

## Jongwoong Park

Associate Professor

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### APPOINTMENTS

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- 2021–present    **Associate Professor**, School of Civil and Environmental Engineering, Chung-Ang University  
Department of Smart Cities, Chung-Ang University
- 2017-2019      **Assistant Professor**, School of Civil and Environmental Engineering, Chung-Ang University
- 2014-2017      **Postdoctoral Researcher**, University of Illinois at Urbana-Champaign  
(Supervisor: Prof. Billie F. Spencer, Jr.)
- 2013            **Research Professor**, Korean Institute of Ocean Science and Technology (KIOST)

### EDUCATION

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- 2009-2013      **Ph.D.**, Civil Eng., Korea Advanced Institute of Science and Technology (KAIST), Korea, 2013  
Dissertation Title: Displacement Estimation using Multimetric Data Fusion  
*Advisor: Hyung-Jo Jung*
- 2008-2009      **M.S.**, Civil Eng., KAIST, Korea, 2009  
Dissertation Title: Vision-based Displacement Measurement Method for Large Flexible Structure  
using Partitioning Approach  
*Advisor: Hyung-Jo Jung*
- 2003-2008      **B.S.**, Civil Eng., Hanyang University, Korea, 2008

### RESEARCH INTERESTS

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- Structural Health Monitoring
- Structural Mechanics and Dynamics
- Deep Neural Network for Data Analysis
- IoT (internet of things) sensor system
- UAV (Unmanned Aerial Vehicle) for Automated Structural Inspection
- Smart Construction & Smart City

### RESEARCH EXPERIENCE

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#### Smart Infrastructure Technology Laboratory, Chung-Ang University, Korea (March 2017 – Present)

- **Smart Bridge using IoT sensors and Cloud-based Analytics**
  - Designed IoT sensors for multi-channel data acquisition and long-term operation
  - Developed cloud-based bridge data management and visualization
  - Deep-learning for anomaly detection and missing data generation
  - Cloud-computing for ambient bridge displacement estimation.
- **Fully non-contact Bridge Displacement Sensing for Load Carrying Capacity Test**
  - Developed computer vision system for non-contact measurement
  - Designed robust tracking algorithm and optimized calibration method using laser projection
  - Designed web-based data management platform
- **Precast Structure Monitoring from Fabrication to Construction**
  - Designed low-power sensor and data visualization QR code that can be embedded in the precast structure

- Embedded sensors monitors strain, acceleration, and temperature from fabrication
- The developed sensors monitor all history during stacking, lifting, delivery to sites to ensure the quality of the precast structure

Cloud-computing for ambient bridge displacement estimation

- ***Development of Portable Device for Automated Visual Inspection***
  - Designed microcontroller module to acquire GPS, IMU, and Lidar measurement
  - Developed 3D scanning system using Lidar synchronized with RGB images
  - Developed image stitching algorithm and deep learning-based crack detection model.
- ***Development of UAV-based Cable Tension Estimation System***
  - Designed a non-contact optical acceleration extraction algorithm
  - Developed a target-free vision-based displacement sensing method
- ***Image to Simulation Framework for Structural System Identification***
  - Developed structural displacement measurement using optical flow and tracking method
  - Integrated image-based multi-point structural sensing with numerical simulation
  - Conducted experiments on imaging to structural state estimation
- ***3D Structural Displacement Sensing using a VR (Virtual Reality) Device***
  - Designed a low-cost 3D motion sensing system using a VR tracking system
  - Developed digital twin model for visualizing motion of actual physical infrastructure
- ***Development of a Low-cost Seismic Sensor for Smart City***
  - Designed a sensor system with affordable MEMs accelerometer and ARM-based microcontroller
  - Designed ultra-low power event trigger to detect vibration and strain response over pre-defined threshold
  - Developed classification algorithm for earthquake to minimize false positive alarm
  - Incorporated BLE (Bluetooth Low Energy) beacons for broadcasting classified information to smart city
- ***Development of Event-Driven Smart Sensor for Long-term and Continuous Monitoring***
  - Designed a ultra-low power triggering system to detect strain and acceleration response over threshold
  - Developed hardware and software for ultra-low power trigger and damage detection algorithm.
- ***Time-Series Deep Learning Model for Automated Bridge Condition Assessment***
  - Designed deep learning model for damage detection using LSTM and CNN
  - Developed input size normalization scheme to allow input data with arbitrary size
  - Conducted numerical simulation to validate the proposed Deep network
- ***Self-Sensing Concrete by coupling fiber-reinforced concrete with Signal Processing Module***
  - Designed a circuit to accurately measure electrical resistance of a fiber-reinforced concrete
  - Developed event driven sensing mechanism to monitor occurrence of crack continuously

## PROFESSIONAL ACTIVITIES AND SERVICE

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### Journal Reviewers

- Structure Control and Health Monitoring; Sensors; Smart Structures and Systems; Advances in Structural Engineering; Shock and Vibration; Mechatronics; Measurement; Structural Health Monitoring; Mechanical System and Signal Processing; Journal of the Korea Institute for Structural Maintenance and Inspection

### Conference Organizer/ Session Chair

- Structural Maintenance Session, Conference on Computational Structural Engineering, 2021
- Session 8, IABSE Seoul, 2020
- Session organizer, CODE2018
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### Professional Committee

- KIBIM Digital infrastructure technical committee
  - KSCE Magazine editing committee
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## **TEACHING EXPERIENCES**

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### **Engineering Math and Practice**

**Spring 2020; Spring 2021**

#02337, Chung-Ang University

- Topics: Analytic and numerical solutions for differential equations, Laplace and Fourier Transform; application to dynamic systems

### **Advanced Sensing Technologies for Civil Engineers**

**Fall 2019; Fall 2017**

#48468, Chung-Ang University

- New multi-disciplinary course developed at Chung-Ang University
- Topics: Fundamental Principle of Accelerometer, Strain, Displacement sensor; Fundamental of Electronic Circuits; Fundamental of Digital Signal Processing; Experimental Structural Response Acquisition
- Directed to graduate students and senior students

### **Deep learning for Civil Engineers**

**Fall 2018**

#48469, Chung-Ang University

- New multi-disciplinary course developed at Chung-Ang University
- Topics: Review of Machine Learning Techniques; Linear Algebra; Numerical Optimization; Introduction to Neural Network; Convolutional Neural Network (CNN) Architecture; Recurrent Neural Network (RNN); Lab Session on Training Time-Series Vibration and Crack Image Dataset.
- Directed to graduate students

### **Structural Dynamics**

**Fall 2018; Fall 2020; Spring 2021**

#31533, Chung-Ang University

- Topics: Modeling SDOF system; Transfer function and Impulse Response Function; MDOF System; Vibration on Continuous System; Brief Introduction to Earthquake Engineering
- Directed to graduate students

### **Capstone Design**

**Fall 2017, 2018, 2019; Spring 2018, 2019, 2020, 2021**

#47693, Chung-Ang University

- Guide student to solve community issues by incorporating sensing technologies
- Topics: Axiomatic Design; Introduction to Arduino; Bluetooth Communication; Data Visualization; Machine Learning; Introduction to Deep Learning
- Directed to senior students

### **Calculus 1**

**Fall 2018, Fall 2017**

#51213, Chung-Ang University

- Topics: Limits; Derivatives; Integral; Differential Equation; Application of Differentials and Integrals
- Directed to freshman students

### **Teaching Assistant**

- Structural Vibration and Control, Dept. of Civil and Env. Engrg., KAIST ( Fall 2012)
  - Held office hours and graded homework
  - Served as laboratory instructor
- Structural Dynamics, Dept. of Civil and Env. Engrg., UIUC ( Fall 2014)
  - Held office hours, graded homework, and graded exams
  - Delivered five substitute lectures in the professor's absence.

## **STUDENT ADVISEMENT**

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### **Ph.D students**

- Jongbin Won (March 2020 – present) at Chung-Ang Univ.  
Topic: Deep neural network for automated bridge condition monitoring
- Sadia Kayam Umer (September 2020 – present) at Chung-Ang Univ.  
Topic: Interfacing deep neural network with real-time sensor data for online condition monitoring
- Vedhus Hoskere (March 2016 – February 2017) at UIUC  
Topic: Vision-based Structural System Identification using a UAV
- Fernando Daniel Gomez (June 2015-February 2017) at UIUC  
Topic: Displacement Reconstruction from Acceleration using Tikhonov Regularization.

### **MS students**

- Suleman Khan (March 2020 – present)  
Topic: ultra-low power embedded sensing for precast structures

- Muhammad Zohaib Sarwar (September 2017 – August 2019) at Chung-Ang Univ.  
Topic: Event-Driven Wireless Sensor System for Multimeric Displacement Monitoring
- Jongbin Won (March 2018 – Present) at Chung-Ang Univ.  
Topic: Weekly Supervised Deep learning for Tracking and Stitching Concrete and Steel Images”
- Muhammad Rakeh Saleem (September 2018 – 2020) at Chung-Ang Univ.  
Topic: Development of Visual-inertia Module and Deep Learning Model for Automated Bridge Inspection”
- Muhammad Rakeh Saleem (September 2018 – 2020) at Chung-Ang Univ.  
Topic: Development of Visual-inertia Module and Deep Learning Model for Automated Bridge Inspection”

### Undergraduate students

- Junyoung Park (June 2019 – Present) at Chung-Ang Univ.  
Topic: IoT sensor development”
- Junsik Shin (June 2019 – Present) at Chung-Ang Univ.  
Topic: cloud-computing development”
- Minhyuk Song (June 2019 – Present) at Chung-Ang Univ.  
Topic: web-based visualization platform development”
- Kunhee Kim (June 2019 – Present) at Chung-Ang Univ.  
Topic: non-contact vision system development”
- Sehwa Yang (June 2019 – Present) at Chung-Ang Univ.  
Topic: cloud-based bridge bearing monitoring”
- Kisun Park (June 2019 –2020) at Chung-Ang Univ.  
Topic: Development of Low-cost Earthquake Monitoring and Notification System”
- Yunsung Han (June 2018 – December 2018) at Chung-Ang Univ.  
Topic: Non-contact Image Tracking using UAV”
- Wontae Jung (June 2017 – December 2017) at Chung-Ang Univ.  
Topic: Dynamic Displacement Estimation using an Accelerometer”

### Visiting students

- Dias Bakhtiyarov from Dept. of Civil Engrg., Nazarbayev, Kazakhstan (June 2018 – August 2018)  
Topic: Non-contact Image Tracking using UAV
- Cheng Liu from Dept. of Civil Engrg., Tsinghua, China (February 2015-March 2015)  
Topic: Sensor Fusion Algorithm for Tilt Measurement using Gyroscope and Accelerometer”

### HONORS & AWARDS

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2020	Excellent award Idea Challenges for Structural Safety and Maintenance in the National Safety Competition
2020	Excellent Award Best Practices and Application for Structural Safety and Maintenance in the National Safety Competition
2019	Mentored a team from our research group to have Minister’s award from Smart Earthquake Detection Competition
2018	Outstanding Faculty Mentor Teaching Award, Chung-Ang University
2018	Best Presentation Award at Korea BIM Conference
2014-2015	National Research Foundation Postdoctoral Fellowship
2013	Concrete Strength Estimation Using Non-destructive Technique, Excellence Award
2013	Best Paper Award, Annual Conference on Structural Maintenance and Inspection
2008-2013	Korea Advanced Institute of Science and Technology Research Assistantship
2003	Korean Government Scholarship for Undergraduate Students

## FUNDING PORTFOLIO

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### Chung-Ang University

- Co-PI:** *Development of Fully Non-Contact Bridge Displacement Sensing System for Bridge Load Carrying Capacity Test*
- \$300K in funding from Ministry of Land and Transportation, Korea (April 2021 – December 2022, funded)
  - The goal is to develop full non-contact displacement measurement system that does not require additional sensor installation on a bridge.
  - Collaborating with Tantan Safety, Inc.
- PI:** *New Paradigm of IoT sensor and Cloud-based Computing for Smart Bridge Level3*
- \$300K in funding from Ministry of Land and Transportation, Korea (April 2021 – December 2022, funded)
  - The goal is to establish a smart bridge by developing new paradigm of IoT sensors, cloud-based computing system.
  - Authored the proposal.
  - Collaborating with Banseok Safety, Inc.
- Co-PI:** *Smart Construction (section 4): Ultra-low power Precast Structure Monitoring System for Quality Assurance*
- \$40K/year in funding from Ministry of Land and Transportation, Korea (May 2019 – December 2025, funded)
  - The goal is develop ultra-low power sensing system with multi-channel strain and temperature sensors to accumulate databases in the fabrication process of precast structures.
  - Authored the proposal.
- Co-PI:** *Smart Construction (section 6): Monitoring Safety of Precast Structures delivered from the factory to the site using Cloud-based Sensing and Decision Making.*
- \$120K/year in funding from Ministry of Land and Transportation, Korea (May 2019 – December 2025, funded)
  - The goal is develop dynamic sensing system and simulation tool to analyze structure's responses in different scenarios (e.g., stacked on ground, during lifting and delivery). Interfacing sensor data with simulated result real-time for decision making.
- Co-PI:** *Development of Digital Twin System for Cable-Stayed Bridge Monitoring*
- \$1.2M in funding from National Research Foundation (NRF), Korea (September 2019 – February 2022, funded)
  - The goal is to establish digital twin model of a cable-stayed bridge by developing sensing skin using self-sensing concrete with IoT sensors, and deep learning architecture for training structural elements for possible damage scenarios.
  - Authored the proposal.
- PI:** *Non-contact Cable Monitoring using UAV and Optical flow*
- \$130K in funding from National Research Foundation (NRF), Korea (June 2019 – February 2022, funded)
  - The goal is to develop a non-contact cable tension force estimation using an UAV and computer vision. Non-contact acceleration measurement method is developed, and vibration of the cable is analyzed in frequency domain for cable force estimation.
  - Authored the proposal.
- Co-PI:** *Development of a Customized UAV for Bridge Inspection*
- \$40K in funding from Ministry of Land and Transportation, Korea (February 2019 – November 2019, funded)
  - The goal is to develop camera and inertial module integrated system for acquiring high-quality images with 6DOF of camera position. The developed system allows rapid image stitching, 3D reconstruction for visual inspection.
  - Authored the proposal.
- PI:** *Development of Structural Condition Index for a Bridge: Equivalent Neutral-Axis using Sensor Fusion*
- \$100K in funding from National Research Foundation (NRF), Korea (March 2017 – February 2020, funded)
  - The goal is to develop a damage indicator of a bridge using minimum possible number of sensors. The damage indicator using change in neutral axis is designed, and strain and acceleration fusion method is incorporated to minimize the use of sensor.
  - Authored the proposal.
- Co-PI:** *Bridge Maintenance System using Augmented Reality and Deep learning*
- \$20K in funding from Korea Expressway Corporation, Korea (August 2017 – December 2019, funded)
  - The goal is to develop a deep learning architecture for concrete image stitching and automated crack detection on a bridge using images acquired from an UAV.
  - Authored the proposal.

## University of Illinois at Urbana-Champaign

### Co-PI: *Condition Assessment of Railroad Bridges using Wireless Smart Sensors*

- \$520K in funding from Federal Railroad Administration (January 2017 – December 2018, funded)
- The goal of the research is to deploy wireless smart sensors for measuring displacement of railroad bridges and determine safety thresholds that can assist railroads in managing bridge assets and prioritizing repairs.
- Authored the proposal.

### Co-PI: *Wireless Sensor Framework for Enhanced Characterization of Oil and Gas Reserves in Kazakhstan*

- \$125K in funding from Nazarbayev University, Kazakhstan (2016-2017, funded)
- The goal of the research is to develop a wireless smart sensor for collecting high-resolution ground reflected waves over a wide inspection area for 3D seismic imaging.
- Organized international research team and authored the proposal

### Senior Researcher: *Reference-free Estimates of a Railroad Bridge Displacement under Revenue Service Traffic*

- \$140K in funding from Federal Railroad Administration (May 2015 – August 2016, funded)
- The goal of the research is to develop a displacement estimation method for a timber trestle and pin-connected truss bridge using wireless smart sensors
- Authored the proposal on behalf of Dr. B.F. Spencer, Jr.

## JOURNAL PUBLICATIONS (*more than 1320 citations, h-index = 19*)<sup>\*</sup>

1. Soojin Cho, Hongki Jo, Shinae Jang, **Jong-Woong Park**, Hyung-Jo Jung, Chung-Bang Yun, Billie F. Spencer Jr., and Ju-Won Seo, "Structural Health Monitoring of a Cable-stayed Bridge using Wireless Smart Sensor Technology: Data Analyses." *Smart Structures and Systems*, vol. 6, no. 5-6, pp. 461-480, 2010.
2. Ki-Yung Koo, Seung-Hoon Sung, **Jong-Woong Park**, and Hyung-Jo Jung, "Damage Detection of Shear Buildings using Deflections Obtained by Modal Flexibility." *Smart Materials and Structures*, vol. 19, no. 11, pp. 115026, 2010.
3. **Jong-Woong Park**, Jong-Jae Lee, Hyung-Jo Jung, and Hyun Myung, "Vision-based Displacement Measurement Method for High-rise Building Structures using Partitioning Approach." *NDT & E International*, vol. 43, no. 7, pp. 642-647, 2010.
4. **Jong-Woong Park**, Hyung-Jo Jung, Hongki Jo, and Billie F. Spencer Jr., "Feasibility Study of Micro-wind Turbines for Powering Wireless Sensors on a Cable-stayed Bridge." *Energies*, vol. 5, no. 9, pp. 3450-3464, 2012.
5. Hongki Jo, **Jong-Woong Park**, Billie F. Spencer Jr., and Hyung-Jo Jung, "Development of High-sensitivity Wireless Strain Sensor for Structural Health Monitoring." *Smart Structures and Systems*, vol. 11, no. 5, pp. 477-496, 2013.
6. Eunsung Kim, **Jong-Woong Park**, and SungHan Sim, "Dynamic Behavior of Composite Steel Girder Bridge Exceeding Train Speed 350km/h." *Journal of the Korea Academia-Industrial Cooperation Society*, vol. 14, no. 7, pp. 3518-3527, 2013. (in Korean)
7. **Jong-Woong Park**, Sung-Han Sim, and Hyung-Jo Jung, "Development of a Wireless Displacement Measurement System using Acceleration Responses." *Sensors*, vol. 13, no. 7, pp. 8377-8392, 2013.
8. **Jong-Woong Park**, Sung-Han Sim, and Hyung-Jo Jung, "Displacement Estimation Using Multimetric Data Fusion." *IEEE/ASME Transactions on Mechatronics*, vol. 18, no. 6, pp. 1675-1682, 2013.
9. **Jong-Woong Park**, Sung-Han Sim, and Hyung-Jo Jung, "Wireless Sensor Network for Decentralized Damage Detection of Building Structures." *Smart Structures and Systems*, vol. 12, no. 3-4, pp. 399-414, 2013.
10. Sung-Han Sim, Jian Li, Hongki Jo, **Jong-Woong Park**, Soojin Cho, Billie F. Spencer Jr, and Hyung-Jo Jung, "A Wireless Smart Sensor Network for Automated Monitoring of Cable Tension." *Smart Materials and Structures*, vol. 23, no. 2, pp. 025006, 2013.
11. Soojin Cho, Sung-Han Sim, **Jong-Woong Park**, and Junhwa Lee, "Extension of Indirect Displacement Estimation Method using Acceleration and Strain to Various Types of Beam Structures." *Smart Structure and Systems*, vol. 14, no. 4, pp. 699-718, 2014.
12. Haemin Jeon, Wancheol Myeong, Jae-Uk Shin, **Jong-Woong Park**, Hyung-Jo Jung, and Hyun Myung, "Experimental Validation of Visually Servoed Paired Structured Light System (ViSP) for Structural Displacement Monitoring." *IEEE/ASME Transactions on Mechatronics*, vol. 19, no. 5, pp. 1603-1611, 2014.
13. Byung-Jin Jung, **Jong-Woong Park**, Jin-Hak Yi, and Jin-Sun Park, "Changes in Dynamic Characteristics of Mono-pile-Type Offshore Structures According to Tidal Environments and Boundary Conditions." *Journal of Ocean Engineering and Technology*, vol. 28, no. 4, pp. 261-267, 2014. (in Korean),

<sup>\*</sup> See: <https://scholar.google.com/citations?user=Ev80LNcAAAAJ&hl=en>

14. **Jong-Woong Park**, Sung-Han Sim, and Hyung-Jo Jung, "Wireless Displacement Sensing System for Bridges using Multi-sensor Fusion." *Smart Materials and Structures*, vol. 23, no. 4, pp. 045022, 2014.
15. Seung-Hun Sung, Jong-Woong Park, Yeong-Jong Moon, and Hyung-Jo Jung, "Estimation of Structural Static Displacements Based on Vibration Data using Known Mass Perturbation." *Smart Material and Structures*, vol. 23, no. 3, pp. 037003, 2014.
16. S. H. Sung, J. H. Lee, **Jong-Woong Park**, K. Y. Koo, and H. J Jung, "Feasibility Study on an Angular Velocity-based Damage Detection Method using Gyroscopes." *Measurement Science and Technology*, vol. 25, no. 7, pp. 075009, 2014.
17. S. H. Sung, **Jong-Woong Park**, T. Nagayama, and H. J Jung, "A Multi-scale Sensing and Diagnosis System Combining Accelerometers and Gyroscopes for Bridge Health Monitoring." *Smart Materials and Structures*, vol. 23, no. 1, pp. 015005, 2014.
18. Chung-Bang Yun, Soojin Cho, Hyun-Jun Park, Jiyoung Min, and **Jong-Woong Park**, "Smart Wireless Sensing and Assessment for civil infrastructure." *Structure and Infrastructure Engineering*, vol. 10, no. 4, pp. 534-550, 2014.
19. Soojin Cho, **Jong-Woong Park**, and Sung-Han Sim, "Decentralized System Identification using Stochastic Subspace Identification for Wireless Sensor Networks." *Sensors*, vol. 15, no. 4, pp. 8131-8145, 2015.
20. Byung-Jin Jung, **Jong-Woong Park**, Sung-Han Sim, and Jin-Hak Yi, "Issues in Structural Health Monitoring for Fixed-type Offshore Structures Under Harsh Tidal Environments." *Smart Structures and Systems*, vol. 15, no. 2, pp. 335-353, 2015.
21. **Jong-Woong Park**, Sung-Han Sim, Byung-Jin Jung, and Jin-Hak Yi, "Study on Combined Use of Inclination and Acceleration for Displacement Estimation of a Wind Turbine Structure" *Journal of the Korean Society of Civil Engineers*, vol. 35, no. 1, pp. 1-8, 2015. (in Korean),
22. **Jong-Woong Park**, Sung-Han Sim, Jin-Hak Yi, and Hyung-Jo Jung, "Development of Temperature-robust Damage Factor Based on Sensor Fusion for a Wind Turbine Structure." *Frontiers of Structural and Civil Engineering*, vol. 9, no. 1, pp. 42-47, 2015.
23. Robin Kim, **Jong-Woong Park\***, and Sunghan Sim, "Development of Wireless Smart Sensing Framework for Structural Health Monitoring of High-speed Railway Bridges." *Journal of the Korea Academia-Industry Cooperation Society*, vol. 17, no. 5, pp. 1-9, (in Korean), 2016. (in Korean)
24. Soojin Cho, **Jong-Woong Park**, Rajendra P. and Sung-Han Sim, "Reference-free Displacement Estimation of Bridges using Kalman filter-based Multimetric Data Fusion." *Journal of Sensors*, 2016
25. **Jong-Woong Park**, Kyoung-Chan Lee, Sung-Han Sim, Hyung-Jo Jung, and Billie F. Spencer Jr, "Traffic Safety Evaluation for Railway Bridges using Expanded Multisensor Data Fusion." *Computer-Aided Civil and Infrastructure Engineering*, 2016.
26. Cheng Liu, **Jong-Woong Park\***, Billie F. Spencer Jr., Jiansheng Fan, and Dosoo Moon, "Sensor fusion for structural tilt estimation using an acceleration-based tilt sensor and a gyroscope." *Smart Material and Systems*, 2017.
27. Hyung-chul Yoon, Vedhus Hoskere, **Jong-Woong Park\***, Billie F. Spencer, Jr., "Cross-correlation-based structural system identification using unmanned aerial vehicles." *Sensors*, 2017
28. Fernando Daniel Gomez, **Jong-Woong Park\***, and Billie F. Spencer Jr., "Reference-Free Structural Dynamic Displacement Estimation Method." *Structural Control and Health Monitoring*, 25(8), 2018.
29. Li Zhu, Yuguang Fu, Raymond Chow, Jong-Woong Park, and Kirill Mechitov., "Development of a High-Sensitivity Wireless Accelerometer for Structural Health Monitoring." Vol. 19, no. 1, pp. 262, *Sensors*, 2018
30. **Jong-Woong Park**, Dosoo Moon, Hyungchul Yoon, Fernando Gomez, Billie F. Spencer Jr. and Jong Ryul Kim, "Visual-Inertia Displacement sensing using data fusion of vision-based displacement with acceleration." *Structural Control and Health Monitoring*, 2018.
31. Jongbin Won, **Jong-Woong Park\***, Kyoohong Park, Hyungchul Yoon, Do-Soo Moon, "Non-Target Structural Displacement Measurement Using Reference Frame-Based Deepflow." *Sensors*, 19(13), 2019
32. Vedhus Hoskere, **Jong-Woong Park\***, Hyungchul Yoon, Billie F Spencer Jr, "Vision-Based Modal Survey of Civil Infrastructure Using Unmanned Aerial Vehicles." *Journal of Structural Engineering*, 145(7), 2019
33. **Jong-Woong Park**, Do-Soo Moon\*, Sung-Han Sim, Billie F Spencer Jr, "Equivalent neutral axis for structural condition assessment using multi-sensor fusion." *Engineering Structures*, 197, 2019
34. Muhammad Zohaib Sarwar, Muhammad Rakeh Saleem, **Jong-Woong Park\***, "Event-Driven IoT Sensing System for Long-term Structural Health Monitoring.", *IEEE Sensors*, 2020
35. Seunghoo Jeong, Eeunjin Kim, **Jong-Woong Park\***, **Sung Han Sim\***, Data fusion-based damage identification for a monopile offshore wind turbine structure using wireless smart sensors, *Ocean Engineering* 195, 106728

36. Muhammad Zohaib Sarwar, **Jong-Woong Park\***, Bridge displacement estimation using a co-located acceleration and strain, *Sensors* 20 (4), 1109
37. Jongbin Won, Jungyoung Park, **Jong-Woong Park\***, In Ho Kim, BLESeis: low-cost IOT sensor for smart earthquake detection and notification, *Sensors* 20 (10), 2963
38. J Won, **Jong-Woong Park\***, Changsu Shim, Man Woo Park, Bridge-surface panoramic-image generation for automated bridge-inspection using deepmatching, *Structural Health Monitoring*, 1475921720930380
39. Min Kyung Kim, **Jong-Woong Park**, Dong Joo Kim, Characterizing the electro-mechanical response of self-sensing steel-fiber-reinforced cementitious composites, *Construction and Building Materials* 240, 117954
40. Sahyun Lee, Junghwa Lee, **Jong-Woong Park**, Sung Han Sim, Nontarget-based Measurement of 6-DOF Structural Displacement using Combined RGB Color and Depth Information, *IEEE/ASME Transactions on Mechatronics*
41. Homin Song, **Jong-Woong Park\***, John S. Popovics, Development of an MEMS ultrasonic microphone array system and its application to compressed wavefield imaging of concrete, *Smart Materials and Structures* 29 (10), 105011
42. Jongbin Won, **Jong-Woong Park\***, Soojin Jang, Kyohoon Jin, Youngbin Kim, Automated Structural Damage Identification Using Data Normalization and 1-Dimensional Convolutional Neural Network, *Applied Sciences* 11 (6), 2610
43. Suleman Khan, Jongbin Won, Junsik Shin, Junyoung Park, **Jong-Woong Park\***, Seung Eok Kim, Yun Jang, Dong Joo Kim, SSVM: An Ultra-Low-Power Strain Sensing and Visualization Module for Long-Term Structural Health Monitoring, *Sensors* 21 (6), 2211
44. Huy Viet Le, Min Kyung Kim, Dong Joo Kim, **Jong-Woong Park**, Electrical properties of smart ultra-high performance concrete under various temperatures, humidities, and age of concrete *Cement and Concrete Composites* 118, 103979
45. Muhammad Rakeh Saleem, **Jong-Woong Park\***, Jin Hwan Lee, Hyung Jo Jung, Muhammad Zohaib Sarwar, Instant bridge visual inspection using an unmanned aerial vehicle by image capturing and geo-tagging system and deep convolutional neural network, *Structural Health Monitoring* 20 (4), 1760-1777
46. **Jong-Woong Park\***, Jongbin Won, "Development of Vision-based Acceleration Measurement using Optical Flow and Tikhonov Regularization" (drafted)
47. Jongbin Won, **Jong-Woong Park\***, "Integration of Imaging and State-Space Model for Response Estimation." (drafted)
48. **Jong-Woong Park\***, Dosoo Moon, Sunghan Sim, "Detection of Prestress Loss in a PSC Beam using Strain and Acceleration" (drafted)

\*corresponding author

## CONFERENCE PROCEEDINGS

1. **Jong-Woong Park**, Hyung-Jo Jung, and Jong-Jae Lee, "Vision-based Displacement Measurement Method for High-rise Building Structures using Partitioning Approach." in *ANCRISST: The Fifth International Workshop on Advanced Smart Structures and Technology*, Boston, US, 2009.
2. **Jong-Woong Park**, Soojin Cho, Hongki Jo, Sung-Han Sim, Hyung-Jo Jung, Chung-Bang Yun, and Billie F. Spencer Jr., "Deployment and Evaluation of Wireless Smart Sensor-based Structural Health Monitoring System for a Cable-Stayed Bridge." in *The Twenty-Third KCCNN Symposium on Civil Engineering*, Taipei, 2010.
3. **Jong-Woong Park**, Soojin Cho, Hyung-Jo Jung, Chung-Bang Yun, Shin Ae Jang, Hongki Jo, Billie F. Spencer Jr., Tomonori Nagayama, and Ju-Won Seo, "Long-term Structural Health Monitoring System of a Cable-stayed Bridge Based on Wireless Smart Sensor Networks and Energy Harvesting Techniques." in *the 5th World Conference on Structural Control and Monitoring*, Tokyo, Japan. 2010.
4. **Jong-Woong Park**, Hyung-Jo Jung, Hongki Jo, Shinae Jang, and Billie F Spencer Jr., "Feasibility Study of Wind Generator for Smart Wireless Sensor Node in Cable-stayed Bridge." in *Proc. SPIE*, San Diego, US., 2010.
5. Hongki Jo, Sung-Han Sim, Kirill A Mechitov, Robin Kim, Jian Li, Parya Moinzadeh, Billie F. Spencer Jr., **Jong-Woong Park**, Soojin Cho, and Hyung-Jo Jung, "Hybrid Wireless Smart Sensor Network for Full-scale Structural Health Monitoring of a Cable-stayed Bridge." in *Proc. SPIE*, San Diego, US., 2011.
6. Hongki Jo, **Jong-Woong Park**, Billie F. Spencer Jr., and Hyung-Jo Jung, "Design and Validation of High-precision Wireless Strain Sensors for Structural Health Monitoring of Steel Structures." in *Proc. SPIE*, San Diego, US., 2012.
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