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RESEARCH INTERESTS

Visual Analytics; Structural Health Monitoring; Prognostics and Health Management; Computer Vision; Deep Learning; Photogrammetry; Aerial Manipulation; Hypersonic Propulsion; Compressible Flow

EDUCATION

PhD., Mechanical Engineering, Purdue University, West Lafayette, IN, USA 05/2020
✚ Dissertation: *Automating Visual Data Collection and Analytics toward Lifecycle Management of Engineering Systems*

MSc., Mechanical Engineering, University of Mississippi, University, MS, USA 05/2014
✚ Thesis: *Parametric Scramjet Analysis*

BSc., Mechanical Engineering, University of Mississippi, University, MS, USA 05/2012

EMPLOYMENT HISTORY

Assistant Professor, Department of Mechanical Engineering 08/2020 – Present
The State University of New York, SUNY Korea, Incheon, South Korea

Research Assistant Professor, Department of Mechanical Engineering 08/2020 – Present
The State University of New York, Stony Brook University, Stony Brook, USA

Graduate Research Assistant, School of Mechanical Engineering 08/2014 – 05/2020
Purdue University, West Lafayette, IN, USA

Graduate Research and Teaching Assistant, Department of Mechanical Engineering 08/2012 – 05/2014
University of Mississippi, University, MS, USA

PROFESSIONAL POSITION

Committee, Board of Finance 01/2022 – Present
The Korean Society of Mechanical Engineers (KSME) – Division of Reliability Engineering, South Korea

Committee, Board of Education 01/2021 – Present
The Korean Society of Prognostics and Health Management (KSPHM), South Korea

Short Course Committee 01/2021 – 09/2021
International Conference on Prognostics and Health Management Asia-Pacific 2021

RESEARCH RECORDS

1. **Development of IMU-based self-stabilizing autonomous guided vehicle (AGV) control system and hardware (Principal Investigator)** supported by AIDL co. Awarded funding of 5.7 million KRW (equivalent to 5k USD). *03/2022 – 7/2022*
2. **2021 Global Product Service Localization Research Group (Principal Investigator), supported by ITP (Incheon Technopark).** Awarded funding of 10 million KRW (equivalent to 9.5k USD). *10/2021– 12/2021*
3. **XR based Intuitive Inventory System for Smart Factory (Co- Principal Investigator),** supported by RAPA (Korea Radio Promotion Association). Award funding of 460 million KRW (equivalent to 420k USD), 3 conference paper published [C6],[C7],[C8]. *04/2021 – 03/2024*
4. **Automating Visual Assessment of Infrastructure exploiting Computer Vision and Big Visual Data (Principal Investigator),** supported by NRF (National Science Foundation of Korea) under Grant No. NRF-2021R1G1A1012298. Award funding of 30 million KRW (equivalent to 27k USD), 1 journal paper published [J10], [A1]. *03/2021 – 03/2022*
5. **Integrating Human and Machine for Post-Disaster Visual Data Analytics (Research Assistant, Purdue University),** supported by NSF under Grant No. NSF-1835473, 2 journal paper published [J7], [J9]; 1 journal paper accepted [J10]; 1 conference paper accepted [C9]; 1 proposal submitted [P5]. *01/2019 – 05/2020*
6. **STORM: Safeguarding Cultural Heritage through Organisational Resources Management (Research Assistant, Purdue University),** collaborated with EU (European Union) under Grant No. H2020 n. 700191, 1 conference paper published [C4]; 1 journal paper under review [J13]. *04/2017 – 05/2020*
7. **RETH: Resilience ExtraTerrestrial Habitat (Research Assistant, Purdue University),** supported by New Horizon Program at Purdue University and NASA (The National Aeronautics and Space Administration), 3D models & videos were published in numerous articles worldwide (e.g., usatoday.com, space.com, etc.); Available in <https://phys.org/news/2019-07-humans-lava-tubes-moon.html>, 1 conference paper published [C5]. *08/2018 – 01/2019*
8. **Active Citizen Engagement to Enable Lifecycle Management of Infrastructure Systems (Research Assistant, Purdue University),** supported by NSF under Grant No. NSF-1645047, 2 journal paper published [J6], [J8]. *05/2017 – 08/2018*
9. **Vision-based Visual Inspection System for A Large Number of Aerial Images (Research Assistant, Purdue University),** 1 journal paper published [J6]; 1 proposal funded [P5] *01/2017 – 12/2017*
10. **Sensor Integrated Autonomous Flight UAV System Development (Research Assistant, Purdue University),** 2 proposal generated [P1], [P2] *05/2016 – 05/2021*
11. **Automated Region-of-Interest Localization and Classification for Facility Visual Assessment (Research Assistant),** 1 journal paper published [J5]; 1 conference paper published [C2]. *05/2015 – 05/2017*

12. **Image-Based Collection and Measurements for Construction Pay Items** 05/2015 – 08/2017
 (Research Assistant), supported by INDOT (Indiana Department of Transportation) under Grant No. SPR-4006, 1 journal paper published [J4]; 1 conference paper published [C1]; 1 technical Report published [C3].
13. **Parametric Analysis of Scramjet Engine Varying Material and Fuel (Research Assistant)**, 08/2012 – 05/2014
 supported graduate program by University of Mississippi, 3 journal papers published [J1], [J2], [J3]; 1 Master thesis generated

TEACHING RECORDS

Course Teaching

MEC 510: Object-Oriented Programming for Scientists and Engineers – Visual Analytics for Mechanical Engineers at the State University of New York, SUNY Korea	Sp2022
MEC 410: Design of Machine Elements at the State University of New York, SUNY Korea	Sp2022
MEC 301: Thermodynamics at the State University of New York, SUNY Korea: Recorded the highest course evaluation score in the department	Fa2020, 2021
MEC 320: Numerical Methods in Engineering Design and Analysis at the State University of New York, SUNY Korea	Fa2021
MEC 363: Mechanics of Materials at the State University of New York, SUNY Korea	Sp2021

Student Advising

Supervisor, Ph.D. Students, the State University of New York, SUNY Korea

- **Jonathan Boyack:** Smart and resilience city application exploiting visual data and computer vision techniques 2020 – Present

Supervisor, Master’s Students, the State University of New York, SUNY Korea

- **Ricardo Ortiz:** Vision-based Lifecycle assessment and management on infrastructure 2021 – Present
- **Jee Won Lee:** Lidar sensing and SLAM for autonomous vehicle 2022 – Present

Dissertation Committee Chair, Ph.D. Student, the State University of New York, SUNY Korea

- **Mark Anthony Rotor:** Designing tidal turbine (HATT) blades utilizing Artificial Neural Network (ANN) where I serve as chair of the committee 2021 – Present

Supervisor, Undergraduate Students, the State University of New York, SUNY Korea

- **Pureun Jeong:** Visual Analytics (Fa2021, Sp 2022)
- **Sooyon Chang:** SLAM implementation for visual assessment (Fa2020, Sp 2021, Fa2021)
- **Hyunseung Cha:** Motor driver development for EV (Fa2020, Sp 2021, Fa2021)
- **Hansol Lim:** EV system for visual assessment (Fa2020, Sp2021)
- **Prince-David Malendele:** SLAM implementation for visual assessment (Fa2020, Sp2021)

Research Mentor, Undergraduate Research Course, Purdue University

- **Wookjin Chung:** 6 credits of undergraduate research (Sp2018, Fal2019)
- **Jonghyun Park:** 6 credits of undergraduate research (Sp2018, Fa2019)
- **Gun Wook Park:** 6 credits of undergraduate research (Sp2017, Fa2017)
- **Sharda Parth:** 3 credits of undergraduate research (Sp2018)
- **Yisong Yin:** 6 credits of undergraduate research (Fa2016, Sp2017)

STEM Curriculum Development for K-12 Students

TRAILS: Teachers and Researchers Advancing Integrated Lessons in STEM, *Purdue University* 2016 – 2017

- Supported by NSF under Grant No. NSF-1513248
- Promote practices that increase students' motivations and capacities to pursue careers in STEM area.

SLED: Science Learning through Engineering Design 2015 – 2016

- Supported by NSF under Grant No. NSF-0962840
- Collaboration between STEM disciplinary faculty and grades 3-6 teachers to develop engineering-based tasks.

Teaching and Educational Services

- **TRAILS K-12 Outreach:** Collaborated Eng. Project & Activity with 8 high schools and 12 elementary schools in Indiana

SYNERGISTIC LEADERSHIP POSITION

Session Chair, Asia Pacific Conference of the Prognostics and Health Management 09/2021

Society 2021 (PHMAP 2021), Jeju, South Korea.

- Organize short course; serve as a chair of the session "Machine Learning Methods for PHM".

Session Chair, Conference on Toward 'Ontact' Industries through PHM (PHM Korea 09/2021

2021, Jeju, South Korea.

- Serve as a chair of the session "Application of PHM".

Workshop Director, 4th Midwest Smart Structure Colloquium at Purdue University, West 04/2019

Lafayette, IN, USA.

- Organize, design, and direct a 3-days colloquium with 50 participants which is held in Bowen Laboratory at Purdue University.

HONORS & AWARDS

Awards

Honorable Mentions from 3rd Midwest Smart Structure Colloquium, *University of Illinois (UIUC)* 10/2017

Travel Award & Workshop Invitation from *NHERI RAPID Experimental Facility, NSF* 07/2019

- This award selects 20 attendees who has professional research background for the RAPID 4 days Equipment Training Workshop at the University of Washington, Seattle, as well as support up to \$1,500 Travel Fund.

Travel Award for Conference from College of Engineering, *Purdue University* 05/2018

- This award recognizes excellence PhD candidates supporting up to \$1,000 for 2019 EWSHM conference at Hilton Hotel, Manchester, UK

Resident Assistant Scholarship from University of Mississippi 08/2012 – 08/2013

Honor Program Scholarship from University of Mississippi 01/2011

- This scholarship is awarded to prominent undergraduate students in the School of Engineering.

PROPOSAL DEVELOPMENT to U.S. GOVERNMENT (5 generated, 1 awarded).

- [P5] **Active Citizen Engagement to Enable Lifecycle Management of Infrastructure Systems** 07/2016
- (Funded under Grant No. **CMMI-1645047**) Co-authored successful proposal with funded \$100,000 from National Science Foundation (NSF).
- [P4] **Automating Damage Quantification, Localization and BIM Updating Using Voluminous Optical Data** 02/2020
- Co-authored successful proposal and requested \$400,000 to National Science Foundation (NSF).
- [P3] **HDBE (E-Defense): Enabling Building Damage Assessment by Engaging Remote Experts** 01/2018
- Co-authored and requested \$700,000 to National Science Foundation (NSF).
- [P3] **S&SA: Autonomous Infrastructure Inspection and Condition-Based Maintenance** 05/2017
- Co-authored proposal and requested to National Science Foundation (NSF).
- [P1] **S&SA: Reconfigurable Aerial Robots for Intelligent Assessment to Industrial Disasters** 11/2016
- Co-authored proposal and requested to National Science Foundation (NSF).

PROFESSIONAL TALKS & PRESENTATION

- [T6] Invited Guest Lecturer, Artificial Intelligence Winter School, Korea Society for Mechanical Engineers (KSME) – AI Research Group, KAIST, Daejeon, South Korea 02/2022
- [T5] Invited Speaker, Conference on Toward 'Ontact' Industries through PHM (PHM Korea 2021), Korea Society for Prognostics and Health Monitoring (KSPHM), Jeju, South Korea 09/2021
- [T4] Research Seminar, Korea Institute of Construction Technology (KICT), Ilsan, South Korea 09/2020
- [T3] Research Seminar, Midwest Smart Structure Colloquium (MSSC), Midwest area US 10/2016, 10/2017, 4/2019
- [T2] Research Seminar, 9th European Workshop on SHM, Manchester, UK, July 08/2018
- [T1] Poster Session, Herrick board meeting, West Lafayette, IN, USA 11/2015, 11/2016, 11/2018

PATENTS

- [A1] **Jongseong Choi*** (2021.11), Computer Vision Technique to Extract Structural Information from Citizen Science Data: Automated Lifecycle Infrastructure Monitoring Application. Korean Patent No. 10-2021-1068454 11/2021

PEER-REVIEWED JOURNAL PAPERS (10 published, 1 accepted, 4 under review)

- [J15] Xiao-Le Han; Toshiro Hata, **Jongseong Choi**, Yan-Jun Du, Yi-Jie Wang, & Ning-Jun Jiang* (2022), Deep Learning Based Approach for the Automatic Detection of Marine Microplastics, Classification and Segmentation, *Chemosphere*, under review.
- [J14] Ju An Park, Xiaoyu Liu, Chul Min Yeum, Shirley J. Dyke, Max Midwinter, Chungwook Sim, **Jongseong Choi**, Zhiwei Chu, Thomas Hacker, & Bedrich Benes (2022), Multi-output Image Classification to Support Post-Earthquake Reconnaissance, *Journal of Performance of Constructed Facilities*, accepted.
- [J13] Xiao-Le Han, Ning-Jun Jiang*, Yu-Fei Yang, **Jongseong Choi**, Devandra N. Singh, Yan-Jun Du, & Yi-Jie Wang (2022), Deep Learning Approach for the Detection and Instance Segmentation of Clayey Soil Desiccation Crack, *Computers and Geotechnics*. accepted.

- [J12] Xiaoyu Liu, Shirley J. Dyke*, Ali Lenjani, Ilias Billionis, Xin Zhang, & **Jongseong Choi** (2022), Automated Image Localization to Support Rapid Building Reconnaissance in a Large-scale Area, *Computer-Aided Civil and Infrastructure Engineering*, in press, (IF: 11.775, JCR top 0.72%)
- [J11] **Jongseong Choi***, Lazaros Toumanidis, Chul Min Yeum, Patrikakis Charalampos, Ali Lenjani, Xiaoyu Liu, Panagiotis Kasnesis, Ricardo Ortiz, Nin-Jun Jiang, & Shirley J. Dyke (2022), Automated Graffiti Detection: Automated Graffiti Detection: A Novel Approach for Maintaining Historical Architectures in Community, *Applied Sciences*, 12(6), 2983
- [J10] **Jongseong Choi***, Ju An Park, Shirley J. Dyke, Chul Min Yeum, Xiaoyu Liu, Ali Lenjani, & Ilias Billionis (2022), Similarity Learning to Enable Building Searches in Post-event Image Data, *Computer-Aided Civil and Infrastructure Engineering*, 37(2), 261-275, (IF: 11.775, JCR top 0.72%)
- [J9] Xiaoyu Liu, Shirley J. Dyke*, Chul Min Yeum, Ilias Billionis, Ali Lenjani, & **Jongseong Choi** (2020), Automated Indoor Image Localization to Support Post-Event Building Assessment. *Sensors*, 20(6), 1610.
- [J8] **Jongseong Choi*** & Shirley J. Dyke (2020), CrowdLIM: Crowdsourcing to Enable Lifecycle Infrastructure Management. *Computers in Industry*, 115, 103185.
- [J7] Ali Lenjani*, Shirley J. Dyke, Ilias Billionis, Chul Min Yeum, Kenzo Kamiya, **Jongseong Choi**, Xiaoyu Liu, & Arindam G. Chowdhury (2020), Towards Fully Automated Post-event Data Collection and Analysis: Pre-event and Post-event Information Fusion. *Engineering Structure*, 109884.
- [J6] Chul Min Yeum*, **Jongseong Choi**, & Shirley J. Dyke. (2019), Automated Region-of-interest Localization and Classification for Vision-based Visual Assessment of Civil Infrastructure. *Structural Health Monitoring*, 1475921718765419.
- [J5] **Jongseong Choi**, Chul Min Yeum*, Shirley J. Dyke, & Mohammad J. Jahanshahi (2018), Computer-aided Approach for Rapid Post-event Visual Evaluation of a Building Façade. *Sensors*, 18(9), 3017.
- [J4] Chul Min Yeum*, **Jongseong Choi**, & Shirley J. Dyke (2017), Autonomous Image Localization for Visual Inspection of Civil Infrastructure. *Smart Materials and Structures*, 26(3), 035051.
- [J3] Jeffrey A. Roux*, **Jongseong Choi**, & Neerad Shakya (2014), Parametric Scramjet Cycle Analysis for Nonideal Mass Flow Rate. *Journal of Thermophysics and Heat Transfer*, 28(1), 166-171.
- [J2] Jeffrey A. Roux*, Neerad Shakya, & **Jongseong Choi** (2013), Scramjet: Minimum Thrust-specific Fuel Consumption with Material Limit. *Journal of Thermophysics and Heat Transfer*, 27(2), 367-368.
- [J1] Jeffrey A. Roux*, Neerad Shakya, & **Jongseong Choi** (2012), Revised Parametric Ideal Scramjet Cycle Analysis. *Journal of Thermophysics and Heat Transfer*, 27(1), 178-183.

CONFERENCE PROCEEDINGS & OTHER ARTICLES (9 published)

- [C10] **Jongseong Choi** & Shirley J. Dyke, "ARIO: Automatic Reconnaissance Image Organizer to Learn from Earthquake", Annual Conference of Korean Society of Mechanical Engineers, Division of Reliability, Jeju, South Korea, Mar 23 – 25, 2022
- [C9] Shirley J. Dyke, Xiaoyu Liu, **Jongseong Choi**, Chul Min Yeum, Juan Park, Ali Lenjani, Julio A. Ramirez, & Randall Poston, "Learning from Earthquakes Using the Automatic Reconnaissance Image Organizer," Proceedings of 17th World Conference on Earthquake Engineering, Sendai, Japan, Sep 27- Oct 2, 2021
- [C8] **Jongseong Choi** & Jonathan Boyack, "Automating Visual Data Analytics to Aid lifecycle Management of Infrastructure toward Sustainable cities", Annual Conference of the PHM Korea Society, Sep 8 – 10, 2021
- [C7] **Jongseong Choi**, Ju An Park, Chul Min Yeum, & Shirley J Dyke, "Similarity Learning to Building Search Capability: Post-event Image Data Application", Proceedings of Asia Pacific Conference of the Prognostics and Health Management Society 2021, Jeju, South Korea, Sep 8 – 11, 2021

- [C6] Jonathan Boyack & **Jongseong Choi**, “Machine Learning Approach for a Rapid Falling Hazard Assessment on High-Rise Buildings”, Proceedings of Asia Pacific Conference of the Prognostics and Health Management Society 2021, Jeju, South Korea, Sep 8 – 11, 2021
- [C5] Audai Theinat, Anahita Modiriasari, Antonio Bobet, Jay Melosh, Shirley J. Dyke, Julio A. Ramirez, **Jongseong Choi**, Amin Maghareh, & Daniel Gomez (2019, March), “Geology Explorations of Lava Tubes in the National Beds Lava Monuments,” In Lunar and Planetary Science Conference (Vol. 50).
- [C4] **Jongseong Choi**, Chul Min Yeum, Shirley J. Dyke, Mohammad R. Jahanshahi, & Gun Wook Park (2018), “Rapid Vision-Based Inspection of Nonstructural Components in Buildings,” Proceedings of the 9th European Workshop on Structural Health Monitoring, Manchester, UK, July 10-13, 2018.
- [C3] Chul Min Yeum, Anup Mohan, Shirley J. Dyke, Mohammad R. Jahanshahi, **Jongseong Choi**, Ziyi Zhao, & Julio A. Ramirez (2017), “Image-Based Collection and Measurements for Construction Pay Items,” Purdue University e-publication.
- [C2] Chul Min Yeum, **Jongseong Choi**, & Shirley J. Dyke (2017), “Automated Region-of-Interest Localization and Classification for Visual Assessment on Civil Infrastructure,” Proceedings of the 11th International Workshop on Structural Health Monitoring, Stanford, CA, September 12-14, 2017.
- [C1] Chul Min Yeum, **Jongseong Choi**, & Shirley J. Dyke (2017), “Image Localization for Computer-enhanced Visual Inspection of Civil Infrastructure,” Proceedings of Engineering Mechanics Institute Conference, San Diego, CA, United States, June 4-7, 2017.