Jingdao Chen

Butler Hall 314,
Mississippi State, MS 39762
(662) 325-7514 chenjingdao@cse.msstate.edu

Appointments

Mississippi State University — Starkville, MS
Tenure-track Assistant Professor, Computer Science and Engineering — *Aug 2021 - present*

Education

Georgia Institute of Technology — Atlanta, GA
Ph. D. in Robotics — *May 2021*
Dissertation: 3D Segmentation and Damage Analysis from Robotic Scans of Disaster Sites
Core Areas: Perception, Artificial Intelligence

Georgia Institute of Technology — Atlanta, GA
M.S. in Computer Science — *Dec 2019*
Specialization in Machine Learning

Washington University in St Louis — St. Louis, MO
B. S. in Electrical Engineering, Computer Science minor — *May 2015*
Summa Cum Laude

Work Experience

Georgia Institute of Technology, RICAL Lab — Atlanta, GA
Graduate Research Assistant with Dr. Yong K. Cho — *Jun 2015 – May 2021*

Facebook, Inc. — Menlo Park, CA
AR/VR Research Intern with Dr. Daniel Huber — *May 2020 – Aug 2020*

Wheego Technologies, Inc. — Atlanta, GA
Research Intern, Autonomous Vehicle Project — *May 2017 – Jul 2017*

Hunter Engineering Company — St. Louis, MO
Computer Science Co-op, Wheel Balancer Project — *Jan 2014 – Jul 2014*

Washington University, Electrical and Systems Engineering — St. Louis, MO
Research Assistant, Autonomous Quadcopter Project — *Sep 2013 – Dec 2013*

Teaching Experience

CSE 8990 – Special Topics in CS – Advanced AI Robotics — Mississippi State University
Primary Instructor — *Spring 2022*

CSE 4643 / 6643 – AI Robotics — Mississippi State University
Primary Instructor — *Fall 2022, Fall 2021*

CSE 4633 / 6633 – Artificial Intelligence — Mississippi State University
Primary Instructor — *Spring 2023*

CEE 8813 – Automation in Construction — Georgia Institute of Technology
Co-developer and Instructor — *Fall 2018, Fall 2019, Spring 2021*

Center for Teaching and Learning — Georgia Institute of Technology
Tech to Teaching Certificate — *Spring 2019 – Fall 2019*

CSE 241 – Data Structures and Algorithms — Washington University
Teaching Assistant — *Fall 2014*

Mentoring Experience

- Jinhee Yu, Grant Greenwood, Mississippi State University, CS PhD, 2023
- Charles Moore, Lucian Murdock, Erez Meoded, Joshua Waldbieser, Mississippi State University, CS Master's, 2023
- Yuexin Xu, Justin Yi, Austin Cosby, Mississippi State University, CS Undergraduate Research, 2023
- Shiqin Zeng, Georgia Tech, CSE/CEE Master's thesis, 2019 - 2020

- Mark Kahoush, John Yi, Georgia Tech, CS Undergraduate Research, 2019 - 2021

Honors / Awards

- Best Paper Award (co-author), "SLAM-driven Intelligent Autonomous Mobile Robot Navigation for Construction Applications." (2018) European Group for Intelligent Computing in Engineering (EG-ICE), 25th Workshop, Lausanne, Switzerland
- Best Poster Award: 2nd runner-up, "Semantic Parsing of 3D Point Clouds for Construction Progress Estimation." (2018) Construction Research Congress (CRC), New Orleans, LA.
- Best Poster Award, "Autonomous Mobile Robot Navigation and Scan Planning for 3D Mapping of Infrastructure" (2018). Georgia Institute of Technology Career, Research, and Innovation Development Conference (CRIDC), Atlanta GA.
- Best Paper Award (co-author), "Building element recognition with thermal-mapped point clouds." (2017) International Symposium on Automation and Robotics in Construction (ISARC), Taipei, Taiwan.
- Best Paper Award (co-author), "Target-Free Automatic Registration of Point Clouds." (2016) International Symposium on Automation and Robotics in Construction (ISARC), Auburn, AL.
- David Levy ESE Award for Design Excellence (2015). Washington University in St. Louis.

Research Grants and Gifts

NSF Computer and Information Science and Engineering Research Initiation Initiative (CRII) Lead PI
Semantic Vector Fields for Robot Navigation and Exploration in Unstructured Environments *2022 - 2024*

USDA Agricultural Marketing Service (AMS) co-PI
Advancing Optical Technologies for Enhanced Quality Evaluation, Grading and Sorting of Sweet Potatoes *2022 - 2025*

Google Cloud Computing Research Credits *2022 - 2023*

XSEDE Cloud Computing Startup Allocation *2022 - 2023*

Professional / Service Activities

Conference Chair

- Session Chair for International Conference on Construction Engineering and Project Management (ICCEPM) 2022
- Session Chair for International Conference on Computing in Civil Engineering (i3CE) 2021

Organizer

- 2nd Workshop on Future of Construction: Robot Perception, Mapping, Navigation, Control in Unstructured and Cluttered Environmentss at ICRA 2023
- Tutorial on Scan-to-BIM using Python and Open3D at ICCEPM 2022, presenter
- Workshop on Future of Construction: Build Faster, Better, Safer - Together with Robots at ICRA 2022
- 2019 Southeast Robotics Symposium, organizing committee

Invited Talks

- *Robust Scene Understanding for Robots in Unstructured Environments*
  - Mississippi State University CSE Seminar, February 2022
  - IEEE Mississippi Seminar, April 2022

Reviewer

- IEEE Transactions on Robotics
- IEEE Robotics and Automation Letters
- IEEE International Conference on Robotics and Automation
- IEEE International Conference on Intelligent Robots and Systems
- IEEE International Conference on Automation Science and Engineering
- IEEE Control Systems Letters
- IEEE Transactions on Vehicular Technology
- IEEE Transactions on Systems, Man and Cybernetics
- IEEE Transactions on Cognitive and Developmental Systems
- IEEE International Conference on Advanced Intelligent Mechatronics
- IEEE International Conference on Ubiquitous Robots
- IEEE Access
- International Symposium on Automation and Robotics in Construction
- International Conference on Computing in Civil Engineering (i3CE)
- Automation in Construction
- Advanced Engineering Informatics
- Journal of Computing in Civil Engineering

Panelist
- National Science Foundation (NSF) Panelist, 2021

Professional Memberships
- IEEE Robotics and Automation Society

Departmental Service
- Mississippi State University CSE Courses and Curricula Committee

Outreach
- Mississippi State University: Intro to Engineering Summer Camp, Engineering Demo Day, Academic Insight
- Georgia Tech : Girl Code Project, LEGO Mindstorms competition, National Robotics Week

Journal Publications

[J1] **Chen, J.**, and Cho, Y. (2022). "CrackEmbed: Point feature embedding for crack segmentation from disaster site point clouds with anomaly detection" Advanced Engineering Informatics, Volume 52, April 2022

[J2] **Chen, J.**, Kira, Z., and Cho, Y. (2021). "LRGNet: Learnable Region Growing for Class-Agnostic Point Cloud Segmentation." IEEE Robotics and Automation Letters, 6(2), pp. 2799-2806. Accepted for oral presentation at the IEEE International Conference on Robotics and Automation (ICRA).

[J3] Price, L., **Chen, J.**, Park, J.S. and Cho, Y. (2021). "Multisensor-driven Real-time Crane Monitoring System for Blind Lift Operations: Lessons Learned from a Case Study." Automation in Construction, Volume 124, April 2021, 103552

[J4] **Chen, J.**, Yi, J., Kahoush, M., Cho, E. and Cho, Y. (2020). "Point Cloud Scene Completion of Obstructed Building Facades with Generative Adversarial Inpainting." MDPI Sensors, 20(18), 5029

[J5] Zeng, S., **Chen, J.**, and Cho, Y. (2020). "User exemplar-based building element retrieval from raw point clouds using deep point-level features." Automation in Construction, Volume 114, June 2020, 103159

[J6] Park, J.S., **Chen, J.**, Cho, Y., Kang, D., and Son, B. (2020). "CNN-Based Person Detection Using Infrared Images for Night-Time Intrusion Warning Systems." MDPI Sensors, 20(1), 34

[J7] **Chen, J.**, Kira, Z. and Cho, Y. (2019). "Multi-view Incremental Segmentation of 3D Point Clouds for Mobile Robots." IEEE Robotics and Automation Letters. 4(2), pp. 1240-1246.

[J8] **Chen, J.**, Kira, Z. and Cho, Y. (2019). "Deep Learning Approach to Point Cloud Scene Understanding for Automated Scan to 3D Reconstruction." ASCE Journal of Computing in Civil Engineering, 33(4).

[J9] Fang, Y., **Chen, J.**, Cho, Y., and Kim, K.N. (2018). "Vision-based Load Sway Monitoring to Improve Crane Safety in Blind Lifts. " Journal of Structural Integrity and Maintenance, 3(4), Pages 233-242.

[J10] Kim, P., **Chen, J.**, and Cho, Y. (2018). "SLAM-driven robotic mapping and registration of 3D point clouds." Automation in Construction, Volume 89, Pages 38-48.

[J11] Kim, P., **Chen, J.**, and Cho, Y. (2017). "Automated Point Clouds Registration using Visual and Planar Features for Construction Environments." ASCE Journal of Computing in Civil Engineering, Volume 32, March 2018

[J12] **Chen, J.**, Fang, Y., and Cho, Y. (2017). "Performance Evaluation of 3D Descriptors for Object Recognition in Construction Applications." Automation in Construction, Volume 86, Pages 44-52, February 2018

[J13] Kim, P., **Chen, J.**, and Cho, Y. (2017). "Robotic sensing and object recognition from thermal-mapped point clouds." International Journal of Intelligent Robotics and Applications. September 2017, Volume 1, Issue 3, Pages 243-254

[J14] **Chen, J.**, Fang, Y., and Cho, Y. (2017). "Real-Time 3D Crane Workspace Update Using a Hybrid Visualization Approach." ASCE Journal of Computing in Civil Engineering, Vol. 31. Issue 5

[J15] Park, J.W., **Chen, J.**, and Cho, Y. (2017). "Self-Corrective Knowledge-based Hybrid Tracking System Using BIM and Multimodal Sensors." Advanced Engineering Informatics, Volume 32, Issue C, April 2017, Pages 126-138

[J16] **Chen, J.**, Fang, Y., Cho, Y., and Kim, C. (2016). "Principal Axes Descriptor (PAD) for Automated Construction Equipment Classification from Point Clouds." ASCE Journal of Computing in Civil Engineering, Volume 31, Issue 2

[J17] Fang, Y., Cho, Y., and **Chen, J.** (2016). " A Framework for Real-time Pro-active Safety Assistance for Mobile Crane Lifting Operations." Automation in Construction, Volume 72, Part 3, December 2016, Pages 367-379

Conference Publications

[C1] Goh, E., Ward, I. R., Vincent, G., Pak, K., **Chen, J.**, and Wilson, B. (2023). "Self-supervised Distillation for Computer Vision Onboard Planetary Robots." IEEE Aerospace Conference, Big Sky, MT, USA, March 4-11

[C2] Ward, I. R., Moore, C., Pak, K., **Chen, J.**, and Goh, E. (2022). "Improving Contrastive Learning on Visually Homogeneous Mars Rover Images." European Conference on Computer Vision (ECCV) Workshop on AI4Space, Tel Aviv, Israel, Oct 23

[C3] Vincent, G., Yepremyan, A., **Chen, J.**, and Goh, E. (2022). "Mixed-Domain Training Improves Multi-Mission Terrain Segmentation." European Conference on Computer Vision (ECCV) Workshop on AI4Space, Tel Aviv, Israel, Oct 23

[C4] Kim, S., Yajima, Y., Park, J., **Chen, J.**, and Cho, Y. (2022). "A Hybrid Semantic-Geometric Approach for Clutter-Resistant Floorplan Generation from Building Point Clouds." Proceedings of the 9th International Conference on Construction Engineering and Project Management (ICCEPM), Las Vegas, NV, USA, June 20-23

[C5] Goh, E., **Chen, J.**, and Wilson, B. (2022). "Mars Terrain Segmentation with Less Labels". IEEE Aerospace Conference, Big Sky, MT, USA, March 5-12

[C6] Yajima, Y., Kim, S., **Chen, J.**, Cho,Y. (2021). "Fast Online Incremental Segmentation of 3D Point Clouds from Disaster Sites." Proceedings of the 38th International Symposium on Automation and Robotics in Construction (ISARC), Dubai, UAE, November 2-5

[C7] Kahoush, M., Yajima, Y., Kim, S., **Chen, J.**, Park, J., Kangisser, S., Irizarry, J., Cho,Y. (2021). "Analysis of Flight Parameters on UAV Semantic Segmentation Performance for Highway Infrastructure Monitoring." Proceedings of the ASCE 2021 International Conference on Computing in Civil Engineering (i3CE), Orlando, FL, USA, September 12-14

[C8] Yajima, Y., Kahoush, M., Kim, S., **Chen, J.**, Park, J., Kangisser, S., Irizarry, J., Cho,Y. (2021). "AI-driven 3D Point Cloud-Based Highway Infrastructure Monitoring System using UAV." Proceedings of the ASCE 2021 International Conference on Computing in Civil Engineering (i3CE), Orlando, FL, USA, September 12-14

[C9] **Chen, J.**, Kim, P., Sun, D.I., Han, C.S., Ahn, Y.H., Ueda, J., and Cho, Y. (2020). "Workspace Modeling: Visualization and Pose Estimation of Teleoperated Construction Equipment from Point Clouds." Proceedings of the 37th International Symposium on Automation and Robotics in Construction (ISARC), October 27-29

[C10] Price, L., **Chen, J.**, and Cho, Y. (2020). "Dynamic Crane Workspace Update for Collision Avoidance during Blind Lift Operations." Proceedings of the 18th International Conference on Computing in Civil and Building Engineering (ICCCBE) 2020, August 18-20, São Paulo, Brazil

[C11] **Chen, J.**, and Cho, Y. (2020). "Unsupervised Crack Segmentation from Disaster Site Point Clouds using Point Feature Clustering." Proceedings of the 27th International Workshop on Intelligent Computing in Engineering (EG-ICE) 2020, July 1-4, Berlin, Germany

[C12] Park, J., **Chen, J.**, and Cho, Y. (2020). "Point Cloud Information Modeling (PCIM): an Innovative Framework for as-is Information Modeling of Construction Sites". ASCE Construction Research Congress (CRC) 2020, March 9-10, Tempe, AZ

[C13] **Chen, J.** and Cho, Y. (2019). "Exemplar-based Building Element Retrieval from Point Clouds." International Conference on Smart Infrastructure and Construction (ICSIC), Churchill College, Cambridge, UK, July 8-9

[C14] **Chen, J.** and Cho, Y. (2019). "Detection of Damaged Infrastructure on Disaster Sites using Mobile Robots." IEEE 2019 16th International Conference on Ubiquitous Robots (UR), Jeju, Korea, June 24-27

[C15] **Chen, J.**, Kim, K.N., Cho, Y., Lee, J., Kim, B., Ahn, Y., and Kang, J. (2019). "Nuclear Power Plant Disaster Site Simulation using Rigid Body Physics." Proceedings of the ASCE 2019 International Conference on Computing in Civil Engineering (i3CE), Atlanta, GA, USA, June 17-19

[C16] Kim, K.N., **Chen, J.**, and Cho, Y. (2019). “Evaluation of Machine Learning Algorithms for Worker's Motion Recognition using Motion Sensors.” Proceedings of the ASCE 2019 International Conference on Computing in Civil Engineering (i3CE), Atlanta, GA, USA, June 17-19

[C17] **Chen, J.**, Cho, Y., and Ueda, J. (2018). "Sampled-Point Network for Classification of Deformed Building Element Point Clouds". Proceedings of the 2018 IEEE Conference on Robotics and Automation (ICRA).

[C18] **Chen, J.**, Kim, P., Cho, Y., and Ueda, J. (2018). "Object-sensitive potential fields for mobile robot navigation and mapping in indoor environments." Proceedings of the 2018 IEEE 15th International Conference on Ubiquitous Robots (UR), Honolulu, HI, USA, June 26-30.

[C19] Fang, Y., **Chen, J.**, Cho, Y., Zhang, S., and Perez, E. (2018). " Enhance Blind Lift Safety by Real-Time Sensing and Visualization." Proceedings of the 18thInternational Conference on Construction Applications of Virtual Reality (CONVR2018), Auckland, New Zealand, Nov 22-23

[C20] Kim, P., **Chen, J.**, Kim, J., and Cho, Y. (2018). "SLAM-Driven Intelligent Autonomous Mobile Robot Navigation for Construction Applications." Best Paper Award, Proceedings of Workshop of the European Group for Intelligent Computing in Engineering, EG-ICE. pp. 254-269, Lausanne, Switzerland,

[C21] **Chen, J.** and Cho, Y. (2018). "Point-to-point Comparison Method for Automated Scan-vs-BIM Deviation Detection." Proceedings of 17th International Conference on Computing in Civil and Building Engineering, Tampere, Finland

[C22] Kim, P., **Chen, J.**, Cho, Y. (2018). "Autonomous Mobile Robot Localization and Mapping for Unknown Construction Environments." ASCE Construction Research Congress (CRC) 2018, pp.147-156, April 2-4, New Orleans, LA

[C23] **Chen, J.**, Cho, Y., and Kim, K. (2018). "Region Proposal Mechanism for Building Element Recognition for Advanced Scan-to-BIM Process." ASCE Construction Research Congress 2018, April 2 - 4, New Orleans, LA

[C24] Kim, P., Cho, Y. and **Chen, J.** (2017). "Building element recognition with thermal-mapped point clouds." Proceedings of the 34rd International Symposium on Automation and Robotics in Construction (ISARC), Taipei, Taiwan, June 28-July 1

[C25] **Chen, J.**, Fang, Y., and Cho, Y. (2017). "Mobile Asset Tracking for Dynamic 3D Crane Workspace Generation in Real Time." Proceedings of the 2017 International Workshop on Computing for Civil Engineering (IWCCE), Seattle, WA, USA, June 25-27

[C26] **Chen, J.**, Fang, Y., and Cho, Y. (2017). "Unsupervised Recognition of Volumetric Structural Components from Building Point Clouds." Proceedings of the 2017 International Workshop on Computing for Civil Engineering (IWCCE), Seattle, WA, USA, June 25-27,

[C27] Kim, P., Cho, Y., and **Chen, J.** (2016). " Automatic Registration of Laser Scanned Color Point Clouds Based on Common Feature Extraction." 16th International Conference on Construction Applications of Virtual Reality (CONVR), Hong Kong, Dec. 11-13

[C28] **Chen, J.**, Fang, Y., and Cho, Y. (2016). "Automated Equipment Recognition and Classification from Scattered Point Clouds for Construction Management." International Symposium on Automation and Robotics in Construction (ISARC), Auburn, AL, July 18-21, 2016

[C29] **Chen, J.**, Cho, Y. (2016). “Real-time 3D Mobile Mapping for the Built Environment”. International Symposium on Automation and Robotics in Construction (ISARC), Auburn, AL, July 18-21, 2016

[C30] Fang, Y., **Chen, J.**, Cho, Y., and Zhang, P. (2016). "A Point Cloud-Vision Hybrid Approach for 3D Location Tracking of Mobile Construction Assets." International Symposium on Automation and Robotics in Construction (ISARC), Auburn, AL, July 18-21, 2016

[C31] Kim, P., Cho, Y., **Chen, J.** (2016). "Target-Free Automatic Registration of Point Clouds." International Symposium on Automation and Robotics in Construction (ISARC), Auburn, AL, July 18-21, 2016

Workshop Presentations

Chen, J., Park, J., Yajima, Y., Kim, S. (2021). GTS2B. 1st Workshop and Challenge on Computer Vision in the Built Environment. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021

Book Chapters

[B1] **Chen, J.**, and Cho, Y. (2021). “Rapid Scan-to-BIM using Robotics and Artificial Intelligence for Construction Applications.” Research Companion on Building Information Modeling, March 2022.