

Jaehwan Jeon, Ph.D.

Department of Civil and Mineral Engineering
University of Toronto

Curriculum Vitae

A. Personal

Date of Birth March 29, 1994
Citizenship South Korea
Addresses Office: 35 St. George Street, #213B, Toronto, ON, M5S 1A4, Canada (Department of Civil and Mineral Engineering, University of Toronto). C.P. +1(437) 435-3701
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Current Rank Postdoctoral Fellow, University of Toronto



B. University Education

M.S./Ph.D. in Civil and Environmental Engineering, Seoul National University, 2020.03 – 2026.02

Visiting Graduate Student, University of Toronto, Toronto, Canada, September 1, 2022 – February 16, 2023

B.S. in Civil and Environmental Engineering, Seoul National University, 2013.03 – 2020.02

C. Research Interest

Structural reliability analysis, Uncertainty quantification, Trustworthy AI for structural safety, Physics-informed deep learning, Surrogate modeling, Bayesian neural networks, Earthquake engineering

D. Professional Experience

Nov 2014 **Korean Army Augmented to the U.S. Army (KATUSA), Sergeant, Nov 2014 – Aug 2016.** S3 (Operations), 8th Brigade Engineer Battalion, 1st Cavalry Division, U.S. Army. Served as a primary liaison between ROK and U.S. forces.

Fall 2020 **Graduate Teaching Assistant.** Department of Civil and Environmental Engineering, Seoul National University, Seoul, Korea
– 457.212 Statistics for Civil & Environmental Engineers (002)

Spring 2024 **Graduate Teaching Assistant.** Department of Civil and Environmental Engineering, Seoul National University, Seoul, Korea
– M.3204.00600 001 Information Engineering for Infrastructures in Smart Cities (001)

2026.03–2026.04 **Postdoctoral Researcher.** Institute of Construction and Environmental Engineering, Seoul National University

2026.05–Present **Postdoctoral Fellow.** Department of Civil and Mineral Engineering, University of Toronto

E. Honors and Awards

May 2026	Korean Nuclear Society (KNS) Spring Meeting Best Paper Award
Nov 2025	Computational Structural Engineering Institute of Korea (COSEIK) Annual Conference Best Paper Presentation Award
May 2025	International Conference on Structural Safety and Reliability (ICOSSAR'25) Award Finalist
Oct 2024	Korean Society of Civil Engineers (KSCE 2024) Convention Best Paper Award
May 2024	Engineering Mechanics Institute (EMI) – Probabilistic Methods Committee (PMC) Award Finalist
June 2022	Mitacs Globalink Research Award (3,000 CAD (\$2,800)), Mitacs, Canada
March 2021	Brain Korea 21 Scholarship (4,200,000 KRW (\$3,800)), Ministry of Education, Korea
September 2020	Merit-based scholarship (382,800 KRW (\$350)), Seoul National University, Korea
March 2020	Lecture & research scholarship (5,197,000 KRW (\$4,700)), Seoul National University, Korea
September 2019	Merit-based scholarship (1,499,000 KRW (\$1,400)), Seoul National University, Korea
September 2018	Merit-based scholarship (1,499,000 KRW (\$1,400)), Seoul National University, Korea
March 2018	Merit-based scholarship (1,199,200 KRW (\$1,100)), Seoul National University, Korea
September 2017	Academic scholarship (2,998,000 KRW (\$2,700)), Kwanak Corporation, Korea
March 2017	Academic scholarship (2,998,000 KRW (\$2,700)), Kwanak Corporation, Korea
March 2013	Goal achievements scholarship (3,000,000 KRW (\$2,700)), Megastudy Scholarship Foundation, Korea

F. Publications

F.1 Ph.D. Dissertation

- T1. Jeon, J. (2026). Prediction and Uncertainty Quantification of Nonlinear Dynamic Response of Structures via Physics-informed Deep Learning. Doctoral dissertation, Seoul National University. <https://dcollection.snu.ac.kr/common/orgView/000000196702>

F.2 Journal Publications

- J1. Jeon, J., and J. Song (2025). Neural Network–Augmented Physics Models Using Modal Truncation for Dynamic MDOF Systems under Response-Dependent Forces. *Journal of Engineering Mechanics*. Vol. 151, No. 1. <https://doi.org/10.1061/JENMDT.EMENG-7845> **Ranked as most read & most cited paper**

- J2. Jeon, J., O. Kwon, and J. Song (2026). Unified Hysteresis Modeling via Physics-based Deep Learning and Data Augmentation. *Earthquake Engineering & Structural Dynamics*. Vol. 55, No. 2, 379-396. <https://doi.org/10.1002/eqe.70081>
- J3. Jeon, J., J. Song, and O. Kwon (2026). Ensemble-based Uncertainty Quantification and Decomposition of Probabilistic Surrogate Models Using Bayesian Neural Networks. *Structural Safety*. Vol. 121, 102698. <https://doi.org/10.1016/j.strusafe.2026.102698> **Ranked as most downloaded paper**
- J4. Guo, F., J. Song, Y. Liu, J. Joo, and J. Jeon (2026). A Unified Rate-Dependent Rheological Model for High Damping Rubber Bearings: Seismic Performance Assessment in Cold Climates. *Engineering Structures*. Vol. 367, 123564. <https://doi.org/10.1016/j.engstruct.2026.123564>
- J5. Joo, J., J. Jeon, and J. Song (2026). Physics-based Encoder-only Transformer for Structural Hysteresis Prediction and Dynamic Analysis. *Earthquake Engineering & Structural Dynamics*. **In press**
- J6. Jeon, J., C. H. Lee, and T. Kim. Automating Structural Reliability Analysis with a Multi-Agent Large Language Model Framework. (Under review). <https://doi.org/10.48550/arXiv.2607.16580>

F.3 Conferences (International)

- C-I1. Jeon, J., and J. Song (2022), Physics-Informed Neural Network for Dynamic Responses of Structures Based on Monitoring Data, The 2022 World Congress on Advances in Civil, Environmental, & Materials Research, August 16-19, Seoul, Korea.
- C-I2. Jeon, J., and J. Song (2023), Dynamic Response Prediction of Nonlinear MDOF Systems by Neural-Network-Augmented Physics Models, Engineering Mechanics Institute Conference 2023, June 6-9, Atlanta, USA. (Extended Abstract)
- C-I3. Jeon, J., and J. Song (2023), Deep-Learning-Augmented Physics Models to Predict Nonlinear Dynamic Responses of Multi-Degree-of-Freedom Structures, 14th International Conference on Applications of Statistics and Probability in Civil Engineering, July 9-13, Dublin, Ireland. (Extended Abstract)
- C-I4. Jeon, J., O. Kwon, and J. Song (2024), Physics-informed Deep Learning Model for Prediction of Complex Hysteresis, 27th International Conference on Structural Mechanics in Reactor Technology, March 3-8, Yokohama, Japan. (Extended Abstract)
- C-I5. Jeon, J., J. Song, and O. Kwon (2024), Integrating Physics-Based Deep Learning Models and Data Augmentation to Reduce Uncertainties in Hysteresis Modeling, Engineering Mechanics Institute Conference and Probabilistic Mechanics & Reliability Conference 2024 (EMI/PMC 2024), May 28-31, Chicago, USA. (Extended Abstract) **Selected as EMI/PMC 2024 student competition finalist**
- C-I6. Jeon, J., J. Song, and O. Kwon (2024), Model Uncertainty Quantification and Selection for Deep Learning-based Simulation of Hysteresis with Stiffness and Strength Degradations, 9th European Congress on Computational Methods in Applied Sciences and Engineering, June 3-7, Lisbon, Portugal.
- C-I7. Jeon, J., O. Kwon, and J. Song (2024), Long Short-term Memory Model for Dynamic Analysis of Hysteretic Structures Subjected to Earthquakes, 18th World Conference on Earthquake Engineering, June 30-July 5, Milan, Italy. (Extended Abstract)

- C-I8. Jeon, J., O. Kwon, and J. Song (2024), Uncertainty Quantification of Deep Learning Hysteresis Models Using Bayesian Neural Network with Concrete Dropout, 8th Asia-Pacific Symposium on Structural Reliability and Its Applications, September 29-October 2, Ulsan, Korea.
- C-I9. Jeon, J., J. Song, and O. Kwon (2025), Bayesian Neural Network Ensembles for Quantifying Uncertainty in Deep Learning-based Surrogate Models, Engineering Mechanics Institute Conference 2025, May 27-30, Anaheim, USA. (Extended Abstract)
- C-I10. Jeon, J., O. Kwon, and J. Song (2025), Uncertainty Quantification of Hysteresis Prediction in Structural Dynamics Using Bayesian Neural Networks, 14th International Conference on Structural Safety and Reliability (ICOSSAR'25), June 1-6, Los Angeles, USA. (Extended Abstract) **Selected as ICOSSAR 2025 student competition finalist**
- C-I11. Joo, J., J. Jeon, and J. Song (2025), Physics-Based Transformer Model for Predicting Nonlinear Hysteresis in Structures, 14th International Conference on Structural Safety and Reliability (ICOSSAR'25), June 1-6, Los Angeles, USA.
- C-I12. Joo, J., J. Jeon, and J. Song (2025), Dynamic Analysis of Hysteretic Structures Using Transformer Models with Transfer Learning, Civil Engineering Conference in the Asian Region, October 21-24, Jeju, Korea.
- C-I13. Jeon, J., J. Song, and O. Kwon (2025), Enhancing Uncertainty Quantification in Civil Engineering through Bayesian Neural Network Ensembles, Civil Engineering Conference in the Asian Region, October 21-24, Jeju, Korea.
- C-I14. Park, S., J. Jeon, and J. Song (2026), Ensemble-based Uncertainty Quantification for Probabilistic Surrogate Models using SINDy, Engineering Mechanics Institute Conference 2026 (EMI 2026), June 2-5, Boulder, USA. (Extended Abstract)
- C-I15. Joo, J., J. Jeon, and J. Song (2026), Uncertainty Quantification in Unified Hysteresis Modeling Using a Partially Bayesian Neural Architecture, Engineering Mechanics Institute Conference 2026 (EMI 2026), June 2-5, Boulder, USA. (Extended Abstract) **Selected as EMI 2026 PMC student competition finalist**
- C-I16. Park, S., J. Jeon, and J. Song (2026), Ensemble-based Uncertainty Quantification for Probabilistic Surrogate Models using SINDy, 10th International Symposium on Reliability Engineering and Risk Management (ISRERM 2026), June 28-July 1, Sapporo, Japan.
- C-I17. Joo, J., J. Jeon, and J. Song (2026), Uncertainty Quantification in Unified Hysteresis Modeling Using a Partially Bayesian Neural Architecture, 10th International Symposium on Reliability Engineering and Risk Management (ISRERM 2026), June 28-July 1, Sapporo, Japan.
- C-I18. Park, S., J. Jeon, and J. Song (2026), Probabilistic SINDy Surrogate Model for Ensembled Uncertainty-Quantification of Hysteretic Structures, 17th International Workshop on Advanced Smart Materials and Smart Structures Technology (ANCRiSST 2026), July 24-25, Turin, Italy. (Abstract)

F.4 Conferences (Domestic – South Korea)

- C-D1. Jeon, J., and J. Song (2021), Development of Artificial Neural Network to Estimate Damping Force Under Wind Loadings Using Acceleration and Force Data, Korean Society of Civil Engineers 2021 Convention, October 20-22, Gwangju, Korea.

- C-D2. Jeon, J., and J. Song (2021), Development of Artificial Neural Network to Estimate Nonlinear Damping Force Under Wind Loadings Using Acceleration and Force Data - Focusing on Small Damping Force Identification, Korean Institute of Bridge and Structural Engineers 2021 Conference: Digital Twin Technology in Infrastructure, November 26, Virtual conference.
- C-D3. Jeon, J., and J. Song (2022), Prediction of Dynamic Responses of Structures Using Neural Network Augmented Physics Model, Computational Structural Engineering Institute of Korea 2022 Annual Conference, April 13-15, Jeju, Korea.
- C-D4. Jeon, J., and J. Song (2023), Generalized Seismic Hysteresis Modeling Method Using Long Short-Term Memory Model, Korean Society of Civil Engineering 2023 Convention, October 18-20, Yeosu, Korea.
- C-D5. Jeon, J., O. Kwon, and J. Song (2024), Probabilistic Seismic Hysteresis Modeling Method Using Bayesian Neural Networks, Korean Society of Civil Engineering 2024 Convention, October 16-18, Jeju, Korea. **KSCE Convention Best Paper Award**
- C-D6. Joo, J., J. Jeon, and J. Song (2025), Development of a Transformer-based Unified Hysteretic Behavior Model for Seismic Response Prediction of Nuclear Power Plant Structures, 2025 Korea Electric Power Industry Code-Week, August 11-14, Busan, Korea.
- C-D7. Jeon, J., J. Song, and O. Kwon (2025), Uncertainty Quantification of Ensemble Prediction for Structural Hysteretic Behavior using Bayesian Neural Networks, Computational Structural Engineering Institute of Korea Annual Conference, November 28-29, Daejeon, Korea. **COSEIK Best Paper Presentation Award**
- C-D8. Joo, J., J. Jeon, and J. Song (2026), Multi-Modal Deep Learning-Based Seismic Damage Identification for Nuclear Power Plant Structures, Transactions of the Korean Nuclear Society Spring Meeting, May 7-8, Jeju, Korea. **KNS Spring Meeting Best Paper Award**

G. Patents

- G1. Jeon, J., J. Song, Kim, D., Lee, Y., Lee, J. (2024), Method, System, and Computer-Readable Recording Medium for Predicting Seismic Response and Non-stationarity of Structures (Patent application No. 1020240192098, South Korea)
- G2. J. Song, Jeon, J., Kim, D. (2024), Method, System, and Computer-Readable Recording Medium for Predicting Seismic Response and Non-stationarity of Structures based on a 1D Convolutional Neural Network Model (Patent application No. 1020240192098, South Korea)

H. Open-Source Software Contributions

- H1. UQpy (Python Library for UQ): Implemented SVI-based BNN trainer, added documentation, and improved containerized development workflows. <https://github.com/SURGroup/UQpy/pull/274>

I. Invited Talks and Seminars

- S1. Physics-Based Seismic Hysteresis Modeling Method Using Long Short-Term Memory Model. *Joint Seminar*, Joint seminar with Prof. Tao Wang's group (Hong Kong Polytechnic University) and Prof. Oh-Sung Kwon's group (University of Toronto), Online. January 25, 2024.
- S2. Ensemble-based Uncertainty Quantification and Decomposition for Probabilistic Surrogate Models in Structural Dynamics. *Joint Seminar*, Joint seminar with Prof. You Dong's group (Hong Kong Polytechnic University) and Prof. Junho Song's group (Seoul National University), Hong Kong. December 16, 2025.
- S3. Uncertainty Quantification and Decomposition in Hysteresis Modeling Using Ensemble of Bayesian Neural Networks. *Invited Seminar*, Invited seminar by Prof. Junho Song's group (Seoul National University), hosted by Prof. Yanhui Liu's group (Guangzhou University), Guangzhou. December 18, 2025.
- S4. Prediction and Uncertainty Quantification of Complex Structural System's Dynamic Response via Physics-informed Deep Learning. *Joint Seminar*, Joint seminar with Prof. Jize Zhang's group (Hong Kong University of Science and Technology) and Prof. Junho Song's group (Seoul National University), Hong Kong. December 19, 2025.
- S5. Trustworthy AI for the Built Environment: A Multi-Agent LLM Framework for Structural Reliability Analysis. *Invited Workshop Presentation*, Future of the Building Industry (FoBI) Workshop, Durham School of Architectural Engineering and Construction, University of Nebraska–Lincoln, Omaha, NE, USA. August 11, 2026.

J. Professional Service

Journal Reviewer, *Earthquake Engineering & Structural Dynamics*

Journal Reviewer, *Structural Safety*

Journal Reviewer, *Scientific Reports*

Journal Reviewer, *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering*