

**Junhwa Lee**

Assistant Professor

Department of Civil Engineering

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**Education**

**B.S. in Civil Engineering**, February 2016, UNIST, Ulsan, Korea (Graduated *cum laude*)

**Ph.D. in Civil Engineering**, August 2020, UNIST, Ulsan, Korea

**Dissertation:**

Long-term displacement measurement of full-scale bridges using computer vision and LiDAR

(Advisor: Sung-Han Sim, Young-Joo Lee)

**Research Interests**

* Displacement measurement
* Static stress measurement
* Cable control and monitoring
* Structural health monitoring
* Smart construction

**Work Experience**

**Assistant Professor**

*September 2023 – current*

Pukyong National University

**Postdoctoral Researcher**

*November 2022 – August 2023*

University of Illinois at Urbana-Champaign (UIUC), USA

Smart Structures Technology Laboratory (Advisor: Prof. B.F. Spencer Jr.)

**Postdoctoral Researcher**

*March 2022 – August 2023*

Sungkyunkwan University, Korea

Smart Construction Laboratory (Advisor: Prof. Sung-Han Sim)

**Postdoctoral Researcher**

*September 2020 – February 2022*

Ulsan National Institute of Science and Engineering (UNIST), Korea

Structural Reliability & Disaster Risk Laboratory (Advisor: Prof. Young-Joo Lee)

**Research Experience**

**Graduate Research Assistant**

*September 2019 – August 2020*

Ulsan National Institute of Science and Engineering (UNIST), Korea

Structural Reliability & Disaster Risk Laboratory (Advisor: Prof. Young-Joo Lee)

**Graduate Research Assistant**

*March 2016 – August 2019*

Ulsan National Institute of Science and Engineering (UNIST), Korea

Smart Infrastructure and Systems Laboratory (Advisor: Prof. Sung-Han Sim)

**Undergraduate Research Assistant**

*December 2012 – February 2016*

Ulsan National Institute of Science and Engineering (UNIST), Korea

Smart Infrastructure and Systems Laboratory (Advisor: Prof. Sung-Han Sim)

**Awards and Honors**

**UNI-STAR Scholarship**

Duration: March 2011 – February 2017

Top entrance score scholarship for undergraduate school

**Global Ph.D. Fellowship (GPF)**

Duration: March 2017 – August 2020

Grants: KRW 30,000,000 / year

Funding code: NRF- 2017H1A2A1046416

Title: Bridge performance evaluation using sensor information fusion by deep learning

Funded by National Research Foundation (NRF) and Ministry of Education

**Journal Publications**

**International (SCI)**

\* Corresponding Author

1. (Under review) Wang, S., Fillmore, T., **Lee, J.\***, Eick, B. A., and Spencer Jr, B. F., “Reference-free ego-motion compensation for vision-based measurement of structural deformations of miter gates”
2. (Under review) Geetha, G. K., **Lee, J.\***, and Sim, S.-H.\*, “Computer vision-based scan-to-BIM from single image for prefabricated concrete slab using UAVs”
3. (Under review) Kim, H., Sim, S.-H., Yoon, J., and **Lee, J.\***, “Full-scale structural displacement measurement with camera ego-motion compensation using RGB and LiDAR cameras”
4. (Under review) Hong, J., Sim, S.-H., Lee, J., Kim, H., Cho, S., and **Lee, J.\***, “Computer vision-based 6-DOF displacement measurement of bridge bearings robust to camera ego-motion”
5. (Under review) Lee, G., Sim, S.-H., and **Lee, J.\***, “Automated localization of shear connectors in prefabricated construction using 3D point cloud”
6. (Accepted) Jeong, S., Kim, H., Kim, S. I., Lee, K. C., and **Lee, J.\***, “Phase shift-based resonance assessment for in-service high-speed railway bridges”
7. **Lee, J.**, Choi, J., Shin, Y., and Sim, S.-H.\* (2023), "Estimation of water stagnation in asphalt-overlaid bridges using ground-penetrating radar," Structural Control and Health Monitoring, 2023, Article ID 7280555.
8. Kim, B., **Lee, J.**, Sim, S.-H., Cho, S.\*, and Park, B.H. (2022), "[Computer vision-based remote displacement monitoring system for in-situ bridge bearings robust to large displacement induced by temperature change](https://doi.org/10.12989/sss.2022.30.5.521)," Smart Structures and Systems, 30(5), pp.521-535.
9. **Lee, J.**, Jeong, S., Kim, H., Lee, K.-C.\*, and Sim, S.-H.\* (2022), "[Comparative study of long-term displacement measurement methods - Focusing on a pre-stressed concrete bridge under construction](https://doi.org/10.1016/j.measurement.2022.111691)," Measurement, 201, pp.111691.
10. Lee, J., Jeong, S., **Lee, J.**, Sim, S.-H., Lee, K.-C.\*, and Lee, Y.-J.\* (2022), "Sensor data-based probabilistic monitoring of time-history deflections of railway bridges induced by high-speed trains," Structural Health Monitoring, 14759217211063424.
11. Lee, S., **Lee, J.**, Park, J.-W., and Sim, S.-H.\* (2021), “Nontarget-based measurement of 6-DOF displacement using combined RGB color and depth information,” IEEE/ASME Transactions on Mechatronics, 26(3), pp.1358-1368.
12. Jeong, J., Kim, H., **Lee, J.**, and Sim, S.-H.\* (2021), “Automated wireless monitoring system for cable tension forces using deep learning,” Structural Health Monitoring, 20(4), pp.1805-1821.
13. **Lee, J.**, Lee, K.-C., Jeong, S., Lee, Y.-J., and Sim, S.-H.\* (2020), "Long-term displacement measurement of full-scale bridges using camera ego-motion compensation," Mechanical Systems and Signal Processing, 140.
14. **Lee, J.**, Jeong, S., Lee, Y.-J.\*, and Sim, S.-H.\* (2019), "Stress estimation using digital image correlation with compensation of camera motion-induced error," Sensors, 9(24), pp.5503.
15. Lee, J., Lee, K.-C., Sim, S.-H., **Lee, J.**, and Lee, Y.-J.\* (2019), "Bayesian prediction of prestressed concrete bridge deflection using finite element analysis," Sensors, 19(22), pp.4956.
16. **Lee, J.**, Lee, K.-C., Lee, S., Lee, Y.-J.\*, and Sim, S.-H.\* (2019), "Long-term displacement measurement of bridges using a LiDAR system," Structural Control and Health Monitoring, 26(10), pp.e2428.
17. Jeong, S., **Lee, J.**, Cho, S.\*, and Sim, S.-H.\* (2019), "Integrated cable vibration control system using Arduino," Smart Structures and Systems, 23(6), pp.695-702.
18. **Lee, J.**, Kim, E., Gwon, S., Cho, S., and Sim, S.-H.\* (2019), "Uniaxial static stress estimation for concrete structures using digital image correlation," Sensors, 19(2), pp.319.
19. Cho, S., **Lee, J.**, and Sim, S.-H.\* (2018), "Comparative study on displacement measurement sensors for high-speed railroad bridge," Smart Structures and Systems, 21(5), pp.637-652.
20. **Lee, J.**, Lee, K.-C., Cho, S.\*, and Sim, S.-H.\* (2017), "Computer vision-based structural displacement measurement robust to light-induced image degradation for in-service bridges," Sensors, 17(1), pp.2317.
21. Kim, H., **Lee, J.**, Ahn, E., Cho, S., Shin, M., and Sim, S.-H.\* (2017), "Concrete crack identification using a UAV incorporating hybrid image processing," Sensors, 17(9), pp.2052.
22. Cho, S., Sim, S.-H.\*, Park, J.-W., and **Lee, J.** (2014), "Extension of indirect displacement estimation method using acceleration and strain to various types of beam structures," Smart Structures and Systems, 14(4), pp.699-718.

**Domestic (KCI)**

1. Jeong, S., Lee, C., Kim, G., Yeo, I., and **Lee, J.\*** (2023), “Image-based high-precision strain measurement system for continuous welded rail,” Journal of the Korean Society for Railway, 26(9), pp. 664-671.
2. Jeong, S., **Lee, J.**, and Lee, K.C.\* (2023), “Seasonal variation of dynamic properties of Honam high-speed railway PSC bridge,” Journal of the Korean Society for Railway, 26(4), pp.260-267.
3. **Lee, J.**, Cho, S., and Sim, S.-H.\* (2014), "Vision-based displacement measurement system operable at arbitrary positions,” Journal of the Korea institute for structural maintenance and inspection, 18(6), pp.123-130.