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Education

- Ph.D. Mechanical Engineering Purdue University 2017-2022
Dissertation: *Automated Image Localization and Damage Level Evaluation for Rapid Post-Event Building Assessment.*
Adviser: Dr. Shirley J. Dyke
- M.S. Mechanical Engineering Purdue University 2015-2017
Thesis: *Sensitivity Analysis and Frequency Prediction of a Multi-Story Structure.*
Adviser: Dr. Shirley J. Dyke

Employment History

- Assistant Professor, Department of Mechanical and Aerospace Engineering 2025.8 – Present
University of South Florida, Tampa, FL, USA.
- Postdoctoral Researcher, School of Mechanical Engineering 2022.9 – 2025.8
Purdue University, West Lafayette, IN, USA

Research Interests

Applying machine learning and mathematical methods to developing computational model and strategies to support human–robot teaming for space missions.

Peer-Reviewed Journal Publications

- J1. **Xiaoyu Liu**, Amir Behjat, Shirley J. Dyke, Dawn Whitaker, Julio Ramirez, and Ilias Bilonis. "Computational Framework for Assessing Mission Outcomes with Humans and Robots." *AIAA Journal*, 63(4), 1596-1614. <https://doi.org/10.2514/1.j063846>
- J2. Amir Behjat, **Xiaoyu Liu**, Oscar Forero, Roman Ibrahimov, Shirley Dyke, Ilias Bilonis, Julio Ramirez, and Dawn Whitaker. "A Computational Framework for Making Early Design Decisions in Deep Space Habitats." *Advances in Engineering Software* 195 (2024): 103690. <http://dx.doi.org/10.1016/j.advengsoft.2024.103690>
- J3. Lissette Iturburu, **Xiaoyu Liu**, Xin Zhang, Benjamin E. Wogen, Juan Nicolas Villamizar, Shirley J. Dyke, Julio Ramirez, Jongseong Choi, Gianella Valencia, and Sergio M. Alcocer. "Building pose detection for the characterization of reinforced concrete buildings." *The Structural Design of Tall and Special Buildings*: 33, no. 13 (2024): e2120. <http://dx.doi.org/10.1002/tal.2120>
- J4. Benjamin Wogen, Jongseong Choi, Xin Zhang, **Xiaoyu Liu**, Lissette Iturburu, and Shirley J. Dyke. "Automated Bridge Inspection Image Retrieval Based on Deep Similarity Learning and GPS." *Journal of Structural Engineering* 150, no. 3 (2024): 04023238. <http://dx.doi.org/10.1061/JSENDH.STENG-12639>
- J5. **Xiaoyu Liu**, Shirley J. Dyke, Ali Lenjani, Ilias Bilonis, Xin Zhang, and Jongseong Choi. "Automated Image Localization to Support Rapid Building Reconnaissance in a Large-Scale Area." *Computer-Aided Civil and Infrastructure Engineering* 38, no. 1 (2023): 3-25. <http://dx.doi.org/10.1111/mice.12828>

- J6. Zhang, Xin, Benjamin Wogen, **Xiaoyu Liu**, Lissette Iturburu, Manuel Salmeron, Shirley J. Dyke, Randall Poston, and Julio Ramirez. "Machine-aided bridge deck crack condition state assessment using artificial intelligence." *Sensors* 23, no. 9 (2023): 4192. <http://dx.doi.org/10.3390/s23094192>
- J7. Lissette Iturburu, Jean Kwannandar, Shirley J. Dyke, **Xiaoyu Liu**, Xin Zhang, and Julio Ramirez. "Towards Rapid and Automated Vulnerability Classification of Concrete Buildings." *Earthquake Engineering and Engineering Vibration* 22, no. 2 (2023): 309-332. <http://dx.doi.org/10.1007/s11803-023-2171-2>
- J8. Xin Zhang, Benjamin Wogen, Zhiwei Chu, Shirley J. Dyke, Randall Poston, Thomas Hacker, Julio Ramirez, **Xiaoyu Liu**, Lissette Iturburu, Prince Baah, and Jeremy Hunter. "Machine-supported bridge inspection image documentation using artificial intelligence." *Transportation Research Record* 2677, no. 5 (2023): 720-736. <http://dx.doi.org/10.1177/03611981221135803>
- J9. Xin Zhang, Corey Beck, Ali Lenjani, Leslie Bonthron, Alana Lund, **Xiaoyu Liu**, Shirley J. Dyke, Julio Ramirez, Prince Baah, and Jeremy Hunter. "Enabling Rapid Large-Scale Seismic Bridge Vulnerability Assessment Through Artificial Intelligence." *Transportation research record* 2677, no. 2 (2023): 1354-1372. <http://dx.doi.org/10.1177/03611981221112950>
- J10. **Xiaoyu Liu**, Lissette Iturburu, Shirley J. Dyke, Ali Lenjani, Julio Ramirez, and Xin Zhang. "Information Fusion to Automatically Classify Post-Event Building Damage State." *Engineering Structures* 253 (2022): 113765. <http://dx.doi.org/10.1016/j.engstruct.2021.113765>
- J11. Ju An Park, **Xiaoyu Liu**, Chul Min Yeum, Shirley J. Dyke, Max Midwinter, Jongseong Choi, Zhiwei Chu, Thomas Hacker, and Bedrich Benes. "Multioutput Image Classification to Support Postearthquake Reconnaissance." *Journal of Performance of Constructed Facilities* 36, no. 6 (2022): 04022063. [http://dx.doi.org/10.1061/\(ASCE\)CF.1943-5509.0001755](http://dx.doi.org/10.1061/(ASCE)CF.1943-5509.0001755)
- J12. Jongseong Choi, Lazaros Tomanidis, Chul Min Yeum, Patrikakis Charalampos, Ali Lenjani, **Xiaoyu Liu**, Panagiotis Kasnehs, Ricardo Ortiz, Ning-Jun Jiang, and Shirley J. Dyke. "Automated Graffiti Detection: A Novel Approach to Maintaining Historical Architecture in Communities." *Applied Sciences* 12, no. 6 (2022): 2983. <http://dx.doi.org/10.3390/app12062983>
- J13. Jongseong Choi, Ju An Park, Shirley J. Dyke, Chul Min Yeum, **Xiaoyu Liu**, Ali Lenjani, and Ilias Bilonis. "Similarity Learning to Enable Building Searches in Post-Event Image Data." *Computer-Aided Civil and Infrastructure Engineering* 37, no. 2 (2022): 261-275. <http://dx.doi.org/10.1111/mice.12698>
- J14. **Xiaoyu Liu**, Shirley J. Dyke, Chul Min Yeum, Ilias Bilonis, Ali Lenjani, and Jongseong Choi. "Automated Indoor Image Localization to Support a Post-Event Building Assessment." *Sensors* 20, no. 6 (2020): 1610. <http://dx.doi.org/10.3390/s20061610>
- J15. Ali Lenjani, Shirley J. Dyke, Ilias Bilonis, Chul Min Yeum, Kenzo Kamiya, Jongseong Choi, **Xiaoyu Liu**, and Arindam Chowdhury. "Towards Fully Automated Post-Event Data Collection and Analysis: Pre-Event and Post-Event Information Fusion." *Engineering Structures* 208 (2020): 109884. <http://dx.doi.org/10.1016/j.engstruct.2019.109884>
- J16. Ju An Park, Chul Min Yeum, Jongseong Choi, and **Xiaoyu Liu**. "Automated Image Classification for Post-Earthquake Reconnaissance Images." *Journal of Computational Vision and Imaging Systems* 5, no. 1 (2019): 1-1.

Conference Proceedings

- C1. Shirley J. Dyke, **Xiaoyu Liu**, Xin Zhang, and Lissette Iturburu. "Empowering Engineers by Leveraging AI in Structural Engineering and Monitoring." *7th International Conference on Smart Monitoring, Assessment and Rehabilitation of Civil Structures (SMAR 2024)*. September 4-6, 2024, Salerno, Italy. <http://dx.doi.org/10.1016/j.prostr.2024.09.203>
- C2. Xin Zhang, Manuel Salmeron, Benjamin E. Wogen, **Xiaoyu Liu**, Lissette Iturburu, And Shirley Dyke. "Reinforcement Learning-based Bridge Inspection Management." *14th International Workshop on*

Structural Health Monitoring (IWSHM). September 12-14, 2023, Stanford, CA, USA. <http://dx.doi.org/10.12783/shm2023/36975>

- C3. **Xiaoyu Liu**, Amir Behjat, Shirley J. Dyke, Dawn Whitaker, Julio Ramirez, and Ilias Bilionis. "Roles of Human and Robotic Agents Toward Operating a Smart Space Habitat." *52nd International Conference on Environmental Systems (ICES 2023)*, July 16-20, 2023, Calgary, Canada. <https://ttu-ir.tdl.org/items/c9e2eb9f-b7ca-474a-b02d-dfb00229da84>
- C4. Kenneth Pritchard, Luca Vaccino, **Xiaoyu Liu**, Dawn Whitaker, and Shirley J. Dyke. "Lunar SmartHab Mission Operations and Crew Day-In-The-Life." *52nd International Conference on Environmental Systems (ICES 2023)*, July 16-20, 2023, Calgary, Canada. <https://ttu-ir.tdl.org/items/fc009078-c226-4d76-a50f-6ff7e2dc0e00>
- C5. Shirley J. Dyke, **Xiaoyu Liu**, Jongseong Choi, Chul Min Yeum, Ju An Park, Max Midwinter, Thomas Hacker, Zhiwei Chu, Julio Ramirez, Randall Poston, Mathieu Gaillard, Bedrich Benes, Ali Lenjani, and Xin Zhang. "Learning from Earthquakes Using the Automatic Reconnaissance Image Organizer (ARIO)." *17th World Conference on Earthquake Engineering*, September 27-October 2, 2021, Sendai, Japan. <https://par.nsf.gov/servlets/purl/10308795>

Presentations

- P1. **Xiaoyu Liu** (Author and Presenter), Shirley J. Dyke. "Assessing human and robotic agents for space habitat operation." *Lunar Surface Innovation Consortium at JHUAPL: Maintenance and Repair for Sustainable Lunar Surface Infrastructure Workshop*, September 3, 2025, online.
- P2. **Xiaoyu Liu** (Author and Presenter), Lissette Iturburu, Shirley J. Dyke. "Automated Localization for Path and Images on Structural Drawings." *ICURC: VISER Center Planning Meeting*, October 21-22, 2024, Houston, TX, USA.
- P3. **Xiaoyu Liu** (Author and Presenter), Shirley J. Dyke, and Dawn Whitaker. "Values of ISRU Technologies for Water Recovery System in Extended Missions." *2024 RETHi NASA Annual Review meeting*, June 10-11, 2024, West Lafayette, IN, USA.
- P4. **Xiaoyu Liu** (Author and Presenter), Dawn Whitaker, Shirley J. Dyke. "Evaluating the Sustainable Water Recycle System for Space Habitats: A Trade Study on In-Situ Manufacturing vs. Earth-Based Resupply." *6th Midwest Smart Structure Colloquium (MSSC)*, April 26-28, 2024, West Lafayette, IN, USA. **1st Place.**
- P5. **Xiaoyu Liu** (Author), Amir Behjat, Shirley J. Dyke, Dawn Whitaker, Julio Ramirez, and Ilias Bilionis. "Roles of Human and Robotic Agents Toward Operating a Smart Space Habitat." *52nd International Conference on Environmental Systems (ICES 2023)*, July 16-20, 2023, Calgary, Canada.
- P6. **Xiaoyu Liu** (Author and Presenter), Amir Behjat, Shirley J. Dyke, Dawn Whitaker, Julio Ramirez, and Ilias Bilionis. "Roles of Human and Robotic Agents Toward Operating a Smart Space Habitat." *2023 RETHi NASA Annual Review meeting*, June 21-22, 2023, West Lafayette, IN, USA.
- P7. **Xiaoyu Liu** (Author and Presenter). "Automated Image Localization and Damage Level Evaluation for Rapid Post-Event Building Assessment." *Invited talk at research seminar*, Lyles School of Civil Engineering, Purdue University. April 18, 2023, West Lafayette, IN, USA.
- P8. **Xiaoyu Liu** (Author and Presenter), Shirley J. Dyke, Ali Lenjani, Ilias Bilionis, Xin Zhang, and Jongseong Choi. "Automated Image Localization to Support Rapid Building Reconnaissance in a Large-scale Area." *Engineering Mechanics Institute Conference 2023 (EMI 2023)*, June 6-9, 2023, Atlanta, GA, USA.
- P9. **Xiaoyu Liu** (Author and Presenter), Amir Behjat, Shirley J. Dyke, Dawn Whitaker, Julio Ramirez, and Ilias Bilionis. "Roles of Human and Robotic Agents Toward Operating a Smart Space Habitat." *2023 Spring RETHi Industrial Advisory Board Meeting*, May 23, 2023, online.
- P10. **Xiaoyu Liu** (Author and Presenter), Shirley J. Dyke, Ali Lenjani, Ilias Bilionis, Xin Zhang, and Jongseong Choi. "Automated Image Localization to Support Rapid Building Reconnaissance in a Large-scale Area." *5th Midwest Smart Structure Colloquium (MSSC)*, April 14-16, 2023, Champaign, IL, USA. **Honorable mention.**

- P11. **Xiaoyu Liu** (Author and Presenter), Amir Behjat, Shirley J. Dyke, Dawn Whitaker, Julio Ramirez, and Ilias Bilionis. "Roles of Human and Robotic Agents Toward Operating a Smart Space Habitat." *2022 Winter RETHi Industrial Advisory Board Meeting*, December 12, 2022, online.
- P12. **Xiaoyu Liu** (Author and Presenter), Amir Behjat, Shirley J. Dyke, Dawn Whitaker, Julio Ramirez, and Ilias Bilionis. "Roles of Human and Robotic Agents Toward Operating a Smart Space Habitat." *2022 RETHi NASA Annual Review meeting, June 13-14, 2022*, West Lafayette, IN, USA.
- P13. **Xiaoyu Liu** (Author and Presenter), Amir Behjat, Shirley J. Dyke, Dawn Whitaker, Julio Ramirez, and Ilias Bilionis. "Roles of Human and Robotic Agents Toward Operating a Smart Space Habitat." *Engineering Mechanics Institute Conference 2022 (EMI 2022)*, May 31-June 3, 2022, Baltimore, MD, USA.
- P14. **Xiaoyu Liu** (Author and Presenter), Amir Behjat, Shirley J. Dyke, Dawn Whitaker, Julio Ramirez, and Ilias Bilionis. "Roles of Human and Robotic Agents Toward Operating a Smart Space Habitat." *2022 Spring RETHi Industrial Advisory Board Meeting*, April 4, 2022, online.
- P15. **Xiaoyu Liu** (Author and Presenter), Shirley J. Dyke, Chul Min Yeum, Ilias Bilionis, Ali Lenjani, and Jongseong Choi. "Automated image localization and 3D reconstruction for post-event building assessment." *Engineering Mechanics Institute Conference 2019 (EMI 2019)*, June 18-21, 2019, Pasadena, CA, USA.
- P16. **Xiaoyu Liu** (Author and Presenter), Shirley J. Dyke, Chul Min Yeum, Ilias Bilionis, Ali Lenjani, and Jongseong Choi. "Automated image localization and 3D reconstruction for post-event building assessment." *4th Midwest Smart Structure Colloquium (MSSC)*, April 12-14, 2019, West Lafayette, IN, USA. **Honorable mention.**
- P17. **Xiaoyu Liu** (Author and Presenter). "Sensitivity Analysis and Frequency Prediction of a Multi-Story Structure." *2nd Midwest Smart Structure Colloquium (MSSC)*, September 30-October 2, 2017, Champaign, IL, USA.
- P18. Shirley J. Dyke, **Xiaoyu Liu** (Author and Presenter), Jongseong Choi, Chul Min Yeum, Ju An Park, Max Midwinter, Thomas Hacker, Zhiwei Chu, Julio Ramirez, Randall Poston, Mathieu Gaillard, Bedrich Benes, Ali Lenjani, and Xin Zhang. "Transforming Visual Reconnaissance Data into Knowledge, with ARIO: The Automated Reconnaissance Image Organizer." *An international workshop focused on the use of artificial intelligence for automating data analytics and organization*, April 23-26, 2021, online.

Posters

- O1. **Xiaoyu Liu** (Author and Presenter), Shirley J. Dyke. "Leveraging Human-AI Collaboration for Structural Engineering Workflows." *ICURC: VISER Center Planning Meeting*, October 21-22, 2024, Houston, TX, USA.
- O2. **Xiaoyu Liu** (Author and Presenter), Dawn Whitaker, Shirley J. Dyke. "Technology Options for Future Water Recovery Systems." *53rd International Conference on Environmental Systems (ICES 2024)*, July 21-25, 2024, Louisville, KY, USA.
- O3. Chirag Pimpale, Davi Carvalho, and **Xiaoyu Liu** (Author and Presenter). "Demonstrating Space Planning Possibilities Using Trend and Outlier Analysis of International Space Station Data." *2024 RETHi NASA Annual Review meeting*, June 10-11, 2024, West Lafayette, IN, USA.
- O4. Krish Thakkar, Taylor Vicente, and **Xiaoyu Liu** (Author and Presenter). "Bayesian Optimization for Resilient Space Habitat Design in Limited Simulation Environments." *2024 RETHi NASA Annual Review meeting*, June 10-11, 2024, West Lafayette, IN, USA.
- O5. Ben Krugman, Meredith Clark, and **Xiaoyu Liu** (Author and Presenter). "Advancing Space Habitat Safety: A Simulation-based Analysis of Safety Control Strategies." *2024 RETHi NASA Annual Review meeting*, June 10-11, 2024, West Lafayette, IN, USA.
- O6. **Xiaoyu Liu** (Author and Presenter), Amir Behjat, Shirley J. Dyke, Dawn Whitaker, Julio Ramirez, and Ilias Bilionis. "Roles of Human and Robotic Agents Toward Operating a Smart Space Habitat." *RETHi-*

HOME joint Workshop on Interdisciplinary Paradigms for Semi-Autonomous Deep-Space Habitation, October 13, 2022, West Lafayette, IN, USA.

- O7. **Xiaoyu Liu** (Author and Presenter), Shirley J. Dyke, Ali Lenjani, Ilias Bilonis, Xin Zhang, and Jongseong Choi. "Automated Image Localization to Support Rapid Building Reconnaissance in a Large-scale Area." *Purdue Herrick Lab Industrial Advisory Committee Meeting*, October 15, 2021, West Lafayette, IN, USA.
- O8. **Xiaoyu Liu** (Author and Presenter), Shirley J. Dyke, Chul Min Yeum, Ilias Bilonis, Ali Lenjani, and Jongseong Choi. "Automated image localization and 3D reconstruction for post-event building assessment." *Purdue Herrick Lab Industrial Advisory Committee Meeting*, October 26, 2018, West Lafayette, IN, USA.