JONGSEONG BRAD CHOI, Ph.D.

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RESEARCH INTERESTS

Visual Analytics; Structural Health Monitoring; Computer Vision; Smart Structure; Big Visual Data; Multiview Geometry; Aerial Manipulation; Propulsion; Heat Transfer

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 Korea – Stony Brook University, Incheon, South Korea

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

Research Associate, Resilient ExtraTerrestrial Habitats Institute ..... 05/2018 – 01/2019
Purdue University, West Lafayette, IN, USA

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

RESEARCH RECORDS

1. Integrating Human and Machine for Post-Disaster Visual Data Analytics ..... 01/2019 – 07/2020
- Supported by NSF under Grant No. NSF-1835473
- Develop a visual data retrieving software to search for data based on visual similarity, using Siamese Network.
- 1 journal paper accepted **[J10]**; 1 conference paper accepted **[C6]**; 1 proposal submitted **[P5]**; 1 journal paper under review **[J9]**

2. STORM: Safeguarding Cultural Heritage through Organisational Resources Management ..... 04/2017 – Present
- Collaboration with European Union Grant No. H2020 n. 700191
- Develop automated monitoring system for graffiti in a community
- 1 conference paper published **[C4]**; 1 journal paper under review **[J7]**

3. RETH: Resilience ExtraTerrestrial Habitat ..... 08/2018 – 01/2019

- Supported by New Horizon Program at Purdue University.
- Develop the expertise needed to address the grand challenge of permanent human settlements outside Earth.
- 3D models & videos were published in numerous articles worldwide (e.g., usatoday.com, space.com, phys.org, etc.); Available in https://phys.org/news/2019-07-humans-lava-tubes-moon.html
- 1 conference paper published **[C5]**

4. Active Citizen Engagement to Enable Lifecycle Management of Infrastructure Systems ..... 05/2017 – 08/2018

- Supported by NSF under Grant No. NSF-1645047
- Develop a lifecycle structural management system using crowdsourced images.
- 2 journal paper published **[J6], [J8]**

5. Vision-based Visual Inspection System for A Large Number of Aerial Images ..... 01/2017 – 12/2017

- Develop a building façade visual inspection technique using drones and orthophoto generation.
- **1 proposal generated and funded [P5],** 1 journal paper published **[J6]**

6. Sensor Integrated Autonomous Flight UAV System Development ..... 05/2016 – Present

- Use various sensors (LIDAR, stereo camera, and IMU) to achieve autonomous flight.
- 2 proposal generated **[P1]**, **[P2]**

7. Automated Region-of-Interest Localization and Classification for Facility Visual Assessment ..... 05/2015 – 05/2017

- Develop an image localization technique that can be used in structures using a large volume of images.
- 1 journal paper published **[J5]**; 1 conference paper published **[C2]**; 2 proposal generated **[P3], [P5]**

8. Image-Based Collection and Measurements for Construction Pay Items ..... 05/2015 – 08/2017

- Supported by INDOT under Grant No. SPR-4006
- Develop a tool of graphical measurement to improve efficiency and safety at a construction site
- 1 journal paper published **[J4]**; 1 conference paper published **[C1]**; 1 technical Report published **[C3]**

9. Parametric Analysis of Scramjet Engine Varying Material and Fuel ..... 08/2012 – 05/2014

- Supported graduate program by University of Mississippi.
- Analytic research of Propulsion and Heat Transfer of an engine optimization problem.
- 3 journal papers published **[J1]**, **[J2]**, **[J3]**; 1 Master thesis generated.

TEACHING / MENTORING RECORDS

Research Advising (5 undergraduate students)

- Undergraduate Research Advisor ..... 08/2016 – 05/2020
  - Yisong Yin, Undergrad Research (Senior), 6 credits (Fall 2016 – Spring 2017)
  - Sharda Parth, Undergrad Research (Senior), 3 credits (Spring 2017)
  - Gun Wook Park, Undergrad Research (Senior), 6 credits (Spring – Fall 2017), 1 conference paper published **[C5]**
  - Jonghyun Park, Undergrad Independent Research (Senior), 6 credits (Spring 2018 – current)
  - Wookjin Chung, Undergrad Independent Research (Senior), 6 credits (Spring 2018 – current)

Course Teaching

- Teaching Assistant ..... 05/2013 – 05/2014
  - ME325 Dynamics (typ. 70 students)
  - Primary responsibilities included weekly setup of equipment, presentation of pre-lab lectures, and grading.

STEM Curriculum Development for K-12 Students

- TRAILS: Teachers and Researchers Advancing Integrated Lessons in STEM ..... 02/2016 – 01/2020
  - Supported by NSF under Grant No. NSF-1513248
  - Promote practices that increase students' motivations and capacities to pursue careers in STEM area.
  - My role includes analyzing video data to observe students' behavior. (08/2016 – 05/2017)
- SLED: Science Learning through Engineering Design ..... 09/2010 – 08/2019
  - Supported by NSF under Grant No. NSF-0962840
  - Collaboration between STEM disciplinary faculty and grades 3-6 teachers to develop engineering-based tasks.
  - My role includes analyzing video data to observe students' behavior (09/2015 – 08/2016)

Teaching and Educational Services

- TRAILS K-12 Outreach: Collaborated Eng. Project & Activity w/ McCutcheon High School (Lafayette, IN)
- TRAILS K-12 Outreach: Collaborated Project Evaluation w/ Mishawaka High School (South Bend, IN)
- TRAILS K-12 Outreach: Collaborated Eng. Project Activity w/ Wea Ridge Middle School (Lafayette, IN)
- TRAILS K-12 Outreach: Collaborated Project Evaluation w/ Peru High School (Peru, IN)
- TRAILS K-12 Outreach: Collaborated Eng. Project Activity w/ Battle Ground Middle School (Lafayette, IN)

HONORS & AWARDS

Awards & Scholarships

- **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
  - This award recognizes excellence in research presentation.
- **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.

Professional Affiliation

- President of Siloam Purdue Presbyterian church, Purdue University ..... 01/2018 – 01/2019
- President of Korean Student Association (Olemiss KSA), University of Mississippi ..... 05/2014 – 08/2014
- American Society of Engineering Education (ASEE) ..... since 08/2017
- American Society of Mechanical Engineering (ASME) ..... since 04/2011

PROFESSIONAL LEADERSHIP EXPERIENCE

Colloquium Director 04/2019

- 4th Midwest Smart Structure Colloquium from Apr 12014, 2019 at Purdue University West Lafayette, IN, USA.

IT Manager ..... 03/2016 – 05/2020

- IISL Laboratory, Purdue University, West Lafayette, IN, USA

K-12 Video Data Collector & Analyzer ..... 09/2015 – 05/2017

- TRIALS & SLED research groups (NSF-1513248 & NSF-0962840), Purdue University, West Lafayette, IN, USA

- Responsibility: analyze the video data to observe K-12 student behavior in scientific & communicate with teachers and students to proceed a newly developed curriculum from our engineering education team.

Volunteer Staff Caregiver ………… 09/2009 – 10/2010

- ReVitailse, Southport, Merseyside, UK
- Responsibility: operate and maintain medical devices; train weekly volunteers for the devices.

PROFESSIONAL TALKS & PRESENTATIONS

[T3] Professional Presentation, Midwest Smart Structure Colloquium (MSSC), Midwest US … 10/2016, 10/2017, 4/2019

[T2] Professional Presentation, 9th European Workshop on SHM, Manchester, UK, July …….. 08/2018

[T1] Poster Session, Herrick board meeting, West Lafayette, IN, USA …….. 11/2015, 11/2016, 11/2017, and 11/2018

PROPOSAL DEVELOPMENT

[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
(Submitted to NSF HDBE program**)** 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 requrested $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).

PEER-REVIEWED JOURNAL PAPERS

[J11] Xiaoyu Liu, Shirley J. Dyke, Chul Min Yeum, Ilias Bilionis, Ali Lenjani, & **Jongseong Choi** (2020), Automated Indoor Image Localization to Support Post-Event Building Assessment. *Sensors*, 20(6), 1610.

[J10] **Jongseong Choi**, Chul Min Yeum, Ali Lenjani, & Shirley J. Dyke (2020), A Novel Building Searching & Identification Method for A Large Volume of Reconnaissance Images, *Structures*, submitted.

[J9] **Jongseong Choi** & Shirley J. Dyke (2020), CrowdLIM: Crowdsourcing to Enable Lifecycle Infrastructure Management. *Computers in Industry*, 115, 103185.

[J8] Ali Lenjani, Shirley J. Dyke, Ilias Bilionis, 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.

[J7] **Jongseong Choi**, Lazaros Toumanidis, Shirley J. Dyke, Chul Min Yeum, Patrikakis Charalampos, Ali Lenjani, Xiaoyu Liu, & Panagiotis Kasnesis (2020), Automated Graffiti Detection: A Novel Approach for Maintaining Historical Structures in Community, *ACM Journal on Computing and Cultural Heritage (JOCCH),* submitted.

[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

[C6] Shirley J. Dyke, Xiaoyu Liu, **Jongseong Choi**, Chul Min Yeum, Juan Park, Ali Lenjani, Julio A. Ramirez, & Randall Poston (2020), "Learning from Earthquakes Using the Automatic Reconnaissance Image Organizer," Proceedings of 17th World Conference on Earthquake Engineering, Sendai, Japan, Sep 13-18, 2020, accepted

[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-publidation.

[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 Diago, CA, United States, June 4-7, 2017.