
Aslihan Karatas-Fredenburg*, PhD, LEED AP

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*(she/her/hers)

EDUCATION

University of Illinois Urbana-Champaign

Doctor of Philosophy in Construction Engineering and Management, May 2014

University of Florida

Master of Science in Construction Engineering and Management, May 2009

Bogazici University

Bachelor of Science in Civil Engineering, June 2007

PROFESSIONAL EXPERIENCE

University of Illinois Chicago,

Clinical Assistant Professor in Civil, Mat., & Env, Engineering Department
Director of UIC Built Environment and Infrastructure Laboratory

Fall 2021 – present

Lawrence Technological University,

Assistant Professor in Civil and Architectural Engineering Department

Fall 2015 – Spring 2021

Walbridge Construction Company, (Part-time)

Project Controls Engineer at Scheduling Group
Research Analysts at Innovation & Improvement Leadership Group

May 2019 – Feb 2021

University of Michigan,

Postdoctoral Research Fellow in Civil and Environmental Engineering Dept

Aug 2014 – July 2015

LEADERSHIP EXPERIENCES

- [1] ISEC-12 Conference Chair, August 2023 https://www.isec-society.org/ISEC_12/
 - [2] Judge for the Department of Energy (DOE) JUMP into STEM Program (August 2023 - present)
 - [3] National Association of Women in Construction (NAWIC) Foremost Leadership Award, 2019
 - [4] ‘Thought Leaders Policy Conference and Black Caucus Foundation Michigan Briefing’, White House, DC, September 2016 (invited Panelist).
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INVITED TALKS

- [1] ‘Advancements in Sustainable Building Technology’, Purdue University, CIB Women in Built Environment, Feb 2024
- [2] ‘Disaster Management Plan for Aftermath of Eartquakes’, Istanbul Aydin University, May 2023.
- [3] ‘Building Technology and Science”, Oak Ridge National Laboratory, Dec 2022
- [4] ‘Sustainability, Efficiency, and Workforce Development in Construction’, University of Washington Tacoma, College of Engineering Seminar, April 2021.
- [5] ‘Critical Path Method (CPM) in Scheduling Construction Projects’. UIC Civil, Materials, & Environ Engineering Seminar, March 2021.
- [6] ‘Sustainability, Efficiency, and Workforce Development in Construction’, Eastern Michigan University, Department of Engineering Seminar, February 2021.
- [7] ‘Integrated Conceptual Framework for Reducing Hotel Guest Energy Consumption’. Seventeenth International Conference on Environmental, Cultural, Economic & Social Sustainability, Amsterdam, Netherlands, 2021.
- [8] ‘Sustainability and Efficiency in Construction Industry’, Jefferson University, Department of Construction Management Seminar, January 2021.
- [9] ‘Maximizing the Sustainability of Residential Units’, Bowling Green State University, Department of Construction Management Seminar, April 2019.
- [10] ‘Maximizing the Sustainability of Residential Units’, George Mason University, Department of Civil and Environmental Engineering Seminar, March 2018.
- [11] ‘Accelerating Women’s Workforce in Construction Industry’, Southfield, MI, July 2016 – July 2019, BUILD Initiative Annual Graduation Ceremony.
- [12] ‘Maximizing Sustainability in Residential Houses’, SEDAC Seminars, Urbana, IL May 2014.
- [13] ‘A Pathway to Green Cities: Evaluating Sustainability for Urban Neighborhoods’. IIE Annual Conference and Expo. 17-22 May 2013.
- [14] ‘Evaluating and Quantifying Sustainable Development for Urban Neighborhoods’. International Conference on Sustainable Design and Construction. Fort Worth, TX. Nov 2012.
- [15] National Science Foundation workshop for Sciences behind Sustainability Quantification for Building and Infrastructure Design, Engineering and Construction (S2QBIDEC) (invited Panelist) Fort Worth, TX. Nov 2012.

JOURNAL PUBLICATIONS

- [1] Palani, H., & **Karatas, A.** (2024). Investigating the Disparities between Experimental and Computational Analyses of Thermal Performance in Prefabricated Wall Panels. *Applied Thermal Engineering*, 121568.
 - [2] Khaleghi, H., & **Karatas, A.** (2024). Assessing the Dynamic Thermal Performance of Prefabricated Wall Panels in Extreme Hot Weather Conditions. *Journal of Building Engineering*, 82, 108351.
 - [3] Palani, H., Acosta, J. G., **Karatas, A.**, & Derrible, S. (2023). The Role of Socio-Demographic and Economic Characteristics on Energy-Related Occupant Behavior. *Journal of Building Eng*, 106875.
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- [4] Palani, H., & **Karatas, A.** (2023). Innovative Environmental Chamber Construction for Accurate Thermal Performance Evaluation of Building Envelopes in Varied Climates. *Buildings*, 13(5), 1259.
 - [5] Acosta, J. G., Palani, H., Movahedi, A., **Karatas, A.**, & Derrible, S. (2023). Residential Electricity Consumption Patterns and their Relationship to Commute Times by Mode. *Findings*.
 - [6] Palani, H., Khaleghi, H., Salehi, P., & **Karatas, A.** (2023). Assessing Hygrothermal Performance in Building Walls Engineered for Extreme Cold Climate Environments. *Sustainability*, 15(24), 16597.
 - [7] Rener, A., **Karatas, A.**, & Videan, B. (2022). Innovative Design and Execution Model for Improving Productivity of Interior Prefabricated Commercial Wall Assemblies. *Buildings*, 13(1), 68.
 - [8] Palani, H., & **Karatas, A.** (2022). Holistic Approach for Reducing Occupants' Energy Consumption in Hotel Buildings. *Journal of Cleaner Production*, 365, 132679.
 - [9] Palani, H., & **Karatas, A.** (2021). "Identifying Energy-Use Behavior and Energy-Use Profiles of Hotel Guests". *Applied Sciences*, 11(13), 6093.
 - [10] Li, Da, Carol C. Menassa, and **Karatas, A.** (2017) "Energy Use Behaviors in Buildings: Towards an Integrated Conceptual Framework." *Energy Research & Social Science* 23: 97-112.
 - [11] **Karatas, A.** & El-Rayes, K. (2016) "Optimal Tradeoffs between Housing Cost and Environmental Performance." *Journal of Architectural Engineering*, 04015018.
 - [12] **Karatas, A.**, Stoiko, A., & Menassa, C. C. (2016). "Framework for Selecting Occupancy-Focused Energy Interventions in Buildings". *Building Research & Information*, 44(5-6), 535-551
 - [13] **Karatas, A.**, & El-Rayes, K. (2015). "Evaluating the Performance of Sustainable Development in Urban Neighborhoods Based on the Feedback of Multiple Stakeholders". *Sustainable Cities and Society*, 14, 374-382.
 - [14] **Karatas, A.** & El-Rayes, K. (2015) "Optimizing Tradeoffs among Housing Sustainability Objectives", *Automation in Construction*, Elsevier 53: 83-94.
 - [15] **Karatas, A.**, & El-Rayes, K. (2015). "Parallel Computing Framework for Optimizing Environmental and Economic Performances of Housing Units". *Journal of Computing in Civil Engineering*, 04015026.
 - [16] **Karatas, A.**, & El-Rayes, K. (2014) "Optimal Trade-Offs between Social Quality of Life and Life-Cycle Cost in Housing Units". *Journal of Construction Engineering and Management* 140.12.
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BOOK CHAPTERS

- [1] Alsharif S., **Karatas, A.**, "Data-Driven Approach For Improving Schedule and Cost Estimation of Nuclear Power Plant Projects", *Nuclear Power Plants: Recent Progress and Future Directions*. Nova Science Publiswea, 2022. ISBN: 978-1-68507-686-3
 - [2] **Karatas, A.**, Stoiko, A., & Menassa, C. C.. "Framework for Selecting Occupancy-Focused Energy Interventions in Buildings", *Building Governance and Climate Change*, 2019. 535-551.
 - [3] **Karatas, A.**, Stoiko, A., & Menassa, C. C.. "A Framework to Achieve Large Scale Energy Savings for Building Stocks through Targeted Occupancy Interventions: Foundations, Principles, and Applications." *Smart Cities: Foundations, Principles, and Applications*. John Wiley & Sons, 2017. doi: 10.1002/9781119226444.ch17.
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PEER-REVIEWED CONFERENCE PUBLICATIONS

- [1] Palani, H. and **Karatas, A.**, and Taylor T. (2024) "Cost-Effective Hot Box Apparatus to Measure Thermal Performance of Building Envelopes", CRC 2024 Conference (Accepted).
 - [2] Khaleghi, H and **Karatas, A.**, (2024) "Experimental Framework to Measure Dynamic Thermal Resilience of Wall Panels under Extreme Weather Conditions", CRC 2024 Conference (Accepted).
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- [3] Luna H., Palani, H., and **Karatas, A.**, (2023) “Cost-Effective, Scalable and User-Friendly Temperature Control System for Measuring Thermal Performance of Building Envelope Systems in Environmental Chambers”, *Computing in Civil Engineering*, 815-823.
 - [4] Khaleghi, H and **Karatas, A.**, (2023) “Arctic Architectures: Unleashing Energy Efficiency and Resilience in Extreme Cold Regions”, ISEC-12. Chicago, US (In press).
 - [5] Palani, H., Acosta J, Derrible, S., and **Karatas, A.**, (2023) “Predicting Energy Use Intensity of Us Hotel Buildings Using CBECS Microdata”, ISEC-12. Chicago, US (In press).
 - [6] Rener, A., **Karatas, A.**, & Cole, M. (2022). “Innovative Model for Forecasting Trailer Usage for Prefabricated Exterior Wall Panels”, In *ISARC. Proceedings of the International Symposium on Automation and Robotics in Construction* (Vol. 39, pp. 144-151). IAARC Publications.
 - [7] Palani, H., Acosta J., **Karatas, A.**, and Derrible, S. (2022) “Understanding the Interrelationship between Energy-Use Behavior and Socio-Demographic Profile”, ITISE-2022, Gran Canaria, Spain
 - [8] Palani, H. and **Karatas, A.**, (2022) “Integrated Energy-Use Model to Identify Energy-Use Profile of Hotel Guests”, *Computing in Civil Engineering Orlando, FL*, 688-695
 - [9] Palani, H. and **Karatas, A.**, (2021) “Identifying Energy Use Behaviors of Hotel Guests”, *CSCE 2021*.
 - [10] **Karatas, A.**, & Al-Sharif, S., (2020). Schedule and Cost Forecasting Model for Nuclear Power Plant Projects. In *Construction Research Congress 2020: Project Management and Controls, Materials, and Contracts* (pp. 721-729). Reston, VA: American Society of Civil Engineers.
 - [11] Palani, H. and **Karatas, A.**, (2020) “Reducing Occupants Energy Consumptions in Hotel Buildings” *Building Performance Analysis Conference and SimBuild, ASHRAE and IBPSA-USA*.
 - [12] Albayati A. and **Karatas, A.** (2019) “Fall Prevention Supplementary Devices for Bridge Construction Workers: A Life Cycle Cost Analysis”, *Proceedings of the Canadian Society for Civil Engineering International Construction Specialty Conference (ICSC'19)*, Montreal, Canada.
 - [13] Staple N. and **Karatas, A.** (2019) “A Study of the U.S. Roofing Industry and its Workforce”, *Proceedings of the Canadian Society for Civil Engineering International Construction Specialty Conference (ICSC'19)*, Montreal, Canada.
 - [14] Alwerfalli, D., **Karatas, A.**, & Alshammari, M. (2017). “Application of quality management systems (QMS) in construction industry”. In *Proceedings of the International Conference on Industrial Engineering and Operations Management* (p. 46).
 - [15] Alsharif, S. and **Karatas, A.** "A Framework for Identifying Causal Factors of Delay in Nuclear Power Plant Projects." *Procedia Engineering* 145 (2016): 1486-1492.
 - [16] **Karatas, A.**, Carol C. Menassa, and Allisandra Stoiko. (2015)"A Framework for Delivering Targeted Occupancy Interventions to Reduce Energy Usage in Buildings." *Procedia Engineering* 118.
 - [17] **Karatas, A.**, and El-Rayes, K. (2014) ‘Optimal Configurations of Design and Construction Decisions for Maximizing Social Quality-of-Life for Housing Residents’. *Construction Research Congress (CRC) 2014*: pp. 436-443. doi: 10.1061/9780784413517.045.
 - [18] **Karatas, A.**, and El-Rayes, K. (2014) "Maximizing Occupants Comfort in Affordable Housing Units." *Computing in Civil and Building Engineering* pp. 2040-2046). ASCE. doi: 10.1061/9780784413616.253.
 - [19] **Karatas, A.** and El-Rayes, K. (2012) ‘Evaluating and Quantifying Sustainable Development in Urban Neighborhoods’ *ICSDEC 2012*: pp. 214-221. doi: 10.1061/9780784412688.025.
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GRANTS and FELLOWSHIPS

- [1] STO Corp., Role: Principal Investigator (PI), “*Analyzing the Thermal Performance of Prefab Walls with Automated Thermal Imaging Process*”, **Ongoing** Dec 2023-Aug 2024 (Budget: \$24,000). With Co-PI: Enis Cetin
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- [2] DOE/ORNL, Role: Principal Investigator (sole-PI), “*Finding the Impact of Window Leakage and Window Replacement on Low-Income Households’ Utility Bills*”, **Ongoing** Aug 2023-2024 (Budget: \$29,950).
 - [3] STO Corp., Role: Principal Investigator (sole-PI), “*Comparing the Thermal Performances of Joints on Prefab Walls and Precast Walls*”, **Ongoing** Aug 2023-2024 (Budget: \$199,550).
 - [4] UIC Covid Relief Funding, Role: Principal Investigator (sole-PI), “*Investigating the Best Performing Wall Insulation Materials for Silos in Arctic Regions*”, **Ongoing** Aug 2023-2024 (Budget: \$15,000).
 - [5] Heat and Frost Insulator Union, Role: Principal Investigator (PI), “*Synthesizing Current Challenges in Aging Infrastructure for Mechanical Heat and Frost Insulation Workforce*,” **Tentatively Accepted** (Budget: \$61,000). Co-PIs: Sogand Hasanzadeh, Behzad Esmaeili (Purdue University)
 - [6] HUD, Role: PI, “*Advancing Urban Resilience: The MoldMap Development for Predictive Risk Assessment in Low-Income Neighborhoods*”, **Under Review** (Budget: \$997,550). With Co-PIs: Michael Cailas, Andrew Foell, Apostolis Samabanis.
 - [7] DOE/NREL, Role: Principal Investigator (PI), “*Measuring Argon Gas Content in Newly Installed Windows*”, **Under Review** (Budget: \$28,750). With Co-PI: Didem Ozevin.
 - [8] ICON Build, Role: Principal Investigator (PI), “*Hygrothermal Assessment of 3-D Printed ICON Build Structures for Extraterrestrial Conditions*”, **Under Review** With Co-PI: Lauryn Spearing.
 - [9] Dusty Robotics, Role: Principal Investigator (PI), “*Evaluating ROI from Stakeholder Insights and Safety Advantages of Dusty Robotics for Construction Companies*”, **Under Review** (Budget: \$46,000).
 - [10] STO Corp., Role: Principal Investigator (sole-PI), “*Comparing Actual and Theoretical Environmental Performances of Prefab Wall Assemblies*”, **Completed** April 2022-Dec 2023 (Budget: \$212,000).
 - [11] UIC Teaching Sustainability Initiative, “*Developing a Module for CME 481 Sustainable Construction Course*”, **Completed**. Sep-Dec 2023 (Amount: \$1,000).
 - [12] 2023 ASCE Remote ExCEED Teaching Workshop Scholarship, **Completed**, July 2023 (Amount: \$500)
 - [13] CPWR, Role: Co- Investigator (Co-PI), “*Improving the Assessment of Noise Exposure and Warning Signal Audibility on Construction Sites*”, **Completed**. Aug 2021-Feb 2023 (Budget: \$25,000). With Nikolina Samardzic (PI) and Behzad Esmaeili (Co-PI).
 - [14] Centrepolis Accelerator, Role: Principal Investigator (PI), *IEQ-EP: Indoor Environmental Quality and Energy Performance System for Buildings*, **Completed**. Jan 2021- April 2021 (Budget - \$2,000).
 - [15] Kern Family Foundation (KEEN) *Foundation Course Module Development Grant*, **Completed** in 2017 (Amount:- \$3,000).
 - [16] Kern Family Foundation (KEEN) *Foundation PBL/ACL Development*, **Completed** in 2016 (Amount - \$2,000).
 - [17] LTU Presidential Undergrad. Research Award. Role: PI, “*Identifying Effective Occupancy Interventions to Reduce Energy in Commercial Buildings*”, **Completed** in 2016 (Budget -\$1,000).
 - [18] W. E. O’Neil Construction Company Fellowship Award, Sep 2013-May 2014 (Budget -\$50,000).
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PROFESSIONAL REGISTRATIONS, MEMBERSHIPS and HONORS

- LEED Accredited Professional (AP), Credential ID: #10773918-AP-BD+C
- Certificate for Excellence in Sustainable Management & Tech, UIUC Dept. of Business Administration
- Professional Memberships:
 - National Associate of Women in Construction (NAWIC)
 - US Green Building Council (USGBC), Member
 - ASCE Associate Member
 - ASHRAE

PROFESSIONAL and ACADEMIC SERVICES

- Editor for the Proceedings of International Structural Engineering and Construction, Innovative Theory and Practices in Structural Engineering and Construction, Volume 10, Issue 1 (August 2023)
- Department of Energy (DOE) JUMP into STEM Program Professor Team Member, Aug 2022 - 2023
- Conference Co-Chair – Construction Research Congress 2024
- UIC, Advancing Racial Equity - Strategic Planning Committee Member, 2021- present
- UIC, Office Furniture Subcommittee Member, 2023 – present
- Lawrence Technological University Faculty Senate Member, 2017-2020
- Lawrence Technological University Campus Affairs Committee Chair, 2018-2019
- NSF Panel Reviewer
- Journal Paper and Book Reviewer:
 - Oxford Press
 - Construction Research Conference (CRC)
 - Journal of Computing in Civil Engineering
 - Journal of Construction Eng. & Management
 - Journal of Energy & Buildings
 - Journal of Infrastructure Systems
 - Buildings
 - Energies
- THE BUILD INITIATIVE Academic Advisor and Advisory Board Member, 2015- current
- Conference Technical Session Chair:
 - The 39th International Symposium on Automation and Robotics in Construction, 18-22 July 2022, Bogota, Colombia.
 - International Conference Time Series and Forecasting, 12-14 June 2022, Gran Canaria, Spain.
 - Technical Session Chair, International Conference CSCE on Sustainable Design Engineering and Construction, June 2019, Montreal, Canada.
 - International Conference on Sustainable Design Eng. and Cons., 18-20 May 2016, Tempe AZ.

COURSES TAUGHT

- UIC Courses from Fall 2021-Ongoing
 - CME 112 Evolution of Infrastructure
 - CME 201 Statics
 - CME 494 Decision Making and Risk Management in Construction
 - CME 481 Sustainable Construction, Building Energy and Built Environment
 - CME 587 Construction Estimating and Scheduling
 - CME 594 Pre-Construction and Contract Administration
- LTU Courses from Fall 2015-Spring 2021
 - ECE 5223 Techniques of Planning and Control in Construction
 - ECE 5113 Sustainable Construction Practices
 - ECE 4022 CE Capstone Design Project
 - ECE 4263 Cost Estimating, Bidding and Contracting
 - ECE 3213 Construction Engineering
 - ECE 3212 Construction Engineering Lab
 - ECE 1102 CE Perspectives