
Aslihan Karatas-Fredenburg*, PhD, LEED AP

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*(she/her/hers)

EDUCATION

University of Illinois Urbana-Champaign

Doctor of Philosophy in Civil and Environmental Engineering, May 2014

Major: Construction Engineering and Management

University of Florida

Master of Science in Civil and Coastal Engineering, May 2009

Major: Construction Engineering and Management

Bogazici University

Bachelor of Science in Civil Engineering, Istanbul; Turkey, June 2007

PROFESSIONAL EXPERIENCE

University of Illinois Chicago,

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,

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

Warsaw Technological University,

Research Fellow in Civil Engineering Department

June 2006 – Aug 2006

Yuksel Construction,

Junior Project Engineer

2005

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 Foremost Leadership Award, 2019

[4] ‘Thought Leaders Policy Conference and Black Caucus Foundation Michigan Briefing’, White House, DC, September 2016 (invited Panelist).

[5] President of Turkish Student Association at the University of Florida, 2008-2009

INVITED TALKS

- [1] ‘Advancements in Sustainable Building Science Technologies: Enhancing Climate Resilience and Adaptation Strategies in Built Environment’, Distinguished Women Researchers in the Built Environment - President’s Seminar Series, March 2024.
- [2] ‘Disaster Management Plan for Aftermath of Earthquakes’, 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, & Environmental 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] Khaleghi, H., & **Karatas, A.** (2024). Assessing the Dynamic Thermal Performance of Prefabricated Wall Panels in Extreme Hot Weather Conditions. *Journal of Building Engineering*, 108351.
 - [2] Palani, H., & **Karatas, A.** (2024). Investigating the Disparities between Experimental and Computational Analyses of Thermal Performance in Prefabricated Wall Panels. *Applied Thermal Engineering*, 121568.
 - [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”, *I3 Computing in Civil Engineering*, (In press).
 - [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.**, and Cole, Matt, (2022) “Innovative Model for Forecasting Trailer Usage for Prefabricated Exterior Wall Panels”, *ISARC 2022*, Bogota, Colombia.
 - [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] NSF, Role: Principal Investigator (PI), “*CIVIC-PG Track B: Community-Driven, AI-Powered Thermal Imaging for Accessible Window Air Infiltration and Leakage Measurement*”, **Ongoing** October 2024-April 2025 (Budget: \$74,996), With Co-PIs: Enis Cetin, Lauryn Spearing, Lucio Soibelman, Yu Hu
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- [2] HUD, Role: PI, “*Advancing Urban Resilience: The MoldMap Development for Predictive Risk Assessment in Low-Income Neighborhoods*”, **Ongoing** September 2024-2007 (Budget: \$998,764). With Co-PIs: Michael Cailas, Andrew Foell, Apostolis Samabanis.
 - [3] STO Corp., Role: Principal Investigator (PI), “*Analyzing the Thermal Performance of Prefab Walls with Automated Thermal Imaging Process*”, **Ongoing** Dec 2023-September 2024 (Budget: \$24,000), With Co-PI: Enis Cetin
 - [4] DOE/ORNL, Role: Principal Investigator (sole-PI), “*Finding the Impact of Window Leakage and Window Replacement on Low-Income Households’ Utility Bills*”, **Ongoing** Aug 2023-2025 (Budget: \$72,950).
 - [5] STO Corp., Role: Principal Investigator (PI), “*Comparing the Thermal Performances of Joints on Prefab Walls and Precast Walls*”, **Ongoing** Aug 2023-2024 (Budget: \$199,550).
 - [6] Tissue Bank Asbestos Research Charitable Trust (TBAR), Role: Principal Investigator (PI), “*Synthesizing Current Challenges in Aging Infrastructure for Mechanical Heat and Frost Insulation Workforce*”, **Ongoing** April 2024-2025 (Budget: \$61,996).
 - [7] 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).
 - [8] UIC Covid Relief Funding, Role: Principal Investigator (sole-PI), “*Investigating Hygrothermal Performance in Building Walls Engineered for Extreme Cold Climate Environments*”, **Completed** Aug 2023-2024 (Budget: \$15,000).
 - [9] UIC Teaching Sustainability Initiative, “*Developing a Module for CME 481 Sustainable Construction Course*”, **Completed** (Amount: \$1,000)
 - [10] 2023 ASCE Remote ExCEED Teaching Workshop Scholarship, **Completed**, July 18-27 2023 (Amount: \$500)
 - [11] CPWR, Role: Co- Investigator (Co-PI), “*Improving the Assessment of Noise Exposure and Warning Signal Audibility on Construction Sites*”, **Completed**. Aug 21-Feb 2023 (Budget: \$25,000; Co-PI Budget: \$5,000). With Nikolina Samardzic (PI) and Behzad Esmaeili (Co-PI).
 - [12] 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).
 - [13] Kern Family Foundation (KEEN) *Foundation Course Module Development Grant*, **Completed** in 2017 (Amount:- \$3,000).
 - [14] Kern Family Foundation (KEEN) *Foundation PBL/ACL Development*, **Completed** in 2016 (Amount - \$2,000).
 - [15] LTU Presidential Undergrad. Research Award. Role: PI, “*Identifying Effective Occupancy Interventions to Reduce Energy in Commercial Buildings*”, **Completed** in 2016 (Budget -\$1,000).
 - [16] W. E. O’Neil Construction Company Fellowship Award, 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 and Technology, 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
- 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
 - Journal of Energy & Buildings
 - Construction Research Conference (CRC)
 - Journal of Infrastructure Systems
 - Journal of Computing in Civil Engineering
 - Buildings
 - Journal of Construction Eng. & Management
 - 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.
 - International Conference on Sustainable Design Eng. and Cons., 18-20 May 2016, Tempe AZ.
 - Technical Session Chair, International Conference CSCE on Sustainable Design Engineering and Construction, June 2019, Montreal, Canada.

COURSES TAUGHT

- UIC Course from Fall 2021-Ongoing
 - CME 112 Evolution of Infrastructure
 - CME 201 Statics
 - CME 481 Decision Making and Risk Management in Construction
 - CME 488 Sustainable Construction
 - CME 587 Construction Estimating and Scheduling
 - CME 594 Pre-Construction and Contract Administration

REFERENCES

Dr. Khaled El-Rayes, Professor
 Dept. of Civil and Environmental Engineering University of Illinois at Urbana-Champaign
 Ph: (217) 265-0557; E-mail: elrayes@illinois.edu

Dr. Behzad Esmacili, Associate Professor
 Dept. of Civil Engineering
 Purdue University
 Ph: (765) 494-5330; E-mail: besmaci@purdue.edu

Andre O Desjarlais, Residential Building Program Manager
 Oak Ridge National Laboratory
 Ph: (865)574-0022; E-mail: desjarlaisa@ornl.gov