

Jooho Kim, Ph.D.

Assistant Research Scientist
Institute for a Disaster Resilient Texas (IDRT)
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EDUCATION

Purdue University , West Lafayette, IN, USA Ph.D. in Construction Engineering and Management, School of Civil Engineering Dissertation: Adaptive decision support system to navigate the complex post-disaster debris management systems Advisor: Dr. Makarand Hastak	2019
Purdue University , West Lafayette, IN, USA M.S. in Construction Engineering Management, School of Civil Engineering Thesis: Effective debris management system for a resilient community Advisor: Dr. Makarand Hastak	2014
University of Seoul , Seoul, South Korea B.S. in Architectural Engineering Thesis: Flexible TACT construction scheduling method using Theory of constraints Advisor: Dr. Chang-Taek Hyun	2011

HIGHER EDUCATION EXPERIENCES

Texas A&M University , College Station, TX, USA Institute for a Disaster Resilient Texas (IDRT)	2023-Current
University of Oklahoma , Norman, OK, USA NOAA National Severe Storms Laboratory Postdoctoral Research Associate	2019 - 2023
Carnegie Mellon University , Pittsburgh, PA, USA Research Associate at Civil and Environmental Engineering	2018
Purdue University , West Lafayette, IN, USA Graduate Research/teaching Assistant in Construction Engineering and Management, School of Civil Engineering	2012 - 2017

AWARDS & HONORS

2022	Certificate for the top 25 most cited articles in International Journal of Information Management (IJIM): Social network analysis: Characteristics of online social networks after a disaster
2021	Outstanding reviewer award, the Journal of Management in Engineering (JME), ASCE
2020	Best PhD dissertation award, Civil Engineering, Purdue University

2014	Selected paper in International Institute for Infrastructure Resilience and Reconstruction(I3R2) conference, Purdue University, West Lafayette, IN, USA, 20-22 May 2014
2012	US-Korea Collaboration (UKC) in Science and Engineering Conference Poster Award, Korean American Scientists and Engineers Association (KSEA)
2009	College of Urban Science Award in Thesis Exhibition, University of Seoul, South Korea
2008 - 2009	Scholarship for excellent achievement, University of Seoul, South Korea (2003, 2008, 2009)
2009	Certificate of Merit for an excellent work from President of Life University Sihanoukville, Cambodia
2008	Grand prize for Engineering Portfolio, University of Seoul, South Korea

RESEARCH INTEREST AND EXPERIENCE

- Risk assessment for community assets and critical infrastructure from severe weather threats
 - Physical building/structure damage prediction using weather-related data/information including a prototype Probabilistic Hazard Information
 - Building a geodatabase for community assets using multiple machine learning techniques and artificial intelligence
 - Data analytics and visualization for decision-making
- Optimal decision making for infrastructure retrofit and investment
 - Cost-benefit analysis, geospatial modeling, and analysis
 - Spatial equality and equity across public facilities and critical infrastructure systems
- Disaster debris/waste management
 - Geodatabase creation and spatial analytics to locate a temporary debris management site based on technical, environmental and social impacts
 - Simulation for optimal debris removal operation using discrete event, system dynamics and agent-based model
- Online communication network and information diffusion in emergency
 - Online data mining, social network analysis, and semantic analysis
- Participated in multiple NSF research grant proposals (LEAP-HI, EAGER, RAPID, CRISP and IMME), and state and local agency grant proposals (INDOT, PENNDOT, PITA, EREF).

OU CIWRO / NOAA NSSL, Norman, OK

Postdoctoral Research Associate, 2019 - 2023

Community risk assessment using Probabilistic Hazard Information (PHI)

With Dr. Patrick A. Campbell, Dr. Kim Klockow-McClain, and Dr. Joshua Hatzis

- Developed a framework to estimate physical building damage from severe weather threats
- Developed a geodatabase to manage complex community assets including critical infrastructure, systems, networks, and multiple types of buildings (commercial, industrial, and residential) using machine learning and deep learning techniques
- Research-related article in NOAA/NSSL: [Researchers studying impacts of severe weather threats on community assets, including critical infrastructure](#)

Agent-based modeling: emergency evacuation and sheltering behaviors during severe weather threats

With Dr. Joshua Hatzis and Dr. Kim Klockow-McClain

- Performed a comprehensive literature review of ABM evacuation modeling
- Supported the development of ABM logic and flow

Emergency communication network analytics in LatinX

With Joseph Trujillo (PhD student) and Dr. Sun Kyong Lee

- Collected social media data to analyze emergency communication networks in minority groups (LatinX)
- Conducted social network analysis

Carnegie Mellon University, Pittsburgh, PA

Research Associate, 2018

Asset Management: Sewer pipeline maintenance and replacement

With Dr. Burcu Akinci and Dr. Sean Qian

- Assist a research proposal for developing a web-based asset management system for local-level underground infrastructure management system

Decision support system for prioritizing infrastructure investments/retrofit

With Dr. Burcu Akinci, Dr. Sean Qian and Dr. Daniel Armanios

- Investigate bridges with low under-clearance in Pennsylvania to prioritize bridge lifting/replacement investments
- Develop a holistic framework for effective decision making under the consideration of construction cost, road users and short- and long-term community impacts.

Purdue University, West Lafayette, IN

Graduate Research Assistant, 2012- 2018

Human Behaviors and Cyber Infrastructure during a Catastrophic Event

With Dr. Juhee Bae and Dr. Makarand Hastak

- Investigated online social network and information diffusion during emergency
- Data mining: online social media data (e.g., Facebook and Twitter) in emergency
 - 2016 Louisiana Flood
 - 2017 Storm Cindy, Hurricane Harvey, Hurricane Irma and Hurricane Maria
- Analyzed a social network structure and developed social media strategy in emergency
- Currently, developing an intelligent rumor control system using social network analysis, text analysis, neural network and deep learning

Michigan Flint Water Crisis: water bottle recycling system

with Dr. Andrew Whelton

- Investigated emergency water distribution infrastructure and water bottle recycling issues during the water crisis in Flint, Michigan

Disaster Debris/Waste Management

with Dr. Makarand Hastak

- Developed a framework for effective debris management integrated with economic, environmental, and social perspectives
- Developed GIS-based decision support system to site a temporary debris management site
- Developed GIS-based Agent-Based Model for evaluating existing debris management system and develop effective and intelligent debris management system

Construction Key Performance Indicators (KPIs)

with Dr. Makarand Hastak

- Identified and developed Key Performance Indicators (KPIs) related to construction industry, research, education and program

Purdue ECT (Emerging Construction Technology)

with Dr. Makarand Hastak

- Primary construction-related tech investigator for emerging construction technologies
- Developed and manage Purdue ECT factsheet repository with Bypass and Purdue Library

TEACHING EXPERIENCE

Carnegie Mellon University, Pittsburgh, PA

Research Associate, 2018

Fall 2018 **Project Management for Construction (12-411)**

w/ Dr. Burcu Akinci

- Developed course assignments, reading materials and case studies

Purdue University, West Lafayette, IN

Graduate Teaching Assistant, 2014-2017

Spring 2017 **Practical Applications for Construction Engineering (CEM 302)**

Spring 2016 • Teaching assistant for the undergraduate practical application for construction engineering.

Spring 2015 Topics included reading blueprints, cost estimation, Primavera 6, bidding proposal

- Prepared homework and exam problems/solutions. Gave lab lectures

Fall 2015 **Project Control & Life Cycle Execution of Constructed Facilities (CEM 301)**

- Teaching assistant for the undergraduate practical application for construction engineering.

Topics included reading analytical methods, cost optimization, safety, construction management applications (P6, MS project and NetPoint)

- Prepared homework and exam problems/solutions. Gave review lectures

- Presented two teaching sessions to demonstrate the construction management software/tools

Fall 2016 **Life Cycle Engineering and Management of Constructed Facilities (CEM 201)**

Spring 2016 • Teaching assistant for the undergraduate practical application for construction engineering.

Spring 2015 Topics included

- Prepared homework and exam problems/solutions.

- Presented one teaching session to teach construction scheduling methods

Fall 2014 **Analytical methods for the design of construction operations (CE 527)**

- Teaching assistant for the graduate analytical methods for design of construction operations (queuing theory, discrete event simulation, System dynamics and Agent-based Model)

- Prepared homework and exam solutions

STUDENT MENTORING

- Dago Kweon, Master student, Industrial Engineering, Ulsan National Institute of Science & Technology (UNIST), 2023-Current

- OU/CIMMS Travel Award Committee, 2019-2023
- OU/CIMMS Outreach Committee, 2019-2022
- Conference Judge, 2020 American Meteorological Society (AMS) Conference, Boston, MA
- Mentor, ASCE Mentoring program, 2019-present
- Program coordinator at [Global Leadership Forum for Construction Engineering and Management Programs \(GLF-CEM\)](#), 2014-2018
- Member of the Editorial Board
 - International Journal of Information Management
 - International Journal of Information Management Data Insights
- Journal Reviewer:
 - ASCE Journal of Management in Engineering
 - Bulletin of the American Meteorological Society (BAMS)
 - Government Information Quarterly
 - IEEE Transactions on Network Science and Engineering
 - International Journal of Disaster Risk Reduction
 - International Journal of Disaster Resilience in the Built Environment
 - International Journal of Distributed Sensor Networks
 - Journal of the Royal Society Interface
 - Journal of Environmental Management
 - Nature Scientific Report
 - Sociology International Journal
 - Waste Management

JOURNAL PUBLICATION

[Google scholar link](#)

- Hatzis, J., **Kim, J. (corresponding author)**, and K. Klockow. 2023 “An Agent-Based Modeling Approach to Protective Action Decision-Related Travel during Tornado Warnings”, Nat. Hazards Rev., American Society of Civil Engineering (ASCE), <http://10.1061/NHREFO.19 NHENG-1783>.
- **Kim, J.**, Campbell, P.A., Calhoun, K., 2023. A Framework to Predict Community Risk from Severe Weather Threats Using Probabilistic Hazard Information (PHI). Atmosphere, <https://doi.org/10.3390/atmos14050767>
- **Kim, J.**, J. J. Hatzis, K. Klockow, and P. A. Campbell, 2022: Building classification using random forest to develop a geodatabase for Probabilistic Hazard Information (PHI). Nat. Hazards Rev., American Society of Civil Engineering (ASCE), [https://doi.org/10.1061/\(ASCE\)NH.1527-6996.0000561](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000561).
- **Kim, J.**, S. J. Kweon, and S. W. Hwang, 2021. Spatial Equality and Equity for Effective Emergency Water Distribution System: Points of Distribution. J. Water Resources. Planning and Management, American Society of Civil Engineering (ASCE), 147, 04020111, [https://doi.org/10.1061/\(ASCE\)WR.1943-5452.0001318](https://doi.org/10.1061/(ASCE)WR.1943-5452.0001318).
- Lee, S., and **Kim, J. (corresponding author)**, 2020. Prediction of Nanofiltration and Reverse-Osmosis-Membrane Rejection of Organic Compounds Using Random Forest Model. J. Environ. Eng., 146, 04020127, [https://doi.org/10.1061/\(ASCE\)EE.1943-7870.0001806](https://doi.org/10.1061/(ASCE)EE.1943-7870.0001806).
- **Kim, J.**, and H. Park, 2020. A framework for understanding online group behaviors during a catastrophic event. Int. J. Inf. Manage., 51, 102051, <https://doi.org/10.1016/j.ijinfomgt.2019.102051>.
- Wang, T., **J. Kim**, and A. J. Whelton, 2019. Management of plastic bottle and filter waste during the large-scale Flint Michigan lead contaminated drinking water incident. Resources. Conservation and Recycling, Elsevier, 140, 115–124, <https://doi.org/10.1016/j.resconrec.2018.08.021>.
- **Kim, J.**, and Hastak, M. 2018. “Online Human Behaviors on Social Media During Disaster Responses.” The Journal of the NPS Center for Homeland Defense and Security, 7–8.
- **Kim, J.**, J. Bae, and M. Hastak, 2018. Emergency information diffusion on online social media during storm

Cindy in U.S. *Int. J. Inf. Manage.*, 40, 153–165, <https://doi.org/10.1016/j.ijinfomgt.2018.02.003>

- **Kim, J.**, and M. Hastak, 2018. Social network analysis: Characteristics of online social networks after a disaster. *Int. J. Inf. Manage.*, 38, 86–96, <https://doi.org/10.1016/j.ijinfomgt.2017.08.003>. (Top 25 most cited articles out of all the papers published in the journal's history)
- **Kim, J.**, A. Deshmukh, and M. Hastak, 2018. A framework for assessing the resilience of a disaster debris management system. *Int. J. Disaster Risk Reduct.*, 28, 674–687, <https://doi.org/10.1016/j.ijdr.2018.01.028>.

CONFERENCES

- **Kim, J.**, and Campbell P. “Building type classification using deep learning CNN”, American Meteorological Society (AMS) 102nd Annual Meeting, Houston, Texas, USA, 23-27 January 2022.
- Hatzis, J., **Kim, J.**, and Klockkow, K. “The Development of a Tornado Protective Action Decision Model for the City of Norman, Oklahoma”, American Meteorological Society (AMS) 102nd Annual Meeting, Houston, Texas, USA, 23-27 January 2022.
- **Kim, J.**, and Campbell P. “Creating geodatabase using Machine-Learning techniques to manage complex community assets”, Graduate and Postdoctoral Research Symposium, University of Oklahoma, Norman, OK, USA, Feb 26, 2021.
- **Kim, J.**, Hatzis, J., Klockkow, K. and Campbell P. “Residential building type classification using Machine Learning”, American Meteorological Society (AMS) 101st Annual Meeting, Louisiana, USA, 10–14 January 2021.
- **Kim, J.**, Klockkow, K. and Campbell P. “Real-time Critical Infrastructure Risk Assessment using Probabilistic Hazard Information (PHI)”, American Meteorological Society (AMS) 101st Annual Meeting, Louisiana, USA, 10–14 January 2021.
- Lee, S. and **Kim, J.** “Predicting membrane rejection of emerging contaminants using random forest”, *US-Korea Conference 2021 on Science, Technology, and Entrepreneurship*
- **Kim, J.** and Hastak, M. (2018). “Evaluating Service Level of Point of Distributions during the Michigan Flint Water Crisis.”, *International Conference on Building Resilience (ICBR)*, Lisbon, Portugal, Nov 7-9, 2018.
- **Kim, J.**, and Hastak, M. (2018). “Applying the Theory of Intelligent Planning Unit to the Practice of Disaster Debris Management.” *2018 Construction Research Congress (CRC 2018)*, New Orleans, Louisiana, USA, April 2-5, 2018.
- Wang, T., **Kim, J.** and A. Whelton. (2018). “Management of Plastic Bottle and Filter Waste during the Large-Scale Flint Michigan Contaminated Drinking Water Incident.”, *AEEESP (Association of Environmental Engineering and Science Professors) Distinguished Lecture Conference*, Purdue University, West Lafayette, Indiana, USA, Feb 2, 2018.
- Wang, T., **Kim, J.** and A. Whelton. (2018). “Michigan Flint Water Crisis: Recycling Material Collection Strategy and Policy in Emergency.”, *Global Waste Management Symposium*, Indian Wells, California, USA, Feb 11-14, 2018.
- **Kim, J.**, and Hastak, M. (2017). “Social Network Analysis: The role of social media after a disaster.” *10th Anniversary Homeland Defense/Security Education Summit*, George Mason University at Arlington, Virginia, USA., March 23-24, 2017.
- **Kim, J.**, Yu, D., and Hastak, M. (2016). “Impacts of a collective action in a disaster-affected community to site a temporary debris management site.” *6th International Disaster and Risk Conference: IDRC Davos 2016*, Davos, Switzerland., August 28 - September 1, 2016.
- **Kim, J.**, Deshmukh, A., and Hastak, M. (2014). “Selecting a Temporary Debris Management Site for Effective Debris Removal.” *The 10th International Conference of the International Institute for Infrastructure Resilience and Reconstruction (I3R2)*, R. R. Rapp and W. Harland, eds., West Lafayette, Indiana, USA, 214–218.
- **Kim, J.**, Deshmukh, A., and Hastak, M. (2013). “Effective debris management for a resilient community.”

ISEC 2013 - 7th International Structural Engineering and Construction Conference: New Developments in Structural Engineering and Construction, West Lafayette, Indiana, USA.

- **Kim, J.,** Deshmukh, A., and Hastak, M. (2013). “Visualizing Debris Management System for a Decision Maker after Natural Hazards.” *US-Korea Conference 2013 on Science, Technology, and Entrepreneurship*, New Jersey, USA.
- **Kim, J.,** and Hastak, M. (2012). “Geographical Decision-making Tool for Temporary Debris Management Site.” *US-Korea Conference 2012 on Science, Technology, and Entrepreneurship*, California, USA.

BOOK CHAPTER

- **Kim, J.,** and Veth, B. “Performance-Based Security Contracting.” *Large Event Security Planning and Emergency Management*, E. Dietz and R. Black, eds., Taylor & Francis. (*under publication*)

INVITED TALK

- NOAA/SPC research seminar: community risk prediction using probabilistic hazard information, April 2021.
- OU CIMMS research seminar: Decision support system for an effective disaster debris management, April 2020.
- Purdue University research seminar: Understanding online human behaviors during a catastrophic event., Oct 2017.
- Purdue University research seminar: Agent-based modeling to analyze dynamic system behaviors, Oct 2016.

MEDIA COVERAGE

- “[Researchers Studying Impacts of Severe Weather Threats on Community Assets, including Critical Infrastructure](#)”, NOAA/NSSL news, May 2021
- “[Flint, Michigan, lead crisis should have buried the city in water bottles. So, why didn't it?](#)” – by Purdue University Giant Leaps, EurekAlert - American Association for the advancement of Science (AAAS), Science daily, Science X

COMPUTER/SOFTWARE SKILL

- Programming language: Python and R
- Multi-method modeling and simulation tools: MATLAB, AnyLogic, Vensim, Netlogo
- Geospatial modeling and analysis: ArcGIS and QGIS
- Network Analysis: UCINET, NodeXL, Gephi
- Construction management: P6, Netpoint, MS project, AutoCAD, BIM 360, and Bluebeam