Woei-Chyi Chang
Ph. D. Candidate and Research Assistant
Lyles School of Civil and Construction Engineering
Purdue University,
West Lafayette, IN 47907
Email: chang803@purdue.edu
Phone: (765) 418-4574

1. EDUCATION

Ph.D. in Civil Engineering (*Construction Engineering*) 2021–2025
- Purdue University, West Lafayette, Indiana, United States (Advisor: Dr. Sogand Hasanzadeh)
- *Dissertation: Determinants of Successful Worker-Autonomy Teaming in Future Construction Workplaces*

M.Eng. in Electrical and Computer Engineering (*Computer Engineering*) 2024–2025
- Purdue University, West Lafayette, Indiana, United States (Advisor: Dr. Lu Su)

M.S in Civil Engineering (*Construction Management*) 2017–2020
- National Taiwan University (NTU), Taiwan (Advisor: Dr. Po-Han Chen)
- *Thesis: Application of Mixed Reality and Infrared Inspection to Examination of External Wall Tiles*
- Study Abroad, Technical University of Darmstadt, Darmstadt, Germany 2019–2020

B.S. in Civil Engineering 2013–2017
- National Taiwan University (NTU), Taiwan

2. HONORS AND AWARDS

The Spring 2025 Best Dissertation Award 2025
Estus H. and Vashti L. Magoon Research Excellence Award 2025
Kinnier Dissertation Fellowship, Purdue University 2024
Crooks Graduate Scholarship, Purdue University 2024
Invited for Plenary Talk (top 12 papers), ISARC Conference 2023
Invited to Submit Extended Work to Automation in Construction, EC3 Conference 2023
Lyle School of Civil Engineering Graduate Travel Award, Purdue University 2023
Academic Choice Runner-up Award in CII Poster Competition, Purdue University 2022
Professional Engineer (P.E.) License in Taiwan 2018–Present

3. RESEARCH EXPERIENCE (*funding sources: 2 NSF, 3 State DOTs, and 3 international agencies*)

Worker-AI Teaming in Future Construction Industry, FW-HTF National Science Foundation (NSF) 2021–Present
- Role: Leading Graduate Research Assistant, Purdue University

Improving Worker Safety by Understanding Risk Compensation as a Latent Precursor of At-risk Decisions, Collaborative Research National Science Foundation (NSF) 2021–2023
- Role: Graduate Research Assistant, Purdue University

Integrated Smart Work Zones, INDOT 2023–Present
- Role: Leading Graduate Research Assistant, Purdue University

Implementation and Assessment of Work Zone Intrusion Technologies, INDOT 2021–2023
- Role: Graduate Research Assistant, Purdue University

Synthesis Study on Best Practices of Cleaning Tools & Paving Equipment: Asphalt Release Agents (ARA) and Asphalt Cleaners (AC), INDOT 2021–2022
- Role: Leading Graduate Research Assistant, Purdue University

Application of BIM and Feng-Shui to Architectural Design, National Science and Technology Council 2020

- Role: Leading Graduate Research Assistant, National Taiwan University

Application of BIM to Support Grading Hosing Performance – Fire Protection, Barrier-free Environment, and Residential Maintenance, Architecture and Building Research Institute.....2017–2018

- Role: Leading Graduate Research Assistant, National Taiwan University

Combining Augmented Reality with UAV for Real-Time Recognition of Rust, National Science and Technology Council 2017–2018

- Role: Leading Graduate Research Assistant, National Taiwan University

4. PUBLICATIONS

4.1 Peer-Reviewed Published Journal Papers: (*6 Published and 1 Accepted*)

[01] **Chang, W. C.**, & Hasanzadeh, S. (2024). "Mental Workload in Worker-Drone Communication in Future Construction: Considering Coexistence, Cooperation, and Collaboration Interaction Levels". *Advanced Engineering Informatics, 65(A), 103110. DOI: https://doi.org/10.1016/j.aei.2025.103110*

[02] **Chang, W. C.**, Garcia, N. F. G., Esmaeili, B., & Hasanzadeh, S. (2024). "Deep Learning–based Prediction of Human-Robot Trust Dynamics in Future Construction". *Journal of Computing in Civil Engineering. DOI: 10.1061/JCCEE5/CPENG-6302* (*Accepted in December 2024*).

[03] **Chang, W. C.**, Esmaeili, B., & Hasanzadeh, S. (2024). "The Impacts of Physical and Informational Failures on Worker-Autonomy Trust in Future Construction". *Journal of Construction Engineering Management*. *DOI: 10.1061/JCEMD4/COENG-15241* (*Accepted in September 2024*)

[04] **Chang, W. C.**, & Hasanzadeh, S. (2024). "Toward a Framework for Trust Building between Humans and Robots in the Construction Industry: A Systematic Review of Current Research and Future Directions". *Journal of Computing in Civil Engineering*, 38(3), 03124001. *DOI: 10.1061/JCCEE5.CPENG-5656*

[05] Pooladvand, S., **Chang, W. C.**, & Hasanzadeh, S. (2024). "Identifying At-Risk Workers Using fNIRS-Based Mental Load Classification: A Mixed Reality Study". *Automation in Construction*, 164, 105453. *DOI: 10.1016/j.autcon.2024.105453*

[06] Chen, P. H., Huang, T. Y., **Chang, W. C.**, & Lin, Y. H. (2022). "A Smart Scoring Method for The Assessment of Office Lighting Systems". *Journal of Building Engineering*, 61, 105258. *DOI: 10.1016/j.jobe.2022.105258*

[07] Cheng, M. Y., Yeh, S. H., & **Chang, W. C.** (2020). "Multi-Criteria Decision Making of Contractor Selection in Mass Rapid Transit Station Development Using Bayesian Fuzzy Prospect Model". *Sustainability*, 12(11), 4606. *DOI: 10.3390/su12114606*

4.2 Under-review and In-progress Journal Papers: (*2 In-Progress*)

[01] **Chang, W. C.**, Karalunas, S. L., Esmaeili, B., & Hasanzadeh, S. (2024). "How ADHD Workers Will Read the Future Construction Sites: The impact of time pressure and multitasking on situational awareness, productivity, and stress management". (*In-progress, to be submitted by May 2025*).

[02] **Chang, W. C.**, & Hasanzadeh, S. (2024). "Human-centered Worker-autonomy Teaming in Future Construction Industry". (*In-progress, to be submitted by May 2025*).

4.3 Peer-Reviewed Conference Papers: (*6 Published, and 4 Accepted*)

[01] **Chang, W. C.**, Yu, L. F., Esmaeili, B., & Hasanzadeh, S. (2025). "Exploring Worker-Drone Interaction in Mixed Reality: Balancing Distraction and Situational Awareness". *The 32nd IEEE Conference on Virtual Reality and 3D User Interfaces*. Arles, France. *DOI: 10.1109/VR59515.2025.00065*

[02] **Chang, W. C.**, Garcia, N. F. G., Esmaeili, B., & Hasanzadeh, S. (2024). "Partial Personalization for Worker-robot Trust Prediction in the Future Construction Environment". *International Symposium on Automation and Robotics in Construction (ISARC)*. Lille, France. *DOI:* 10.22260/ISARC2024/0008
[Invited for Plenary Talk]

[03] **Chang, W. C.**, Ismael Becerra, J., Karalunas, S. L., Esmaeili, B., Yu, L. F., & Hasanzadeh, S. (2024). "Pioneering Research on a Neurodiverse ADHD Workforce in the Future Construction Industry". *Construction Research Congress 2024*. Des Moines, Iowa. *DOI: 10.1061/9780784485293.029*

[04] **Chang, W. C.**, Ryan, S. M., Hasanzadeh, S., & Esmaeili, B. (2023). "Attributing Responsibility for Performance Failure on Worker-Robot Trust in Construction Collaborative Tasks". *2023 European Conference on Computing in Construction (EC3)*. Crete, Greece. *DOI: 10.35490/EC3.2023.205*
[Invited for special collection in Automation in Construction]

[05] **Chang, W. C.**, Borowiak, A., & Hasanzadeh, S. (2023). "The Importance of Situational Awareness in Future Construction Work: Toward the Effects of Faulty Robots, Trust, and Time Pressure". *International Conference on Computing in Civil Engineering*. Corvallis, Oregon. *DOI: 10.1061/9780784485224.099*

[06] **Chang, W. C.**, Pooladvand, S, & Hasanzadeh, S. (2024). "The Impact of Physically Demanding Human-Drone Communication on Worker Mental Stress". *The CIB World Building Congress*. West Lafayette, Indiana. *DOI: 10.7771/3067-4883.1578*

[07] **Chang, W. C.**, Pooladvand, S., Esmaeili, B., & Hasanzadeh, S. (2024). "Worker-Drone Communication and Stress in Construction Workplaces under Varying Safety Conditions". *International Conference on Computing in Civil Engineering*. Pittsburgh, Pennsylvania. *(Accepted)*.

[08] **Chang, W. C.**, Wang, X., Zhu, T., Adetooto, J. D., Su L., Feng, Y., Esmaeili, B., & Hasanzadeh, S. (2025). "Digital Twin for Detecting Worker Geofence Violations in Road Construction Work Zones". *International Conference on Computing in Civil Engineering*. New Orleans, Louisiana. *(Accepted)*.

[09] Ghadiri, A., **Chang, W. C.**, & Hasanzadeh, S. (2025). "Leveraging Large Language Models and Deep Learning for Construction Work Zone Intrusion Risk Assessment". *International Conference on Computing in Civil Engineering*. New Orleans, Louisiana. *(Accepted)*.

[10] Zhou, W., **Chang, W. C.**, & Hasanzadeh, S. (2025). "Assessing Situational Awareness in Human-Autonomy Interaction Using Physiological Responses: A Privacy-Preserving Approach". *International Conference on Computing in Civil Engineering*. New Orleans, Louisiana. *(Accepted)*.

4.4 Book Chapter:

[01] Book Title: *"Advances in Human-AI Collaboration",* Chapter: "*Human-AI Interaction Fundamentals*", Editors: *Vincent G. Duffy, Waldemar Karwowski, and Gavriel Salvendy.* (*Submitted*).

4.5 Technical Report: (*2 Published*)

[01] Hasanzadeh, S., Esmaeili, B., Lee, K., Pokharkar, H., Pooladvand, S., & **Chang, W. C.** (2024). "Implementation and Assessment of Highway Intrusion Technologies". Purdue University & INDOT. Joint Transportation Research Program. *DOI: 10.5703/1288284317727*

[02] Hasanzadeh, S., Velay-Lizancos, M., **Chang, W. C.**, Lopez-Arias, M., & Francioso, V. (2022). "Synthesis Study of Best Practices for Cleaning Tools and Paving Equipment: Asphalt Release Agents (ARAs) and Asphalt Cleaners (ACs)". Purdue University & INDOT. Joint Transportation Research Program. *DOI: 10.5703/1288284317381*

4.6 Magazine and News Highlight:

[01] Lyles School of Civil and Construction Engineering (2024). "Human-Robot Teaming in Construction". *CE Impact Magazine.* (https://engineering.purdue.edu/CCE/Media/Impact/2024-Fall/humanrobot-teaming)

[02] "Understanding Behavior Through VR". (https://www.youtube.com/watch?v=poXCbEZ7SaE)

4.7 Thesis and Dissertations:

[01] Master of Science Thesis (2020); Construction Engineering and Management; National Taiwan University. Title: *"Application of Mixed Reality and Infrared Inspection to Examination of External Wall Tiles"*

4.8 Other Oral and Poster Presentations:

[01] **Chang, W. C.**, Yu, L. F., & Hong, S.R. (2024). "Worker-AI Teaming to enable ADHD Workforce Participation in the Construction Industry of the Future" Presented at the *2024 Learning Multiverse Conference: AI-Enabled Immersive Technologies in Workforce Training & Education*. ***[Keynote Speaker]***

[02] **Chang, W. C.**, & Hasanzadeh, S. (2024). "Worker-robot Interactions in the Future Construction Industry: Trust-building and Situational Awareness (SA)" Poster Presented at the *Construction Research Congress.*

[03] **Chang, W. C.**, & Hasanzadeh, S. (2022). "Worker-AI Teaming to enable ADHD Workforce Participation in the Construction Industry of the Future" Presented at the *2022 Construction Industry Institute Poster Callout.* ***[Academic Choice Runner-up Award]***

5. PARTICIPATION IN PROPOSAL DEVELOPMENT

"Integrated Smart Work Zone", INDOT (Budget: $654,939) 2023
- Assisted in developing research ideas and preparing the grant proposal

NSF CAREER Proposal, Hispanic-Serving Institutions (HSI) NSF 2023
- Assisted in writing and preparing the grant proposal

"Fortifying School Infrastructure via Stakeholder-Centered Digital Twin", Strengthening American Infrastructure (SAI) NSF (Budget: $750,000) 2022
- Assisted in writing and preparing the grant proposal

"Synthesis Study of Best Practices for Cleaning Tools and Paving Equipment: Asphalt Release Agents (ARAs) and Asphalt Cleaners (ACs)", INDOT (Budget: $52,644) 2021
- Assisted in writing and preparing the grant proposal

6. TEACHING EXPERIENCE (*Role: 4 teaching assistants, 2 voluntary teachers, and 5 research mentees*)

6.1 Teaching Assistant

Graduate Teaching Assistant, Purdue University ..... Spring 2023, Fall 2023
- Course Name: Design Build (Undergraduate /Graduate level)
- Course Name: Project Control & Life Cycle Execution of Constructed Facilities (Undergraduate level)

Graduate Teaching Assistant, National Taiwan University ..... Fall 2018, Spring 2019
- Course Name: Construction Management (Graduate level)
- Course Name: Build–operate–transfer (BOT) Project Management (Part-time Graduate level)

6.2 Voluntary Teaching

Volunteer Teaching Assistant for Graduate Smart Construction Course, Purdue University ..... Spring 2023, 2024
Volunteer Teaching Assistant for Undergraduate Capstone Projects, Purdue University ..... Spring 2023
Volunteer Teachers for Primary School in Rural Areas, National Taiwan University ..... Fall 2015–Spring 2017

6.3 Mentoring

Graduate Student Research Mentor, Purdue University 2022–Present
- Wei Zhou (Ph.D. student in Civil and Construction Engineering, Purdue University)
- Pretty Elizabeth John (Master student in Civil and Construction Engineering, Purdue University)

Undergraduate Student Research Mentor, Purdue University 2021–Present
- Jocelyn Silva (B.S. student in Civil Engineering, Purdue University)
- Nestor Felipe Gonzalez Garcia (Exchange student in Civil Engineering, from University of the Andes, Colombia)
- Andrew Borowiak (B.S. student in Civil Engineering, Purdue University)
- Sophia Marie Ryan (B.S. student in Civil Engineering, Purdue University)

7. OUTREACH AND SERVICE ACTIVITIES

BUILD, FIX, DRIVE IT: Mini Smart Builders, Imagination Station Children Museum, West Lafayette .....Fall 2024
- Provided 7-year-old children with opportunities to learn bridge-building, construction robotics, and immerse themselves in a virtual reality experience of the future. (https://www.linkedin.com/posts/purduecce_earlier-this-month-purdue-university-lyles-activity-7246515563504508929--Hi9?utm_source=share&utm_medium=member_desktop)

Women in Engineering Program, Purdue University .....Spring 2023, Spring 2024
- Demonstrated construction robotics and virtual reality for female high school students, allowing them to tangibly learn the application of cutting-edge technology in construction.

Grand Opening of Trimble Technology Lab, Purdue University .....March 1, 2024
- Showcased the deployment of the MR device, Trimble XR 10, to revolutionize the current construction and industry for the donors and President Chiang. (https://www.youtube.com/watch?v=-oskQ33f0wI)

Homecoming in Civil Engineering, Purdue University.....September 30, 2023
- Developed interactive activities for Purdue alumni and industry partners to collaborate with construction robots.

Dedication of Dudley and Lambertus Halls, Purdue University .....April 14, 2023
- Demonstrated the application of virtual reality technology in civil and industrial engineering for the donors. (https://polytechnic.purdue.edu/newsroom/dudley-lambertus-halls-gateway-complex-dedication-signals-kinship-between-polytechnic)

8. PROFESSIONAL DEVELOPMENT

8.1 Reviewer in Journals/Conferences/Presentation:

Automation in Construction 2024
Advanced Engineering Informatics 2024
IEEE Internet Computing (Digital Twins for Industry 4.0 or Smart Manufacturing) 2024
International Symposium on Automation and Robotics in Construction (ISARC), Lille, France.....2024
International Conference on Computing in Civil Engineering (I3CE), Pittsburgh.....2024
Construction Research Congress (CRC 2024), Des Moines.....2023
International Conference on Computing in Civil Engineering (I3CE), Corvallis.....2023
Summer Undergraduate Research Fellowship (SURF), Purdue University 2023

8.2 Affiliations:

Student member, ASCE Visualization, Information Modeling, and Simulation Committee (VIMS)..... 2022–Present
Student member, American Society of Civil Engineers (ASCE) 2022–Present

9. COMPETENCES

Devices: UR5e Robotic Arm, Husky Robotic Vehicle, HTC VIVE Pro, fNIRS (brite), Empatica E4, and Trimble XR10

Programming Language: Python, C#, C++, Java, ROS, and MATLAB
Engineering Software: Unity, P6, MS Project, SPSS, AutoCAD, and Revit