

MIN DENG

Assistant Professor
Department of Civil, Environmental, and Construction Engineering
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EDUCATION

University of Michigan, Ann Arbor, MI, U.S.

Ph.D. in Civil Engineering Sept 2019 – April 2023

M.S. in Robotics Sept 2021 – April 2023

Hong Kong University of Science and Technology, Hong Kong.

M.Phil. in Civil Engineering Sept 2016 – Aug 2018

M.Sc. in Intelligent Building Technology & Management Sept 2015 – July 2016

University of Nottingham, Ningbo, China.

B.E. in Architectural Environment Engineering (First-class Honors) Sept 2011 – July 2015

PROFESSIONAL APPOINTMENTS

Assistant Professor, Department of Civil, Environmental, and Construction Engineering, Texas Tech University, 2023 – Present

Graduate Student Research Assistant, University of Michigan, Fall 2019 – April 2023

Graduate Student Instructor, University of Michigan, January 2023 – April 2023

Graduate Student Instructor, University of Michigan, January 2022 – April 2022

Graduate Student Research Assistant, Hong Kong University of Science and Technology, September 2016 – July 2018

Teaching Assistant, Hong Kong University of Science and Technology, January 2017 – May 2017

PUBLICATIONS

Journal Articles:

Deng, M., Gluck, A., Zhao, Yijin., Li, D., Menassa, C. C., Kamat, V.R., Li, D., and Brinkley, J. (2023) A Systematic Analysis of Physiological Responses as Indicators of Driver Takeover Readiness in Conditionally Automated Driving. *Accident Analysis & Prevention*, 195, 107372.

Deng, M., Fu, B., and Menassa, C.C., and Kamat, V.R. (2023). Learning-Based Personal Models for Joint Optimization of Thermal Comfort and Energy Consumption in Flexible Workplaces. *Energy and Buildings*, 298, 113438.

Deng, M., Wang, X., and Menassa, C.C. (2022). Investigating the Effect of Wearing Masks on Office Work in Indoor Environments During the Pandemic Using Physiological Sensing. *Building and Environment*, 221, 109346.

Deng, M., Wang, X., Li, D., and Menassa, C.C. (2022). Digital ID Framework for Human-Centric Monitoring and Control of Smart Buildings. *Building Simulation*, 15(10), p.1709-1728 (**Cover Article**).

Deng, M., Wang, X., and Menassa, C.C. (2021). Measurement and Prediction of Work Engagement under Different Indoor Lighting Conditions using Physiological Sensing. *Building and Environment*, 203, 108098.

Gan, V.J.L., Luo, H., Tan, Y., **Deng, M.,** and Kwok, H.L. (2021). BIM and Data-Driven Predictive Analysis of Optimum Thermal Comfort for Indoor Environment. *Sensors*, 21(13), 4401.

Deng, M., Menassa, C.C., and Kamat, V.R. (2021). From BIM to Digital Twins: A Systematic Review of the Evolution of Intelligent Building Representations in the AEC-FM Industry. *Journal of Information Technology in Construction (ITcon)* 26(5), 58-83.

Deng, M., Tan, Y., Singh, J., Joneja, A., and Cheng, J.C.P. (2021). A BIM-based Framework for Automated Generation of Fabrication Drawings for Façade Panels. *Computers in Industry*, 126, 103395.

Deng, M., Gan, V.J.L., Tan, Y., Joneja, A., and Cheng, J.C.P. (2019). Automatic Generation of Fabrication Drawings for Façade Mullions and Transoms through BIM Models. *Advanced Engineering Informatics*, 42, 100964.

Gan, V.J.L., **Deng, M.,** Tse, T.K.T. Chan, C.M., Lo, I.M.C., and Cheng, J.C.P. (2018). Holistic BIM-Based Framework for Sustainable Low Carbon Design of High-Rise Buildings. *Journal of Cleaner Production*, 195, 1091-1104.

Conference Articles:

Deng, M. (presenting author), Wang, X., Li, D., Fu, B., Menassa, C. C., Kamat, V.R. (2023). Leveraging Artificial Intelligence for Enabling Personalized Activity-Based Workplaces. 2023 ASCE International Conference on Computing in Civil Engineering (i3CE 2023). Corvallis, OR.

Gluck, A., **Deng, M.,** Zhao, Y., Menassa, C., Li, D., Brinkley, J., Kamat, V.R. (2022). Exploring Driver Physiological Response During Level 3 Conditional Driving Automation. In 2022 IEEE 3rd International Conference on Human-Machine Systems (ICHMS), IEEE. Orlando, FL.

Deng, M. (presenting author), Fu, B., and Menassa, C. C. (2021). Room Match: Achieving Thermal Comfort Through Smart Space Allocation and Environmental Control in Buildings. *Proceedings of the 2021 Winter Simulation Conference*. Phoenix, AZ.

Gan, V.J.L., **Deng, M. (presenting author),** Tan, Y., Chen, W.W., and Cheng, J.C.P. (2018). BIM-based Framework to Analyze the Effect of Natural Ventilation on Thermal Comfort and Energy Performance in Buildings. *Energy Procedia*.

Singh, J., **Deng, M.,** and Cheng, J.C.P. (2018). Implementation of Mass Customization for MEP Layout Design to Reduce Manufacturing Cost in One-off Projects. *The 26th Annual Conference of the International Group for Lean Construction*.

Cheng, J.C.P., **Deng, M. (presenting author),** and Singh, J. (2018). Automated Generation and Layout Design for Building Façade Mullions Using BIM. *The 17th International Conference on Computing in Civil and Building Engineering*. Tampere, Finland.

Deng, M. (presenting author), Singh, J., and Cheng, J.C.P. (2017). A BIM-based Framework for Automated Generation of Façade Panel Fabrication Drawings. The 30th KKHTCNN Symposium on Civil Engineering. Taiwan.

Deng, M., Xia, L., and Chan, Y. (2016). Modeling and simulation of the gas flow inside micro-channels for purification. The 58th International Conferences on Engineering and Natural Science.

Chan, Y., and **Deng, M.** (2014). Stress Distribution on a Two-Phase Problem in Micro-Extrusion. Advanced Materials Research.

Book Chapter:

Deng, M., Menassa, C. C., and Kamat, V. R. (2022). A Holistic Framework for Human-Centric Smart Management of the Indoor Environment. CRC Press Taylor & Francis Group. ISBN 9781032136264.

Data Set:

Deng, M., Gluck, A., Zhao, Y., Menassa, C., Kamat, V., Li, D., Brinkley, J. (2023). Data for Predicting Driver Takeover Performance in Conditional Automation (Level 3) through Physiological Sensing [Data Set], University of Michigan - Deep Blue Data.

HONORS AND AWARDS

Rackham Graduate Student Research Grant, University of Michigan, 2022

John L. Tishman Predoctoral Fellowship, University of Michigan, 2020 – 2022

Outstanding Project Award for Education Category, Autodesk Hong Kong Building Information Modeling Awards, 2017

Full Postgraduate Studentship, Hong Kong University of Science and Technology, 2016 – 2018

Dean's Scholarship, University of Nottingham Ningbo China, 2014

GRANT WRITING EXPERIENCE

Understanding Impediments to Carbon Neutral Buildings Through Human-Centric Energy Consumption Models of Post-Pandemic Flexible Spatial-Temporal Workspaces, University of Michigan, 2023 (In Progress)

- National Science Foundation of Environmental Sustainability
- Role: Assisted with proposal writing and budgeting
- PI: Dr. Carol C. Menassa

Collaborative Research: Enabling Efficient Driver Takeover Performance in Conditional Automation (Level 3) through Physiological Sensing and Adaptive Takeover Alerts, University of Michigan, 2023 (In Progress)

- National Science Foundation of Mind, Machine and Motor Nexus (M3X)
- Role: Assisted PI with framework design, technical details, and proposal writing
- PI: Dr. Da Li

Human-Centric Optimization of Indoor Well-Being and Energy Consumption of Flexible Workspaces, University of Michigan, 2022 (Funded: \$2,944.5)

- Rackham Graduate Student Research Grant, University of Michigan
- Role: Led proposal writing and budgeting
- Project Lead: Min Deng

Predicting Driver Takeover Performance in Conditional Automation (Level 3) through Physiological Sensing, University of Michigan & Clemson University, 2021 (Funded: \$149,278)

- Center for Connected and Automated Transportation (CCAT)
- Role: Assisted with proposal writing and budgeting
- PI: Dr. Carol C. Menassa

RESEARCH EXPERIENCE

Projects related to Personal Physiological Sensing in Indoor Environment:

Can Physiological Sensing Indicate Driver Takeover Abilities in Conditional Level 3 Automation?

University of Michigan, March 2021 – March 2023

- Analyzing the collected data and trying to establish the personal prediction for takeover performance in L3 automation
- Designed the experiment and collected the physiological data and feedback from the subjects for takeover performance in L3 automation

Joint Optimization of Thermal Comfort and Energy Consumption for Smart Buildings, University of Michigan, March 2021 – Present

- Developed an optimization algorithm to achieve the optimal thermal comfort and energy consumption by room match and control
- Validated the algorithm using a public database

Human Digital ID (DID) for Enhancing Human-Building Interaction, University of Michigan, March 2021 – March 2023

- Proposed a new concept of human digital ID for next-generation human-centric indoor monitoring
- Developed a framework to integrate personal information with the building system to achieve optimal indoor experience
- Developed a real-time indoor occupants and environment monitoring platform using Unity

Investigating the Effect of Wearing Masks on Office Work in Indoor Environments During the Pandemic, University of Michigan, May 2021 – February 2022

- Designed and conducted an experiment to collect the physiological responses of the subjects while they were performing cognitive tasks under different mask-wearing scenarios
- Analyzed the collected physiological data

Measurement and Prediction of Work Engagement under Different Indoor Lighting Conditions using Physiological Sensing, University of Michigan, September 2020 – May 2021

- Designed and conducted an experiment to collect physiological data from the subjects under different indoor lighting conditions

- Analyzed the collected data and established the personal prediction models for work engagement using easily measurable physiological sensing and lighting level

A Systematic Review of the Evolution of Intelligent Building Representations in the AEC-FM Industry, University of Michigan, March 2020 – September 2020

- Conducted a thorough review of the related work regarding the evolution of intelligent building technologies in the ACE-FM industry

Projects related to the Fabrication of the Building Façade

Integrated CAD/CAM Platform for Level 400 BIM Support in Façade Design and Fabrication, Hong Kong University of Science and Technology, September 2016 – August 2018

- Developed the program for automated extraction of building/project information from BIM models
- Developed the algorithms and program for automated generation of fabrication drawings for building façade panels
- Developed the program for automated integration of various information sources for fabrication drawings
- Developed the algorithms and program for the automatic generation of fabrication drawings for façade mullions and transoms through BIM models

Projects related to Sustainable Building

Comparison Study of Thermoelectric Air Conditioners and Vapor-Compression Systems, Hong Kong University of Science and Technology, September 2015 – August 2016

- Designed a building model in a chosen place using Autodesk Revit
- Conducted energy performance simulation of the building to obtain the peak cooling and heating loads of one specified room
- Conducted a comparison study as well as a long-term economic analysis between the two types of air conditioners.

Modeling and Simulation on Gas Flow Inside Nanomaterials for Air Purification and Ventilation, University of Nottingham Ningbo China, September 2014 – August 2015

- Analyzed and simplified the geometry of the micro materials, built a micro-channel in Ansys Fluent, conducted a simple simulation, and got the properties distribution of the airflow
- Set injection with the same properties into the microchannel within the airflow to see the distribution and tracks of these particles
- Developed the user-defined function (UDF) for different materials, and applied it to the model in Fluent

Green Building Evaluation, China Energy Conservation, and Environmental Protection Group, Hangzhou, China, June 2014 – July 2014

- Accurately obtained the size and other data of China Energy Conservation and Environmental Protection Group based on analysis of drawings and measurement of the actual building
- Simplified those materials and conducted 3D model construction by Open studio
- Conducted energy consumption simulation of the building model in Open studio with EnergyPlus, and the simulation results had only a little deviation from the actual results

Other Projects:

Stress Distribution on A Two-Phase Problem in Micro-Extrusion, University of Nottingham Ningbo China, September 2014 – August 2015

- Conducted mathematical analysis on microfluid by using mathematical modeling
- Performed the nature of microfluid in the colorful image by MATLAB based on theoretical results conducted through mathematics

TEACHING EXPERIENCE

CONE 4322/5322: Construction Management (70 students), Texas Tech University, Spring 2024

- Delivered lectures and held office hours
- Developed and administered projects and exams

CONE 3304/5304: Sustainable Building Design and Construction (58 students), Texas Tech University, Fall 2023

- Delivered lectures, held office hours and led grading
- Developed and administered projects, homework, and exams

CEE 331: Construction Management (47 students), University of Michigan, Winter 2023

- Delivered lectures in weekly lab sessions, instructed course projects, held office hours and led grading
- Developed and administered lab projects and weekly quizzes materials

CEE 555: Sustainability of Civil Infrastructure Systems, University of Michigan, Fall 2022

- Guest lecturer for two class sessions regarding the energy modeling

CEE 331: Construction Management (60 students), University of Michigan, Winter 2022

- Delivered lectures in weekly lab sessions, instructed course projects, held office hours and led grading
- Developed and administered lab projects and weekly quizzes materials

CIVL 5220: Construction Information Technology, Hong Kong University of Science and Technology, Winter 2017

- Led the tutorial sessions of the class, and led the grading

PRESENTATIONS

Invited Talks:

Advancing Management and Control of Enclosed Spaces through Human-Centered Artificial Intelligence, Department of Civil Engineering, The University of Texas at Arlington, 2023

Advancing Management and Control of Enclosed Spaces through Human-Centered Artificial Intelligence, Department of Civil, Environmental, and Construction Engineering, Texas Tech University, 2023

Advancing Management and Control of Enclosed Spaces through Human-Centered Artificial Intelligence, UNL Durham School of Architectural Engineering and Construction, 2023

Advancing Management and Control of Enclosed Spaces through Human-Centered Artificial Intelligence, Department of Civil, Environmental, and Geospatial Engineering, Michigan Technological University, 2023

Advancing Management and Control of Enclosed Spaces through Human-Centered Artificial Intelligence, Department of Civil and Environmental Engineering, Syracuse University, 2023

Human-Building Interaction for Optimization of Indoor Well-Being and Building Energy Consumption, Future of the Building Industry Workshop, UNL Durham School of Architectural Engineering and Construction, 2022

Predicting Driver Takeover Performance in Simulated Level 3 AVs, Center for Connected and Automated Transportation (CCAT) Research Review, 2022. Available online at: <https://www.youtube.com/watch?v=ZzXZVnONBfo&t=349s>

Room Match: Achieving Thermal Comfort Through Smart Space Allocation and Environmental Control in Buildings, Winter Simulation Conference. Phoenix, AZ (online), 2021

Digital ID (DID)-based Human-Building Interaction for Optimizing Individual Indoor Experience, CEE 830: Construction Engineering Seminar, University of Michigan, 2021

Real-time Human-centric Indoor Monitoring and Control, CEE 830: Construction Engineering Seminar, University of Michigan, 2020

Conference Presentations:

BIM-based Framework to Analyze the Effect of Natural Ventilation on Thermal Comfort and Energy Performance in Buildings, International Conference on Applied Energy, Hong Kong 2018

Automated Generation and Layout Design for Building Façade Mullions Using BIM, International Conference on Computing in Civil and Building Engineering, Tampere, Finland, 2018

A BIM-based Framework for Automated Generation of Façade Panel Fabrication Drawings, KKHTCNN Symposium on Civil Engineering, Taiwan, 2017

INDUSTRY EXPERIENCE

BIM Technician in Research & Development, New World Construction Company Limited, Hong Kong, February 2019 – July 2019

- Development of Autodesk Revit functional packages for quantity take-off and generation of formwork for BIM project models
- Development of Construction Information Asset (CIA) Platform

Intern, Zhejiang Urban & Rural Planning Design Institute, Hangzhou, China, July 2014 – September 2014

- Hangzhou Harbor City project: Checked and revised the positions of the casing for the HVAC water supply and pre-left tunnels for buildings
- High-speed Traffic Police Detachment: 3D model establishment, and model crashing checking

Intern, China Energy Conservation and Environmental Protection Group, Hangzhou, China, June 2014 – July 2014

- Checked the size of the green building scientific technology museum
- Finished the modeling construction and simulation of the green building scientific technology museum, compared the monitoring and simulation data, and conducted a reasonable evaluation of the operation of the green building

Intern, Rongji Real Estate Co., Ltd., Jiangsu, China, August 2013 – September 2013

- Field Assistant: presented basic information about the buildings to clients, assisted the property consultant to finish the marketing works

PROFESSIONAL LEADERSHIP AND SERVICE

Leadership

Graduate Student Mentor, University of Michigan, 2021 – Present

Final Year Project Mentor, Hong Kong University of Science and Technology, 2017

Conference Organization

Session Chair for Engineering and Materials Design, Quality, and Value Management, CI & CRC Joint Conference, Arlington, Virginia, 2022

Organizer's Team Member, 16th International Conference on Construction Applications of Virtual Reality, Hong Kong, 2016

Reviewer

Advanced Engineering Informatics, 2023 – Present

Building and Environment, Elsevier, 2023 – Present

Energy and Buildings, Elsevier, 2023 – Present

Energy and Built Environment, Elsevier, 2023 – Present

Building Simulation, Springer, 2022 – Present

Journal of Building Performance Simulation, Taylor and Francis, 2022 – Present

Architectural Engineering and Design Management, Taylor and Francis, 2021 – Present

Others

Member, ASCE DSA Committee, 2023 – Present

Member, ASCE VIMS Committee, 2023 – Present

Member, American Society of Civil Engineers (ASCE), 2022 – Present

Member, CEE Diversity, Equity, and Inclusion (DEI) Program, University of Michigan, 2021 – Present

Rackham Professional DEI Certificate, University of Michigan, 2021

SKILLS

Language Proficiency: Native Chinese, Professional English

Mapping Software: Auto CAD, Autodesk Revit, Bluebeam Revu, Dynamo, Sketchup, Rhino, Grasshopper, ArchiCAD, SolidWorks, CATIA, Fusion 360, Solibri

Simulation Software: Ansys Fluent, Autodesk CFD, Autodesk Ecotect Analysis, OpenStudio, Energyplus, Dialux, Chvac, Design Builder

Hardware: EEG, GSR, COZIR, Skin Temperature Probe, Heart Rate Ear-Clip

Others: Microsoft Software, Adobe Photoshop CS6, Computer Programing Skills (i.e., Python, MATLAB, VBA, C#, C, Julia, C++), ROS2, EmotivPro, Consensus