of buildings and lifeline systems exposed to natural hazards
- Investigation of building and infrastructure performance metric for modeling of post disaster recovery phase
- Development of risk-informed decision support system for civil infrastructure exposed to terrorist attack
- Analytical and statistical evaluation of risk aversion reflected in decisions regarding safety of buildings

## **RESEARCH PROJECTS & GRANTS**

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- Center for Risk-Based Community Resilience Planning, National Institute of Standards and Technology, \$6,500,000, In progress.
- Forecast of Risk to Built and Natural Infrastructure from Climate-Induced Natural Hazards in Changing Climate, UIUC-CERL, \$9757, Completed.

## **HONORS & AWARDS**

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Fellow of NSF Enabling the Next Generation of Hazards & Disasters Researchers Program, 2015.  
ASCE/EMI Probabilistic Methods Committee student paper award, Awarded at EMI/PMC2012, 6/2012  
CERRA Student Recognition Award, Awarded at ICASP11, 8/2011  
Korean Government Scholarship, Ministry of Education and Human Resources Development, 2007-2008  
Award for Excellence, 2006 Seoul National University Annual Exhibition, 8/2006  
Seoul National University Foundation Scholarships, 2002-2006

## **PROFESSIONAL SERVICE**

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### **Affiliations**

American Society of Civil Engineers (ASCE)

### **Scientific Committee**

Member, ASCE 7-22 Load Combination Subcommittee (LCSC)  
Member, Task Group 3 of the ASCE Technical Council on Life-Cycle Performance, Safety, Reliability, and Risk of Structural Systems.  
Member, ASCE Committee on Adaptation to a Changing Climate (CACC)  
13<sup>th</sup> International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP13), Seoul, South Korea.  
12<sup>th</sup> International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP12), Vancouver, Canada.

### **Journal Referee**

ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems; Reliability Engineering and System Safety; Risk Analysis; Computer-aided Civil and Infrastructure Engineering; Journal of Structural Safety; Journal of Structural Engineering; Journal of Engineering Mechanics; Applied Geography; Journal of Structure and Infrastructure Engineering; Journal of Performance of Constructed Facilities; Sustainable and Resilient Infrastructure; Infrastructure Complexity.

## **PUBLICATIONS IN REFEREED JOURNALS**

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1. Gudipati, V.K. & **Cha, E.J.** "A framework for optimization of target reliability index for a building class based on aggregated cost," *Structural Safety* (In review; STRUCS\_2018\_376).
2. Pant, S. & **Cha, E.J.** "Potential changes in hurricane risk profile across the United States coastal regions under climate change scenarios," *Structural Safety* (In review ;STRUCS\_2018\_370).
3. He, X. & **Cha, E.J.** "Game Theory-Based Decision Support Framework for Interdependent Infrastructure Recovery Planning," *Journal of Infrastructure Systems* (In review; ISENG-1528).
4. He, X. & **Cha, E.J.** "Risk-informed Decision Framework for Interdependent Infrastructure Risk Mitigation Planning," *Risk Analysis* (In review; RA-00564-2018).
5. Lin, C.-Y. & **Cha, E.J.** "Hurricane Wind Damage Risk Assessment for Residential Buildings in the US Southeast Coast in Changing Climate by using Artificial Neural Networks," *Natural Hazards Review* (In review; NHENG-977).
6. He, X. & **Cha, E.J.** "Probabilistic Infrastructure Recovery Modeling with Considering Different Levels of Interdependency," *Natural Hazards Review* (In review; NHENG-918).

7. Gudipati, V.K. & **Cha, E.J.** "Resilience-based framework for seismic design optimization of buildings considering interdependencies," *Journal of Structural Engineering* (In review; STENG-7313).
8. Pant, S. & **Cha, E.J.** (2018) "Wind and rainfall loss assessment for residential buildings under climate-dependent hurricane scenarios," *Structure and Infrastructure Engineering* (In press; DOI: 10.1080/15732479.2019.1572199).
9. Pant, S. & **Cha, E.J.** (2018). "Effect of climate change on hurricane damage and loss for residential buildings in Miami-Dade County," *Journal of Structural Engineering* 144(6) (DOI: 10.1061/(ASCE)ST.1943-541X.0002038).
10. **Cha, E.J.** (2018). Discrepancy in the perceived hurricane risks in changing climate. *Natural Hazards Review* 19(2) (DOI: 10.1061/(ASCE)NH.1527-6996.0000284).
11. He, X. & **Cha, E.J.** (2018) "Modeling the Damage and Recovery of Interdependent Civil Infrastructure Network Using Dynamic Integrated Network Model," *Sustainable and Resilient Infrastructure* (DOI: 10.1080/23789689.2018.1448662).
12. He, X. & **Cha, E.J.** (2018) "Modeling the Damage and Recovery of Interdependent Critical Infrastructure Systems from Natural Hazards," *Reliability Engineering and System Safety* 177:162-175.
13. **Cha, E.J.** & Ellingwood, B.R. (2018) "The Relation Between Cost-Benefit Analysis And Risk Acceptance In Regulatory Decision-Making," *International Journal of Risk Assessment and Management*; (In press; IJRAM-137212).
14. Shafieezadeh, A., **Cha, E.J.** & Ellingwood, B.R. (2014) "A decision framework for managing risk to infrastructure systems from terrorist attack," *Risk Analysis* DOI: 10.1111/risa.12266
15. **Cha, E.J.** & Ellingwood, B.R. (2013) "The role of risk aversion in nuclear plant safety decisions," *Structural Safety* 44:28-36.
16. **Cha, E.J.** & Ellingwood, B.R. (2013) "Attitudes toward acceptance of risk to buildings from extreme winds," *Structure and Infrastructure Engineering* 10:697-707.
17. **Cha, E.J.** & Ellingwood, B.R. (2013) "Seismic risk mitigation of building structures: the role of risk aversion," *Structural Safety* 40:11-19.
18. **Cha, E.J.** & Ellingwood, B.R. (2012) "Risk-averse decision-making for civil infrastructure exposed to low-probability, high-consequence events," *Reliability Engineering and System Safety* 104:27-35.

## **BOOK CHAPTER**

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**Cha, E.J.** & Wang, Y. (2015). "CH16 - Risk-Informed Decision Framework for Built Environment: The Incorporation of Epistemic Uncertainty," In Gardoni, P., Murphy, C. & Rowell, A. (Eds.), *Risk Analysis of Natural Hazards - Interdisciplinary Challenges and Integrated Solutions* (pp.279-296). Switzerland:Springer.

## **PUBLICATIONS IN REFEREED CONFERENCE PROCEEDINGS**

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1. Lin, C.-Y. & **Cha, E.J.** "Impact of Climate Change to Hurricane Loss to the Gulf Coast of the US," The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
2. Gudipati, V.K. & **Cha, E.J.** "A resilience-based framework for design optimization of interdependent buildings," The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
3. Gudipati, V.K. & **Cha, E.J.** "Optimization of target safety levels based on community-level objectives," The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
4. Pant, S. & **Cha, E.J.** "Variation of hurricane losses across US coast under changing climate," The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
5. Pant, S. & **Cha, E.J.** "Wind and rainfall loss evaluation for climate-dependent hurricane scenarios," The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
6. He, X. & **Cha, E.J.** "A Game Theory-Based Decision Framework for Post-disaster Recovery Planning of Interdependent Infrastructure Systems," The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.

7. He, X. & **Cha, E.J.** “A Decision Framework for Pre-disaster Risk Mitigation Planning of Interdependent Infrastructure Systems,” The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
8. He, X. & **Cha, E.J.** “Modeling the Post-disaster Recovery of Interdependent Civil Infrastructure Network,” The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
9. He, X. & **Cha, E.J.** “Modeling Resilience of Interdependent Civil Infrastructure Systems Using Dynamic Inoperability Input-Output Model and Graph Theory,” Probabilistic Mechanics & Reliability Conference 2016 (PMC 2016), Nashville, TN, May, 2016.
10. **Cha, E.J.**, Shafieezadeh, A. & Ellingwood, B.R. (2013) “A risk informed decision framework for risk management of infrastructure systems against terrorist attacks,” Proceedings of the 11th International Conference on Structural Safety & Reliability (ICOSSAR), New York, June, 2013.
11. **Cha, E.J.** & Ellingwood, B.R. (2013) “Quantification of risk aversion in decisions related to safety of nuclear power plants,” Proceedings of the 11th International Conference on Structural Safety & Reliability (ICOSSAR), New York, June, 2013.
12. **Cha, E.J.** & Ellingwood, B.R. (2013) “Acceptance of risk due to competing wind and earthquake hazards,” Proceedings of the 11th International Conference on Structural Safety & Reliability (ICOSSAR), New York, June, 2013.
13. **Cha, E.J.** & Ellingwood, B.R. (2012) “Attitudes toward acceptance of risk to wood frame residential buildings from hurricanes,” Proceedings of the 2012 Joint Conference of the Engineering Mechanics Institute and the 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability Conference (EMI/PMC2012), Notre Dame, June, 2012.
14. **Cha, E.J.** & Ellingwood, B.R. (2012) “Risk-aversion in decisions regarding seismic retrofit of unreinforced masonry buildings,” Proceedings of the 2012 Joint Conference of the Engineering Mechanics Institute and the 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability Conference (EMI/PMC2012), Notre Dame, June, 2012.
15. **Cha, E.J.** & Ellingwood, B.R. (2011) “Decision-making for Civil Infrastructure Exposed to Low-probability, High-consequence Hazards: the Role of Risk-Aversion,” Proceedings of the 11th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Zurich, Switzerland, August, 2011.

## **PRESENTATIONS**

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1. Gudipati, V.K. & **Cha, E.J.** “Resilience-based building safety target determination framework,” The 2019 Conference of the Engineering Mechanics Institute (EMI), Pasadena, CA. June, 2019.
2. Lin, C.-Y. & **Cha, E.J.** “Impact of Climate Change to Hurricane Loss to the Gulf Coast of the US,” The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
3. Gudipati, V.K. & **Cha, E.J.** “A resilience-based framework for design optimization of interdependent buildings,” The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
4. Gudipati, V.K. & **Cha, E.J.** “Optimization of target safety levels based on community-level objectives,” The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
5. Pant, S. & **Cha, E.J.** “Variation of hurricane losses across US coast under changing climate,” The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
6. Pant, S. & **Cha, E.J.** “Wind and rainfall loss evaluation for climate-dependent hurricane scenarios,” The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
7. He, X. & **Cha, E.J.** “A Game Theory-Based Decision Framework for Post-disaster Recovery Planning of Interdependent Infrastructure Systems,” The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
8. He, X. & **Cha, E.J.** “A Decision Framework for Pre-disaster Risk Mitigation Planning of Interdependent Infrastructure Systems,” The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
9. Infrastructure Systems,” The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.

10. He, X. & **Cha, E.J.** "Modeling the Post-disaster Recovery of Interdependent Civil Infrastructure Network," The 13th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Seoul, South Korea, May, 2019.
11. Gudipati, V.K. & **Cha, E.J.** "Framework for Design Optimization of Interdependent Buildings based on Community Resilience," Structures Congress, Orlando, FL, April, 2019.
12. Gudipati, V.K. & **Cha, E.J.** "Community-Level Objectives based Optimization of Target Safety Levels," Structures Congress, Orlando, FL, April, 2019.
13. **Cha, E.J.** "Next Generation Civil Infrastructure Systems Risk Management," Seoul Institute of Technology, Seoul, South Korea, December, 2018.
14. **Cha, E.J.** "Hurricane risk assessment of residential buildings in changing climate," Department of Atmospheric Science, University of Illinois at Urbana-Champaign, October, 2016.
15. He, X. & **Cha, E.J.** "Modeling Resilience of Interdependent Civil Infrastructure Systems Using Dynamic Inoperability Input-Output Model and Graph Theory," Probabilistic Mechanics & Reliability Conference 2016 (PMC 2016), Nashville, TN, May, 2016.
16. **Cha, E.J.** "Hurricane risk assessment of civil infrastructure in changing climate," ASCE/GEOSEI Congress 2016, Phoenix, AZ, February, 2016.
17. **Cha, E.J.**, Shafieezadeh, A. & Ellingwood, B.R. "The role of risk acceptance attitudes in managing a risk to infrastructure systems from terrorist attack," Society for Risk Analysis 2015 Annual Meeting, Arlington, VA, December, 2015.
18. **Cha, E.J.** "Risk-informed decision making for civil infrastructure exposed to extreme events," Construction Engineering Research Laboratory, March, 2015.
19. **Cha, E.J.** "Risk-informed decision making for civil infrastructure exposed to low-probability, high-consequence hazard: the role of risk acceptance", Seoul National University, June, 2014.
20. **Cha, E.J.** "Risk-informed decision framework for built-environment: the application of epistemic uncertainty," International Conference on the Societal Risk Management of Natural Hazards (ICSRM), Urbana-Champaign, April, 2014.
21. **Cha, E.J.** "Risk-informed decision framework for built-environment: the application of epistemic uncertainty," Society for Risk Analysis 2013 Annual Meeting, Baltimore, December, 2013.
22. **Cha, E.J.**, Shafieezadeh, A. & Ellingwood, B.R. "A risk informed decision framework for risk management of infrastructure systems against terrorist attacks," The 11th International Conference on Structural Safety & Reliability (ICOSSAR2013), New York, June, 2013.
23. **Cha, E.J.** & Ellingwood, B.R. "Quantification of risk aversion in decisions related to safety of nuclear power plants," The 11th International Conference on Structural Safety & Reliability (ICOSSAR2013), New York, June, 2013.
24. **Cha, E.J.** & Ellingwood, B.R. "Acceptance of risk due to competing wind and earthquake hazards," The 11th International Conference on Structural Safety & Reliability (ICOSSAR2013), New York, June, 2013.
25. **Cha, E.J.** "Decision-making for civil infrastructure exposed to low-probability, high-consequence hazards: the role of risk attitudes", University of Connecticut, January, 2013
26. **Cha, E.J.** & Ellingwood, B.R. "Attitudes toward acceptance of risk to wood frame residential buildings from hurricanes," The 2012 Joint Conference of the Engineering Mechanics Institute and the 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability Conference (EMI/PMC2012), Notre Dame, June, 2012
27. **Cha, E.J.** & Ellingwood, B.R. "Risk-aversion in decisions regarding seismic retrofit of unreinforced masonry buildings," The 2012 Joint Conference of the Engineering Mechanics Institute and the 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability Conference (EMI/PMC2012), Notre Dame, June, 2012
28. **Cha, E.J.** "Decision-making for civil infrastructure exposed to low-probability, high-consequence hazards: the role of risk attitudes", Ohio State University, April, 2012
29. **Cha, E.J.** "Decision-making for civil infrastructure exposed to low-probability, high-consequence hazards: the role of risk attitudes", Cornell University, March, 2012
30. **Cha, E.J.** "Decision-making for civil infrastructure exposed to low-probability, high-consequence hazards: the role of risk attitudes", University of Alabama, February, 2012
31. **Cha, E.J.** "Decision-making for civil infrastructure exposed to low-probability, high-consequence hazards: the role of risk attitudes", University of Michigan, February, 2012

32. **Cha, E.J.** & Ellingwood, B.R. "Decision-making for Civil Infrastructure Exposed to Low-probability, High-consequence Hazards: the Role of Risk-Aversion," The 11th International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP), Zurich, Switzerland, August, 2011