Xi Wang, Ph.D.

Assistant Professor, Department of Construction Science
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EDUCATION

Ph.D., Civil Engineering, University of Michigan, 2022

M.S., Robotics, University of Michigan, 2022

M.S.E., Construction Engineering and Management, University of Michigan, 2018

B.S., Construction Management, Dongbei University of Finance and Economics, 2017

PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Construction Science, Texas A&M University, 2022 – Present

Graduate Student Research Assistant, Department of Civil and Environmental Engineering, University of Michigan, 2018 – 2022

Graduate Student Instructor, Department of Civil and Environmental Engineering, University of Michigan, 2021 – 2021

HONORS AND AWARDS

Outstanding Reviewer, ASCE Journal of Computing in Civil Engineering, 2023

ASCE ExCEEd Teaching Fellow, 2023

Barbour Scholar, University of Michigan, 2021

John L. Tishman Predoctoral Fellowship, University of Michigan, 2019

Rackham Conference Travel Grant, University of Michigan, 2019

Tishman Master's Fellowship, University of Michigan, 2017

Outstanding Graduate Class of 2017, Dongbei University of Finance and Economics (DUFE), 2017

CASC Scholarship, Dongbei University of Finance and Economics, 2016

First-class Academic Scholarship**,** DUFE, 2014, 2015, 2016

Liaoning Undergraduate Innovation and Entrepreneurship Award, 2015

PUBLICATIONS

Refereed Journal Articles

Wang, X.*, Yu, H.*, McGee, W., Menassa, C. C., & Kamat, V. R. (2024). Enabling Building Information Model-driven human-robot collaborative construction workflows with closed-loop digital twins. *Computers in Industry*, *161*, 104112. https://doi.org/10.1016/j.compind.2024.104112

Park, S., **Wang, X.,** Menassa, C. C., Kamat, V. R., & Chai, J. Y. (2024). Natural language instructions for intuitive human interaction with robotic assistants in field construction work. *Automation in Construction*, *161*, 105345. https://doi.org/10.1016/j.autcon.2024.105345

Ibrahim, A., Nnaji, C., & **Wang, X.** (2024). Framework for Quantifying the Impact of Exoskeleton on Musculoskeletal Disorder Risk Reduction. *Journal of Engineering, Project & Production Management*, *14*(2). https://doi.org/10.32738/JEPPM-2024-0019

Wang, X., Wang, S., Menassa, C. C., Kamat, V. R., & McGee, W. (2023). Automatic high-level motion sequencing methods for enabling multi-tasking construction robots. *Automation in Construction*, *155*, 105071. https://doi.org/10.1016/j.autcon.2023.105071

Wang, X., Liang, C. J., Menassa, C. C., & Kamat, V. R. (2021). Interactive and Immersive Process-Level Digital Twin for Collaborative Human-Robot Construction Work. *Journal of Computing in Civil Engineering*, *35*(6), 04021023. https://doi.org/10.1061/(ASCE)CP.1943-5487.0000988

Liang, C. J., **Wang, X.,** Kamat, V. R., & Menassa, C. C. (2021). Human-Robot Collaboration in Construction: Classification and Research Trends. *Journal of Construction Engineering and Management*, *147*(10), 03121006. https://doi.org/10.1061/(ASCE)CO.1943-7862.0002154 **(Editor's Choice Paper)**

Deng, M., **Wang, X.,** Li, D., & Menassa, C. C. (2022). Digital ID framework for human-centric monitoring and control of smart buildings. *Building Simulation*. 1-20. Tsinghua University Press. https://doi.org/10.1007/s12273-022-0902-3

Deng, M., **Wang, X.,** & Menassa, C. C. (2022). Investigating the effect of wearing masks on office work in indoor environments during a pandemic using physiological sensing. *Building and Environment*, *221*, 109346. https://doi.org/10.1016/j.buildenv.2022.109346

Deng, M., **Wang, X.,** & Menassa, C. C. (2021). Measurement and prediction of work engagement under different indoor lighting conditions using physiological sensing. *Building and Environment, 203,* 108098. https://doi.org/10.1016/j.buildenv.2021.108098

Wang, X., Li, D., Menassa, C. C., & Kamat, V. R. (2019). Investigating the effect of indoor thermal environment on occupants' mental workload and task performance using electroencephalogram. Building and Environment, 158, 120-132. https://doi.org/10.1016/j.buildenv.2019.05.012

Refereed Conference Proceedings

Deng, M., **Wang, X.,** Li, D., Fu, B., Menassa, C. C. & Kamat, V. R. (2023). Leveraging Artificial Intelligence for Enabling Personalized Activity-Based Workplaces. *In Computing in Civil Engineering 2023*. (pp. 141-149). Reston, VA: American Society of Civil Engineers. https://ascelibrary.org/doi/abs/10.1061/9780784485224.018

Wang, X., Liang, C. J., Menassa, C. C., & Kamat, V. R. (2020). Real-Time Process-Level Digital Twin for Collaborative Human-Robot Construction Work. In *ISARC. Proceedings of the International Symposium on Automation and Robotics in Construction* (Vol. 37, pp. 1528-1535). IAARC Publications. https://doi.org/10.22260/ISARC2020/0212

Wang, X., Li, D., Menassa, C. C., & Kamat, V. R. (2019). Can infrared facial thermography disclose mental workload in indoor thermal environments?. In *Proceedings of the 1st ACM International Workshop on Urban Building Energy Sensing, Controls, Big Data Analysis, and Visualization* (pp. 87-96). https://doi.org/10.1145/3363459.3363528

Wang, X., Li, D., Menassa, C. C., & Kamat, V. R. (2019). Investigating the neurophysiological effect of thermal environment on individuals' performance using electroencephalogram. *In Computing in Civil*

Engineering 2019: Data, Sensing, and Analytics (pp. 598-605). Reston, VA: American Society of Civil Engineers. https://doi.org/10.1061/9780784482438.075

Books, Monographs, Books Edited, Book Chapters

Li, D., **Wang, X.,** Menassa, C. C., & Kamat, V. R. (2020). Understanding the impact of building thermal environments on occupants' comfort and mental workload demand through human physiological sensing. In *Start-Up Creation* (pp. 291-341). Woodhead Publishing. https://doi.org/10.1016/B978-0-12-819946-6.00012-6 (Book Chapter)

GRANTS

ARTBA Team Work Zone Safety Training Grant Program
Role: Co-PI (PI: Dr. Chuma Nnaji)
Funding Agency: Federal Highway Administration (FHWA)
Project Dates: 05/2024 – 05/2028
Amount of Funding: $320,340

Boosting Construction Site Safety: Neuro-informed Safety Training using Artificial Intelligence
Role: Co-PI (PI: Dr. Mo Hu)
Funding Agency: MyCon General Contractors, Inc.
Project Dates: 01/2024 – 12/2024
Amount of Funding: $25,000

Development of New Standard Method for Evaluating the FreezeThaw Durability Performance of 3D-Printed Concrete
Role: Co-PI (PI: Dr. Julie Hartell)
Funding Agency: ICON Technology, Inc.
Project Dates: 05/2023 – 04/2025
Amount of Funding: $450,000

Developing and Testing a Framework to Assess Human-Exoskeleton Systems in Construction
Role: Co-PI (PI: Dr. Chuma Nnaji)
Funding Agency: Construction Industry Advisory Council (CIAC), Texas A&M University
Project Dates: 01/2023 – 12/2023
Amount of Funding: $25,000

Rackham Graduate Student Research Grant
Faculty advisor: Dr. Carol Menassa and Dr. Vineet Kamat
Funding Agency: Rackham Graduate School, University of Michigan
Project Dates: 05/2021 – 04/2022
Amount of Funding: $3,000

PRESENTATIONS

Workshops and Panels

Exploring Worker Preferences in Human-Robot Collaborative Construction Systems, NSF Workshop: Evaluating Robot Actions and Interactions, University of Michigan, October 2023

Virtual Reality in Construction Automation and Robotics, An Immersive Technology Experience Workshop, University of Johannesburg, South Africa (Online), May 2023

XR in AEC Panel, Taubman College of Architecture and Urban Planning, University of Michigan, March 2023

Enabling Human-Robot Partnership in Digitally-Driven Robotic Construction, NSF Workshop: Next Generation Construction Teams – Vision for Construction Work in 2035, University of Michigan, April 2022

Guest Lectures

Robot Operating System and Gazebo Simulation, ENCE 622 Construction Automation & Robotics, University of Maryland, October 2023

Human-Robot Collaborative Construction, CONE 3304/5304 Sustainable Building Design and Construction, Texas Tech University, October 2023

Construction Robotics Productivity and Safety, ENCE 622 Construction Automation & Robotics, University of Maryland, September 2023

Research Journey in Human-Robot Collaborative Construction, CARC 601 Research Foundations, Texas A&M University, November 2022

Seminars and Symposiums

Enabling Human-Robot Partnership for Digitally-Driven Construction, Construction, Geotechnical, and Structural (CGS) Seminar, Department of Civil and Environmental Engineering, Texas A&M University, April 2024

Enabling Human-Robot Partnership for Digitally-Driven Construction, COSC 681 Graduate Seminar, Texas A&M University, March 2024

Enabling Human-Robot Partnership for Digitally-Driven Construction, COSC 681 Graduate Seminar, Texas A&M University, April 2023

Enabling Human-Robot Partnership for Digitally-Driven Construction, School of Planning, Design and Construction, Michigan State University, March 2022

Enabling Human-Robot Partnership for Digitally-Driven Construction, Department of Construction Science, Texas A&M University, March 2022

Enabling Human-Robot Partnership for Digitally-Driven Construction, Durham School of Architectural Engineering and Construction, March 2022

Enabling Human-Robot Partnership for Digitally-Driven Construction, Department of Civil Engineering, University of Texas at El Paso, February 2022

Human-Robot Collaborative Construction with Interactive and Immersive Digital Twin, CEE 830: Construction Engineering Seminar, University of Michigan, November 2021

Investigating the effect of thermal environment on occupants' mental workload and task performance**,** Construction Research Symposium, University of Michigan, October 2019

K-12 Activities

Camp ARCH summer program – Construction Science track (High School Students), July 2023

Others

Enhancing Construction Industry Workforce with Human-Robot Collaboration, Barbour Scholars Celebration, University of Michigan, September 2021

Enhancing Construction Industry Workforce with Human-Robot Collaboration. GRADtitude in Extraordinary Times: A Virtual Celebration of Rackham Donors & Scholars, University of Michigan, September 2021

TEACHING

Instructor, COSC 461 Building Information Modeling Systems, Spring 2023-2024

Instructor, COSC 642 Construction Information Technology, Fall 2022-2023

Graduate Student Instructor, CEE 331 Construction Management, Winter 2021

Student Instructor, "Introduction to Construction Cost Estimating", General Motors (GM) Purchasing Group, Ann Arbor, MI, 2021

ADVISING AND MENTORING

Doctoral Students advised as Committee Chair

Jia Xu, Texas A&M University, Expected Spring 2027

- Research Topic: Multi-robot Coordination for Enhancing Context-Aware Construction Automation

Doctoral Students advised as Committee Member

Yeon Chae, Texas A&M University, Expected Spring 2026 (Chair: Dr. Youngjib Ham)

- Research Topic: Human-Machine Interfaces for Excavation Work in Construction

Minguk Kim, Texas A&M University, Expected Spring 2026 (Chair: Dr. Youngjib Ham)

- Research Topic: Towards Autonomous Construction Robotics in Extreme Environments via Integration of Human Decision-Making and Inverse Reinforcement Learning

Maryam Abbasi, Texas A&M University, Expected Spring 2026 (Chair: Dr. Manish Dixit)

Miran Seo, Texas A&M University, Expected Spring 2025 (Chair: Dr. Youngjib Ham)

- Research topic: Teleoperation in Lunar Construction: The Impact of Time Delay on Task Performance and Human-Robot Interaction

Xinghui Xu, New York University Abu Dhabi, Spring 2024 (Chair: Dr. Borja Garcia de Soto)

- Dissertation: A Multi-agent Reinforcement Learning Task Allocation Framework for Navigation Sequences of Construction Robots

Master Students advised as Committee Member

Adam Thompson (Master of Science), Department of Engineering Technology, Texas A&M University, Expected Spring 2025

Avinash Subramanian (Master of Science), Department of Engineering Technology, Texas A&M University, Expected Spring 2024

Jonathan Ghering (Master of Science), Department of Engineering Technology, Texas A&M University, Summer 2023

Other Mentoring Activities

Bahareh Alizadeh, Ph.D. student in Construction Science, Academy for Future Faculty Mentor, Texas A&M University

Shuoqi Wang, M.S. in Robotics, ROB 590 Directed Study, University of Michigan

EXTERNAL SERVICE

Editorships and Technical Committee

Associate Editor, Automation in Construction, Elsevier, 2024 – Present

Co-Chair, Technical Committee on Construction Robotics, IEEE Robotics and Automation Society (RAS), 2024 – Present

Conference Service

PC member, Project Management and Construction Track, 2024 IEEE Winter Simulation Conference

Best Paper Award Committee, 2024 ASCE International Conference of Computing in Civil Engineering (i3CE)

Technical Co-Chair, Visualization, Simulation and Process Modeling Track, 2024 ASCE International Conference of Computing in Civil Engineering (i3CE)

Session Chair, ASCE International Conference of Computing in Civil Engineering (i3CE), June 2023

Session Chair, ASCE Construction Institute / Construction Research Congress (CI/CRC) Joint Conference, March 2022

Journal Reviewer Experience

Elsevier

- Building and Environment (2024 – Present)
- Journal of Building Engineering (2023 – Present)
- Automation in Construction (2021 – Present)
- Results in Engineering (2024 – Present)

American Society of Civil Engineering (ASCE)

- Journal of Computing in Civil Engineering (2020 – Present)
- Journal of Construction Engineering and Management (2022 – Present)

Springer

- Discover Analytics (2023 – Present)

Conference Reviewer Experience

International Symposium on Automation and Robotics in Construction (ISARC), 2021 – 2024

ASCE International Conference on Computing in Civil Engineering (i3CE), 2023

Canadian Society for Civil Engineering (CSCE) Annual Conference, 2023

ASCE Construction Research Congress (CRC), 2020

Review Panels for External Funding Agencies

Review Panel, National Science Foundation, 2023

Others

Guest reviewer, ARCH 703 Virtual Engagement Mid-term Project Symposium, University of Michigan, October 2022

INTERNAL SERVICE

School Service

Instructor, Camp Arch (K-12), School of Architecture, 2023

Volunteer, Designing for Neurodivergence in a Neuraltypical Space (DivHack), School of Architecture, 2023

Department Service

Committee Member, Award Committee, Department of Construction Science, Texas A&M University, 2024 – Present

Volunteer, CEE Explore Michigan Engineering Research & Graduate Education (EMERGE) Graduate Recruitment Event, 2021

Volunteer, Transportation Diversity Recruitment Program University Visit Day, Michigan Department of Transportation and University of Michigan, 2021

Voting Member, CEE Diversity, Equity, and Inclusion (DEI) Committee, University of Michigan, 2020 – 2021

Committee Member, CEE Graduate Student Advisory Council, University of Michigan, 2019 – 2021

Committee Member, CEE DEI Collaborative, University of Michigan, 2020 – 2021

Volunteer, CEE Friends Association Visit Day, 2019, 2021

MEMBERSHIP

Member, ASCE Construction Research Congress (CRC), 2023 – Present

Member, ASCE Technical Council on Computing and Information Technology, Data Sensing and Analysis (DSA) Committee, 2022 – Present

Member, ASCE Technical Council on Computing and Information Technology, Visualization, Information Modeling, and Simulation (VIMS) Committee, 2022 – Present

Associate Member, American Society of Civil Engineering, 2022 – Present