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1. Education Background

- Doctor of Philosophy, School of Engineering, 1987, University of Colorado.
- Master of Science, School of Engineering, 1985, University of Colorado.
- Diplôme d'Ingénieur, 1984, Ecole Nationale des Ponts et Chaussées, Paris.
- Diplôme d'Ingénieur, 1982, Ecole Polytechnique, Palaiseau, France.

2. Professional History

2004-Present: Professor and Coordinator, Building Systems Program, Civil, Environmental, and Architectural Engineering Department, University of Colorado.

- Director of Building Energy Smart Technologies (BEST) Center with National Science Foundation, industry members, and university partners.
- Coordinator of building systems program: organize activities for the BSP and AREN programs including curriculum updates, renovations of lab facilities, outreach activities, and course offerings.
- Instructor for courses in building energy laboratory, electrical systems for buildings, building energy audits, building thermal analysis, and computer simulation of building systems.
- Research on modeling solar radiation for building energy simulation, solar hot water systems, zero-energy buildings, HVAC optimal controls, and demand controlled ventilation.

1998-2004: Associate Professor, Civil, Environmental, and Architectural Engineering Department, University of Colorado.

- Instructor for courses in thermodynamics, heat transfer, electrical systems for HVAC systems, building energy audits, building thermal analysis, and computer simulation of building systems.
- Research on modeling building energy systems including cooling thermal energy systems, chillers, and refrigeration cycles, CFC refrigerants, HVAC optimal controls, and demand controlled ventilation.
- Member of CEAE Department Graduate Committee: examine applicants to be admitted in graduate studies for various engineering programs.

1998-Present: Affiliated Professor, *Ecole Nationale des Mines de Paris, Paris, France*.

- Instructor of energy audits and building thermal analysis courses at the Ecole des Mines, Université de Jussieu, Ecole Nationale des Ingénieurs de Tunis, et Ecole Polytechnique de Tunis
- Overview existing and promising technologies in heating and cooling European residential and commercial buildings.

1996-1997: Director, *Joint Center for Energy Management*, *University of Colorado*.
- Administer the operation of the laboratory including staff workload and schedule of the laboratory usage.
- Report on the financial status of the laboratory to the appropriate authorities.

1991-1998: *Assistant Professor, Civil, Environmental, and Architectural Engineering Department, University of Colorado*.
- *Instructor for courses in basic thermodynamics, heat transfer, electrical systems design, and building energy analysis.*
- *Research on ground-coupling heat transfer, double-skin facades, and thermal energy storage systems.*

1988-1991: Associate, Steven Winter and Associates, Norwalk, CT.
- *Performing of energy audits for over a dozen of institutional, commercial, and industrial buildings using state-of-the-art computer simulation tools to evaluate energy conservation measures.*
- *Modeling and testing of air flow in single-family residential buildings and multi-story apartments.*
- *Development of a catalog for thermal bridges in commercial buildings.*

1987-1988: Post-Doctoral Fellow, Mechanical Engineering Department, Texas A&M University.
- Evaluation of energy impact of infiltration in a test cell.
- Analysis of energy-savings design options for correction facilities.

3. Honors and Awards

A partial list is provided:

- Fulbright Global Scholar award, 2023
- Keynote speaker award for the ASHRAE Middle East Conference, Beirut, Lebanon, 2022.
- Best Paper, ASME Energy Sustainability Conference 2021, with Jordan Thompson, July 2021.
- Founder and Editor of ASME Journal of Engineering for Sustainable Buildings and Cities, New York City, NY, 2020.
- Inventor Grant Award for Dynamic Insulation for Buildings, University of Colorado, Boulder, 2020.
- Distinguished Achievement Award, CEAE Department, 2016.
- Elected ASME Fellow, 2015.

- New Inventor Award, University of Colorado at Boulder, 2013.
- Eckel Award for Excellence, University of Colorado at Boulder, 2012.
- Service Award, Solar Energy Division Chair, ASME, New York, NY, 2011.
- Keynote Speaker Award, ASME, for a talk about "Sustainable Heating and Cooling Systems for Buildings", San Francisco, 2009.
- Best Presentation for a Panelist, ASHRAE Chapter in Hong-Kong, 2008.
- Service Award, International Center for Advanced Sustainability Technologies (ICAST) for promoting energy efficiency and sustainability technologies, Denver, Colorado, 2008
- Service Award, CEAE department, University of Colorado, Boulder, Colorado, 2008.
- Service Award, ASME, for organizing the technical program for the Solar Energy Conference, Denver, Colorado, 2006.
- Best paper Award at the International Solar Energy Conference, Portland, Oregon, 2004.
- Best paper Award at the Third World Conference on Photovoltaic Energy Conversion (WCPEC), Osaka, Japan, 2003.
- Best ASHRAE Paper Award at the annual meeting for American Society for Heating, Refrigerating, and Air conditioning Engineers (ASHRAE), 2000.
- Best Paper Award at the Solar Conference, 1998, American Society of Mechanical Engineers (ASME).
- Best Paper Award at the Solar Engineering Conference, 1996.
- Research Development Award, 1995, Civil, Environmental, and Architectural Engineering Department.

4. Research Work

a) Scholarly Publications

Books and Monographs

All publications are peer-reviewed:

1. "Energy Efficient Building Electrical Systems, Second-Edition" M. Krarti, textbook, 512 pages, Taylor and Francis, Boca Raton, FL, 2023.
2. "Energy Audit for Building Systems: An Engineering Approach- third Edition", M. Krarti, textbook, CRC Press, Francis and Taylor Group, 635 pages, 2021.
3. "Optimal Design and Retrofit of Energy Efficient Buildings, Communities, and Urban Centers", Krarti, M., Book, 416 pages, Butterworth-Heinemann Elsevier, Oxford, UK, 2018.
4. "Handbook for Handbook of Integrated and Sustainable Buildings Equipment and Systems, Volume I: Energy Systems", Gonzalez J. and Krarti, M. Editors, Handbook, 520 pages, ASME Press, New York, NY, 2017.
5. "Advanced Energy Efficient Building Envelope Systems", M. Krarti, Monograph, 165 pages, ASME Press, New York, NY, 2017.

6. “Energy Efficient Building Electrical Systems” M. Krarti, textbook, 494 pages, Taylor and Francis, Boca Raton, FL, 2017.
7. “Guide technique d'audit Energétique”, M. Krarti and D. Marchio, book, 275 pages, Presses de l'Ecole des Mines, Paris, France, 2016
8. “Thermo-active Foundations for Sustainable Buildings”, M. Krarti, monograph, 150 pages, ASME Press, 2015.
9. “Weatherization of Residential Buildings; An Engineering Approach” M. Krarti, book, 400 pages, Taylor and Francis Publishing, 2012.
10. “Energy Audit for Building Systems: An Engineering Approach- Second Edition”, M. Krarti, textbook, CRC Press, 600 pages, 2011.
11. “Energy Audit for Building Systems: An Engineering Approach, First Edition”, First Edition, M. Krarti, textbook, CRC Press, 500 pages, published in 2000.

Chapters:

All publications are peer-reviewed:

1. “Review Evaluation of High Energy Performance Commercial Buildings in the GCC Region”, F. Ashraf, B. Park, and M. Krarti, Chapter in the Book for Gulf Conference on Sustainable Built Environment, Edited by A. Bumajdad et al., Publisher, Springer, 2020.

2. "Control Strategies for Building Energy Systems." M. Krarti, Chapter in Handbook of Integrated and Sustainable Buildings Equipment and Systems, Volume I: Energy Systems, Eds. J Gonzalez and M. Krarti, ASME Pres, New York, NY, 2017.

3. "Building Energy Systems Modeling and Simulation", M. Krarti, Chapter in Handbook of Integrated and Sustainable Buildings Equipment and Systems, Volume I: Energy Systems, Eds. J Gonzalez and M. Krarti, ASME Pres, New York, NY, 2017.

4. “Advanced Energy-Efficient Building Envelope Systems”, M. Krarti and J. Zhai, Chapter in CRC Handbook of Thermal Engineering, Ed. RP., Chhabra, Taylor and Francis, Boca Raton , FL, 2017.

5. "Dynamic Cool Roofing System" M. Krarti, J. Testa, and B. Park, Chapter in Advanced Energy Efficient Building Envelope Systems Ed. Krarti M., ASME Press, New York, NY, 2017.

6. "Dynamic Insulation Systems" M. Krarti, B. Park, K. Menyhart, and V. Shekar V., Chapter in Advanced Energy Efficient Building Envelope Systems Ed. Krarti M., ASME Press, New York, NY, 2017.

7. “Analysis Methods for Building Energy Auditing” M Krarti, Chapter in Energy Efficiency and Renewable Energy Handbook, Second Edition, Y. Goswami and F. Kreith, CRC Press, Taylor and Francis Publishing, 2015.

8. “Thermal Storage” Edited by M. Krarti, Chapter in the ASHRAE HVAC Applications Handbook, Atlanta, GA., 90 pages, 2006

9. "Energy Audits for Buildings" M. Krarti, Chapter in Building Energy Efficiency, edited by Y. Goswami and F. Kreith, CRC Press, Taylor and Francis, Chapter 16, 1-19, 2007.

10. “Cogeneration”, M. Krarti, Chapter in IEEE Handbook, edited by J. Webster , CRC Press, 28 pages, 2005.

11. “Energy Conservation and Efficiency” M. Krarti, Chapter in Webster Encyclopedia of Electrical and Electronics Engineering, edited by John Webster, John Wiley and Sons, 80 pages, published in 2001. Available on the web (http://www.interscience.wiley.com).

12. “HVAC Electrical Systems “ M. Krarti, Chapter in Handbook of Building Energy Systems, edited by J. Kreider, CRC Press, 50 pages, published in 2001.

13. “Introduction Energy Audit” M. Krarti, Chapter in Building Energy Efficiency, edited by F. Kreith, CRC Press, 30 pages, published in 1999.

14. “Ground-Coupled Heat Transfer” M. Krarti, chapter in *Advances in Solar Energy*, edited by Y. Goswami, ASES publication, 90 pages, published in 1999.

15. “Ventilation of Enclosed Parking Garages", M. Krarti and A. Ayari, Part of Chapter 12 *Enclosed Vehicular Facilities* of ASHRAE Handbook of HVAC Applications, 1999.

Journal Articles:
All the publications listed below are peer-reviewed.

1. M. Corlouer, M. Krarti, Analysis of Energy Efficiency Benefits of Smart Glazed Overhangs for Office Buildings in France, Journal of Engineering for Sustainable Buildings and Cities, 4 (4), 041002 (2023).
2. M. Krarti, Optimal Optical Properties for Smart Glazed Windows Applied to Residential Buildings, Energy, 278(B),128017 (2023).
3. A.H.A. Dehwah, M. Krarti, Energy performance of integrated adaptive envelope technologies for commercial buildings, Journal of Building Engineering, 63, 105535 (2023).
4. M. Krarti, M. Aldubyan, Peak demand-based optimization approach for building retrofits: case study of Saudi residential buildings, Energy Efficiency, 16 (3) (2023).
5. M. Krarti, D. Ybyraiymkul, M.K. Ja, M. Burhan, Q. Chen, M.W. Shahzad, K.C. Ng, Energy performance of hybrid evaporative-vapor compression air conditioning systems for Saudi residential building stocks, Journal of Building Engineering, 69, 106344 (2023).
6. E.K. Schwartz, M. Krarti, Comparative Analysis Optimal Designs for Passive, Electrified, and Net Zero Energy Residential Buildings, Journal of Engineering for Sustainable Buildings and Cities, 4 (2), 021001 (2023).
7. A. Almaimani, A. Alaidroos, M. Krarti, E. Qurnfulah, A. Tiwari, Evaluation of Optimal Mechanical Ventilation Strategies for Schools for Reducing Risks of Airborne Viral Infection, Buildings, 13 (4), 871 (2023).
8. M. Krarti, Optimal energy performance of dynamic sliding and insulated shades for residential buildings, Energy, 263(B), 125699 (2023).

9. N.A. Lantonio, M. Krarti, Simultaneous design and control optimization of smart glazed windows, Applied Energy, 328,120239 (2022).
10. M. Krarti, Design optimization of smart glazing optical properties for office spaces, Applied Energy, 308, 118411 (2022).
11. K. Barber, and M. Krarti, A review of optimization-based tools for design and control of building energy systems, Renewable and Sustainable Energy Reviews, 160, 112359 (2022).
12. R. Rajabi, A. Dehwah, M. Krarti, Impact of Dynamic Slab Insulation on Energy Performance of Residential Buildings, Journal of Engineering for Sustainable Buildings and Cities, 3(3), (2022).
13. A. Alrobaie, M. Krarti, A Review of Data-Driven Approaches for Measurement and Verification Analysis of Building Energy Retrofits, Energies, 15:7824 (2022).
14. E. Schwartz, and M. Krarti, Review of Adoption Status of Sustainable Energy Technologies in the US Residential Building Sector, Energies, 5(6):2027 (2022).
15. L. Valentin, M. Dabbagh, and M. Krarti, Benefits of Switchable Insulation Systems for Residential Buildings in France, Energy and Buildings, 259, 111868 (2022).
16. A. Shah, M. Krarti, and J. Huang, Energy Performance Evaluation of Shallow Ground Source Heat Pumps for Residential Buildings, Energies, 15(3):1025 (2022).
17. A. Baqer and M. Krarti, Review of Urban Heat Island and Building Energy Modeling Approaches, Journal of Engineering for Sustainable Buildings and Cities, 3(1): 011003 (2022). Selected by ASME for a news release and a podcast: https://www.asme.org/topics-resources/content/podcast-urban-heat-islands.
18. M. AlMansour and M. Krarti, Value Engineering Optimal Design Approach of High-Performance Residential Buildings: Case Study of Kuwait, Energy and Buildings, 258, 111833 (2022).
19. R. Carlier, M. Dabbagh, and M. Krarti, Energy Performance of Integrated Wall and Window Switchable Insulated Systems for Residential Buildings, Energies, 15(3):1056 (2022).
20. M. Krarti, A Comparative Energy Analysis of Dynamic External Shadings for Office Buildings, J. Eng. Sustain. Bldgs. Cities, 3(2): 021001 (2022).
21. S. Dafoe, M. Krarti, and K. Baker, Optimal Designs of Grid-Connected Energy Efficient and Resilient Residential Communities, Journal of Engineering for Sustainable Buildings and Cities, 3(1): 011004 (2022).
22. M. AlDubyan and M. Krarti, Impact of Stay Home Living on Energy Demand of Residential Buildings: Saudi Arabian Case Study, Energy, 238, Part A, 121637 (2022).
23. M. Krarti, Energy Performance of Control Strategies for Smart Glazed Windows Applied to Office Buildings, Journal of Building Engineering, 45, 103462, (2022).
24. A.H.A. Dehwah and M. Krarti, Performance of precooling strategies using switchable insulation systems for commercial buildings, Applied Energy, 303, 117631 (2021).
25. A.H.A. Dehwah and M. Krarti, Energy Performance of Integrated Adaptive Envelope Systems for Residential Buildings, Energy, 233, 121165 (2021).
26. A.H.A. Dehwah and M. Krarti, Cost-Benefit Analysis of Retrofitting Attic-integrated Switchable Insulation Systems of Existing US Residential Buildings, Energy, 221, 119840 (2021).

27. M. Dabbagh and M. Krarti, Energy Performance of Switchable Window Insulated Shades for US Residential Buildings, Journal of Building Engineering, 43, 102584 (2021).
28. M. Krarti and M. AlDubyan, Role of energy efficiency and distributed renewable energy in designing carbon neutral residential buildings and communities: Case study of Saudi Arabia, Energy and Buildings, 250, 111309 (2021).
29. M. Krarti, Evaluation of energy performance of dynamic overhang systems for US residential buildings, Energy and Buildings, 234, 110699 (2021).
30. M. Krarti, Evaluation of PV integrated sliding-rotating overhangs for US apartment buildings, Applied Energy, 293, 116942 (2021).
31. M. Krarti, 2021, Impact of PV integrated rotating overhangs for US residential buildings, Renewable Energy,174, 835-849 (2021).
32. M. Krarti, Performance of PV integrated dynamic overhangs applied to US homes, Energy, 230, 120843 (2021).
33. N. Engler, and M. Krarti, Review of energy efficiency in controlled environment agriculture, Renewable and Sustainable Energy Reviews, 141, 110786 (2021).
34. M.S. Al-Homoud and M. Krarti, Energy Efficiency of Residential Buildings in the Kingdom of Saudi Arabia: Review of Status and Future Roadmap, Journal of Building Engineering, 36, 102143 (2021).
35. F. Chiu, and M. Krarti, Impacts of Air-Conditioning Sizing on Energy Performance of US Office Buildings, ASME Journal of Engineering for Sustainable Buildings and Cities, 2(2), 021001-1-14 (2021).
36. M. Krarti, M., and M. AlDubyan. Mitigation analysis of water consumption for power generation and air conditioning of residential buildings: Case study of Saudi Arabia, Applied Energy, 290, 116767 (2021).
37. M. Krarti, and M. Aldubyan, Review analysis of COVID-19 impact on electricity demand for residential buildings, Renewable and Sustainable Energy Reviews, 110888 (2021).
38. M. Dabbagh, and M. Krarti, Optimal Control Strategies for Switchable Transparent Insulation Systems Applied to Smart Windows for US Residential Buildings, Energies, 14, 10, (2021).
39. J.E. Gonzalez and M. Krarti, Reflecting on Impacts of COVID19 on Sustainable Buildings and Cities, ASME Journal of Engineering for Sustainable Buildings and Cities, 2(1), 010201 (2021).
40. J. Thompson and M. Krarti, Cost-Effectiveness and Resiliency Evaluation of Net-Zero Energy U.S. Residential Communities, ASME Journal of Engineering for Sustainable Buildings and Cities, 2(3), 031002 (2021).
41. A. Allouhi, S. Rehman, and M Krarti, Role of energy efficiency measures and hybrid PV/Biomass power generation in designing 100% electric rural houses: A case study in Morocco, Energy and Buildings, 236,110770 (2021).
42. M. Steen and M. Krarti, A Review and Categorization of Grid-Interactive Efficient Building Technologies for Building Performance Simulation, ASME Journal of Engineering for Sustainable Buildings and Cities, 1(3), Special Issue on Grid-Interactive Efficient Buildings (2020).
43. M. Krarti, Evaluation of occupancy-based temperature controls on energy performance of KSA residential buildings, Energy and Buildings, 220, 110047, (2020).
44. B. Kwag and M. Krarti, Evaluation of Interactions between Thermal Piles Integrated in Building Foundations, ASME Journal of Building Energy Engineering, 31, 0301001 (2020).

45. M. Krarti and X. Jin, Editorial Special Issue on Grid-Interactive Efficient Buildings – Part I, ASME Journal of Engineering for Sustainable Buildings and Cities, 1(3), Special Issue on Grid-Interactive Efficient Buildings (2020).
46. M. Krarti, and N. Howarth, Transitioning to high efficiency air conditioning in Saudi Arabia: A benefit cost analysis for residential buildings, Journal of Building Energy Engineering, 31, 101457 (2020).
47. A. Fathy, A. Salib, and M. Krarti, Transitioning from net-zero energy homes to carbon-neutral grid-connected communities, ASME Journal of Engineering for Sustainable Buildings and Cities, 1(3), 041003, Special Issue on Grid-Interactive Efficient Buildings (2020).
48. R. Rajabi, J. Thompson, and M. Krarti, Benefit Cost Analysis of Electrification of Urban Districts: Case Study of Philadelphia, Pennsylvania, ASME Journal of Engineering for Sustainable Buildings and Cities, 1(3), 041004, Special Issue on Grid-Interactive Efficient Buildings (2020).
49. M. Krarti and X. Jin, Editorial Special Issue on Grid-Interactive Efficient Buildings – Part II, ASME Journal of Engineering for Sustainable Buildings and Cities, 1(4), 040201, Special Issue on Grid-Interactive Efficient Buildings (2020).
50. A. Shah, N. Engler, and M. Krarti, Feasibility Assessment of a Grid-Connected Carbon-Neutral Community in Midland, Texas, ASME Journal of Engineering for Sustainable Buildings and Cities, 1(3), 041005, Special Issue on Grid-Interactive Efficient Buildings (2020).
51. A.H.A Dehwah and M. Krarti, Optimal Control Strategies for Switchable Roof Insulation Systems Applied to US Residential Buildings, ASME Journal of Engineering of Sustainable Buildings and Cities,1(3) 041002 (2020).
52. M. Krarti, M. H. Aldubyan , and E. Williams Residential Building Stock Model for Evaluating Energy Retrofit Programs in Saudi Arabia, Energy, 195, 116980, (2020).
53. S. Garriga, M. Dabbagh and M. Krarti, Optimal carbon-neutral retrofit of residential communities in Barcelona, Spain, Energy and Buildings, 208, 109651, (2020).
54. S. Garriga, M. Dabbagh and M. Krarti, Evaluation of DIM for Residential Buildings in Barcelona Spain, ASME JESBC, 1(1): 011002, (2020).
55. M. Krarti, Multiple-Benefit Analysis of Scaling-Up Building Energy Efficiency Programs: The Case Study of Tunisia, ASME JESBC 1(1): 011008, (2020).
56. S. Rupp and M. Krarti, Analysis of Multi-step Control Strategies for Dynamic Insulation Systems, Energy and Buildings, 204, 109459, (2019).
57. M. Krarti, Evaluation of Large-Scale Energy Efficiency Potential for the Building Sector in the Arab Region, Energies, 12(22), 4279, (2019).
58. A.H.A Dehawah, and M. Krarti, Optimal Hybrid Power Energy Systems for Residential Communities in Saudi Arabia, Journal of Solar Energy Engineering, 141(6), 061002 (2019).
59. B. Park and M. Krarti, Optimal Control Strategies for Hollow Core Ventilated Slab Systems, Journal of Building Engineering, 24, https://doi.org/10.1016/j.jobe.2019.100762, (2019)
60. M. Krarti, K. Dubey, and N. Howarth, Energy productivity analysis framework for buildings: a case study of GCC region, Energy, 167, 1251-1265 (2019).
61. B.C., Kwag, B.M. Adamu, and M., Krarti, Analysis of high-energy performance residences in Nigeria. Energy Efficiency,12 (3), 681-695 (2019).

62. D. Feher, and M. Krarti, Spatial distribution of building energy use in the United States through satellite imagery of the earth at night, Building and Environment, 142(9), 252-264, (2018).
63. B.C., Kwag, and M. Krarti, Analysis of thermo-active foundations for office buildings, Sustainable Energy Technologies and Assessments, 30: 239-252 (2018).
64. G. Luddeni, M. Krarti, G. Pernigotto, and A. Gasparella, An analysis methodology for large-scale deep energy retrofits of existing building stocks: Case study of the Italian office building, Sustainable Cities and Society, 41(8), 296-311, (2018).
65. M. Krarti, and K. Dubey, Benefits of energy efficiency programs for residential buildings in Bahrain, Journal of Building Engineering, 18(7), 40-50, (2018).
66. M. Krarti, and K. Dubey, Review Analysis of Economic and Environmental Benefits of Improving Energy Efficiency for UAE Building Stock, Renewable and Sustainable Energy Reviews, 82(1), 14-24, (2018).
67. M. Krarti, F. Ali, F., A. Alaidroos, and M. Houchati, Macro-economic benefit analysis of large-scale building energy efficiency programs in Qatar, International Journal of Sustainable Built Environment, https://doi.org/10.1016/j.ijsbe.2017.12.006, (2018).
68. B.C. Kwag and M. Krarti, Evaluation of Ground-Source Variable Refrigerant Flow System for U.S. Office Buildings, Sustainability 2018, 10(5), 1621, (2018).
69. B.C. Kwag and M. Krarti, Development of design guidelines for thermo-active foundations, Indoor and Built Environment, 27(6), 805 – 817, (2017).
70. B. Ameer and M. Krarti, Design of Carbon-Neutral Residential Communities in Kuwait, ASME Journal of Solar Energy Engineering, 139(3), (2017).
71. M. Krarti, K. Dubey, and N. Howarth, N., Evaluation of building energy efficiency investment options for the Kingdom of Saudi Arabia, Energy 134, 595–610, (2017).
72. V. Shekar, and M. Krarti, Control strategies for dynamic insulation materials applied to commercial buildings, Energy and Buildings, 154, 305-320, (2017).
73. A. Alidroos, and M. Krarti, Optimized controls for ventilated wall cavities with spray evaporative cooling systems, Energy and Buildings, 154, 356-372, (2017).
74. J. Testa, and M. Krarti, A review of benefits and limitations of static and switchable cool roof systems, Renewable and Sustainable Energy Reviews, 77, 451-460, (2017).
75. J. Testa, and M. Krarti, Evaluation of energy savings potential of variable reflective roofing systems for US buildings, Sustainable Cities and Society, 31, 62-73, (2017).
76. K. Menyhart, and M. Krarti, Potential energy savings from deployment of Dynamic Insulation Materials for US residential buildings, Building and Environment, 114, 203-218, (2017).
77. N. Kruis, and M. Krarti, Three-dimensional accuracy with two-dimensional computation speed: using the Kiva™ numerical framework to improve foundation heat transfer calculations, Journal of Building Performance Simulation, 10(2), 161-182, (2017).
78. M. Krarti M. and K. Dubey, Energy productivity evaluation of large scale building energy efficiency programs for Oman, Sustainable Cities and Society, 29, 12-22, (2017).

79. A. Alaidroos and M. Krarti, Experimental validation of a numerical model for ventilated wall cavity with spray evaporative cooling systems for hot and dry climates, Energy and Buildings, 131, 207-222, (2016).
80. A. Alaidroos and M. Krarti, “Numerical Modeling of Ventilated Wall Cavities with Spray Evaporative Cooling Systems” Energy and Buildings, accepted and available online 24 August (2016).
81. Y. Kang Y. and M. Krarti, "Bayesian-Emulator based parameter identification for calibrating energy models for existing buildings." Building Simulation Journal, 9 (4), 411-428, (2016).
82. M. Krarti and P. Ihm, “Evaluation of Net-Zero Energy Residential Buildings in the MENA Region”, Sustainable Cities and Society, 22, 116-125, (2016).
83. Park and M. Krarti, “Energy performance analysis of variable reflectivity envelope systems for commercial buildings” Energy and Buildings, 124, 88-98, (2016).
84. B. Ameer and M. Krarti, “Impact of Subsidization on High Energy Performance Designs for Kuwaiti Residential Buildings, Energy and Buildings, 116, 249-262, (2016).
85. J. Mun, and M. Krarti, “Optimal Insulation for Ice Rink Floors”, *Energy and Buildings*, *In Press, Available online 25 September, (2015).*
86. M. Krarti “Evaluation of large scale building energy efficiency retrofit program in Kuwait”, Renewable and Sustainable Energy Reviews, 50, 1069-1080, (2015).
87. B. Park, W.V. Srubar, and M. Krarti, “Energy performance analysis of variable thermal resistance envelopes in residential buildings”, *Energy and Buildings*, *103*, *317-325, (2015).*
88. D. Griego, M. Krarti, and A. Hernandez-Guerrero, “Energy efficiency optimization of new and existing office buildings in Guanajuato, Mexico”, Sustainable Cities and Society, 17, 132-140, (2015).
89. B. Park, and M. Krarti, “Development of a simulation analysis environment for ventilated slab systems”, Applied Thermal Engineering, 87, 66-78, (2015).
90. A. Deneuville and M. Krarti, “Comparative Analysis of Optimal Designs for French and US office Buildings” Energy and Buildings, 93, 332-344, (2015).
91. A. Alaidroos and M. Krarti, “Optimal Design of Residential Building Envelope Systems in the Kingdom of Saudi Arabia” Energy and Buildings, Energy and Buildings, 86, 104-117, (2015).
92. C. Kaltreider, M. Krarti, and J.S. McCartney, “Heat Transfer Analysis of Thermo-Active Foundations”. *Energy and Buildings*, *86*, *492-501, (2015).*
93. T. Gibson and M. Krarti, “Analysis of End-Use Impact of Daylighting and Glare Controls for Private Office Spaces”, Leukos, Journal of the Illuminating Engineering Society of North America, DOI:101080/15502724.2014.986275, (2014).
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95. A. H. Hernandez Guerrero and M. Krarti, “ Foundation heat transfer analysis for buildings with thermal piles”, Energy Conversion and Management, Vol. 89:449-457 (2014).
96. M. Solupe, and M. Krarti, "Assessment of Air Infiltration Heat Recovery and Its Impact on Energy Consumption for Residential Buildings", Energy Conversion and Management, Vol. 78:316-323 (2014).

97. A. Khlifi and M. Krarti, "Impact of Above-Grade Walls On three-dimensional Heat Transfer from Slab-on-grade floor building foundations", ASME Journal of Solar Energy Engineering, Volume 136(1), (2014)
98. J. Huang, F. Su, D. Seo, and M. Krarti, “Development of 3,012 IWEC2 weather files for international locations (ASHRAE RP-1477)”, ASHRAE Transactions, (2014).
99. B. Kang and M. Krarti, "Performance of Thermo-active Foundations for Commercial Buildings", ASME Solar Energy Engineering Journal, Vol. 135(4), doi:10.1115/1.4025587, (2013).
100. L. Willam and M. Krarti, "Optimization of Hybrid Distributed Generation Systems for Ru¬ral Communities in Alaska", Distributed Generation and Alternative Energy Journal, Vol. 28(4), 7-31, (2013).
101. P. Ihm, and M. Krarti, "Design Optimization of Energy Efficient Office Buildings in Tunisia", ASME Solar Energy Engineering Journal, Vol. 135(4), pp: 122-130, (2013).
102. Wilson EJH, Mcneill JS, Zhai ZJ, Krarti M. A parametric study of energy savings from cleaning coils and filters in constant air volume HVAC systems. HVAC&R RESEARCH 19(5):616-626, (2013)
103. "Optimal Electrical Circuiting and Desk Locations for Daylight Spaces", D. Seo, P. Ihm, and M. Krarti, Energy and Buildings, Vol. 51, pp: 122-130, (2012).
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All the papers listed below are peer-reviewed.

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2. “A Review and Categorization of Grid-Interactive Efficient Building Technologies for Building Performance Simulation”, M. Steen and M. Krarti, ASME Energy Sustainability Conference (Virtual), June 17-18, 2020.
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34. “Residential Energy Analysis: Regression Analysis of Heating Degree Days With Temperature Setback for Selected ASHRAE Climate Zones”, P. Kearns and M. Krarti, Proceedings of ASME Energy Sustainability Conference, Washington DC, August 7-10 (2011).
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36. “Testing Gas Tankless Water Heater Performance”, P. Grant, J. Burch, and M. Krarti, Proceedings of ASME Energy Sustainability Conference, Washington DC, August 7-10 (2011).
37. "Analysis of Energy and Water Use of Recreation Facilities" K. Mozes and M. Krarti, ASME Energy Sustainability Conference, (2010).
38. "Verification of Energy Savings from Weatherization of Existing Homes" N. Kalinic and M. Krarti, ASME Energy Sustainability Conference (2010).
39. "Methods to Perform Energy Efficiency for Rented Buildings", C. Caramichael and M. Krarti, ASME Energy Sustainability Conference (2010).
40. "Screening Methods for Energy Auditing of Existing Homes", S. Casey, D. Roberts, and M. Krarti, ASME Energy Sustainability Conference, (2010).
41. "Development of an Optimization Design Tool for Hybrid Renewable Energy Systems", C. Lee, A. Walker, and M. Krarti, ASME Energy Sustainability Conference, (2010).
42. "Energy Performance of SIP Homes in the US" M. McCullum and M. Krarti, ASME Energy Sustainability Conference, (2009)
43. “Impact of daylight Saving Time on Building Energy Use in Kuwait", M. Krarti and A. Hajiah, Proceedings for the ASME Energy Sustainability Conference (2009).
44. "Impact of Layered Soil on Foundation Heat Transfer ", S. Khaled and M. Krarti, Proceedings of ASME Energy Sustainability Conference, San Francisco (2009).
45. "Genetic Algorithm Based Daylighting Controller", S. Beldi and and M. Krarti, Proceedings for US-EU-China Thermophysics Conference, Renewable Energy, Beijing, China, (2009).
46. "Feasibility Analysis of CSP Plant in Pakistan", B. Ben Mahmoud and M. Krarti, Proceedings of Alternative Energy Applications Conference, Kuwait, November 2-6, (2009).
47. "Analysis of Microclimate for a Residential Complex in China", Z. Chen, J. Zhai, and M. Krarti, Proceedings of COBBEE Conference, (2008).
48. "A Simplified Method to Estimate Cooling Energy Savings from Night Ventilation for Office Buildings” ", X. Liu, and M. Krarti, Proceedings of ASME Solar Energy Conference, (2007).
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54. "Northward Market Extension for Passive Solar Heaters by Using Pipe Freeze Protection with Freeze-Tolerated Piping", J. Burch, M. Heather, M. Brandemuehl, and M. Krarti, Proceedings of ASES Solar Conference, (2006).
55. "Pipe Freeze Protection for Passive Solar Heaters Using a Room-Air Natural Convection Loop", J. Burch, M. Heather, M. Brandemuehl, and M. Krarti, Proceedings of ASES Solar Conference, (2006).
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61. "Impact of Solar Model on Building Energy Analysis for Kuwait", D. Seo, A. Al-Anzi, and M. Krarti, Proceedings of ASME Solar Energy Conference, (2006).
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65. "Daylighting Savings from Skylights" A. Nemri and M. Krarti, International Solar Energy Conference, (2005).
66. "Implementation of 2-D Radiant Floor Models into Energy-Plus", P. Ihm and M. Krarti, International Building Simulation Association-USA Conference, (2004).
67. "Experimental Analysis of Thermal Comfort Based Controls", J. Mun and M. Krarti, accepted for the International Solar Energy Conference, (2004).
68. "The Effects of Common Daylighting Strategies on Thermal Comfort and Energy Consumption of a Typical Office Environment" M. Wassmer and M. Krarti, International Solar Energy Conference, (2004).
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79. “Transient L-G Analysis Applications to Ground-Coupled Heat Transfer”, A. Al-Anzi and M. Krarti, Proceedings of 10th International Conference in Thermal Analysis, La Marsa, Tunisia, (2001).
80. CFD Analysis of Ventilation System Performance for Parking Garages”, A. Ayari and M. Krarti, Proceedings of 10th International Conference in Thermal Analysis, La Marsa, Tunisia, (2001).
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86. ``Comparative Analysis of Three-Dimensional and Two-Dimensional Heat Transfer From Slab-on-Grade Floors'', P. Chuangchid, and M. Krarti, *ASME Solar Energy Engineering Conference*, pp. 37-44, (1998).
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94. ``Ice Storage System Controls for the Reduction of Operating Cost and Energy Use'', G. Henze and M. Krarti, *ASME Solar Energy Engineering Conference Proceedings*, pp. 395-403, (1996).
95. ``Heat Transfer from Slab-on-Grade Floor with Prescribed Heat Flux,'' S. Choi and M. Krarti, *ASME Solar Energy Engineering Conference Proceedings*, pp. 517-524, (1996).
96. ``Effect of Hourly Indoor Temperature Variation on Ground Heat Transfer'', M. Krarti and S. Choi, *ASME Solar Energy Engineering conference Proceedings*, pp. 487-494, (1996).
97. ``Steady-State Heat Transfer Between Adjacent Basements and Slab-on-Grade Floors,'' R. Grob and M. Krarti, *Proceedings of ASME Solar Engineering Conference*, pp. 229-243, (1995).
98. ``Recurrent Neural Networks for Building Energy Use Prediction and System Identification: A Progress Report'', J. Kreider, D. Claridge, P. Curtiss, R. Dodier, J. Haberl, and M. Krarti, *Proceedings of ASME Solar Engineering Conference*, pp. 229-243, (1995).
99. ``Heuristics for the Optimal Control of Thermal Energy Storage'', G. Henze, M. Laguna, and M. Krarti, *Proceedings of Meta-heuristics International Conference*, (1995).
100. ``Integral Solutions for Ice Formation and Melting Outward of External Wall of a Pipe'', J. Neto and M. Krarti, *Proceedings of the 30th Inter-society Energy Conversion Engineering (IECE) Conference*, (1995).
101. ``A Neural Network Modeling Approach Applied to Energy Conservation Retrofits'', D. Cohen and M. Krarti, *Fourth International Conference Proceedings for Building Simulation*, pp. 423-430, (1995).
102. ``Heat Transfer In Layered Soils Beneath Partially Insulated Slab-on-Grade Floors'', S. Gabbard and M. Krarti, *Proceedings of Thermal Performance of the Exterior Envelopes of Buildings VI*, pp. 225-234, (1995)
103. ``Comparison of a Neural Network Model with a Regression Model for Foundation Heat Loss Calculation'', M. Krarti, *Proceedings of Thermal Performance of the Exterior Envelopes of Buildings VI*, pp. 235-243, (1995)
104. ``Effect of Air Flow on Heat Transfer in Walls'', M. Krarti, *ASME Solar Engineering Proceedings*, pp.141-148, (1993).
105. ``Comparison of Energy Performance of Commonly Used Insulation Configurations for Slab-on-Grade Floors'', M. Krarti, *Proceedings of the Fifth Thermal Performance of Exterior Envelope of Buildings Conference*, pp. 137-146, (1992).
106. ``Preliminary Measurements of the Energy Impact of Air Infiltration in a Test Cell'', S. Battacharrya, M. Krarti, and D. Claridge, *Proceedings of the Fifth Annual Symposium on Improving Energy Efficiency in Hot and humid Climates*, pp. 308-317, Houston, TX, (1988). ``Energy Efficiency Design Evaluation for the Texas Department of Corrections'', D. Claridge, M. Krarti, and W. Turner, *Proceedings of the Fifth Annual Symposium on Improving Energy Efficiency in Hot and humid Climates*, pp. 129-136, Houston, TX, (1988).

107. ``The ITPE Technique Applied to Steady-State Ground-Coupling Problems'', M. Krarti, D. Claridge, and J. Kreider, *Proceedings of the Tenth Annual ASME Solar Energy Conference*, pp. 399-410, Denver, CO, (1988).
108. ``The Schwartz-Christoffel Transformation Applied to Some Ground-Coupling Problems'', M. Krarti, D. Claridge, and J. Kreider, *Proceedings of the Tenth Annual ASME Solar Energy Conference*, pp. 411-420, Denver, CO, (1988).
109. ``The ITPE Technique Applications to Time-Varying Two-Dimensional Ground-Coupling Problems'', M. Krarti, D. Claridge, and J. Kreider, *Proceedings of the Tenth Annual ASME Solar Energy Conference*, pp. 441-452, Denver, CO, (1988).
110. ``Computation of Two-Dimensional Steady-State Temperature Distribution around a Basement'', M. Krarti and J. Kreider, *Proceedings of the International Symposium on Cold Regions Heat Transfer, pp. 91-98, Alberta, Canada (1987).*
111. ``Analytical Model for Heat Transfer in an Underground Air Tunnel'', M. Krarti and J. Kreider, Proceedings of the ASME-JSME Thermal Energy Joint Conference, pp. 184-193, Honolulu, Hawaii, (1987).
112. ``Analytic P-chart Coefficients for Generic Types of Passive Solar Systems'', M. Bida, M. Krarti, and J.F. Kreider, Proceedings of the 11th Passive Solar Conference, pp. 57-61, Boulder, CO, (1986).
113. ``The Interzone Temperature Profile estimation, Slab-on-Grade Heat Transfer Results'', M. Krarti, D. Claridge, and J. Kreider, Poceedings of the 23rd National Heat Transfer Conference, Vol. 41, pp.11-20, Denver, CO, (1985).
114. ``The Interzone Temperature Profile estimation, Below Grade Basement Heat Transfer Results'', M. Krarti, D. Claridge, and J. Kreider, Proceedings of the 23rd National Heat Transfer Conference, Vol. 41, pp.21-29, Denver, CO, (1985).
115. ``P-chart Correlations for the United States'', E. Hamzawi, M. Krarti, and J.F. Kreider, Proceedings of the 9th Passive Solar Conference, pp. 87-60, Columbus, OH, (1984).

c) Research Funding

Dr. Krarti has been involved in a wide of research projects related to building energy systems. Some of his projects include:

- Smart Glazing Controls
- Refrigerated Greenhouses
- Dynamic Insulation Materials for Buildings
- Automated Energy Auditing Approaches for Existing Buildings
- Optimal Control for Daylighting Systems
- Impact of Shapes and Forms on Energy Performance of Buildings
- Optimal Insulation Placement for Buildings Envelope including Walls, Floors, and Roofs
- Impacts of Thermal Bridging Effects in Building Envelope.
- Optimal Selection of Glazing for Windows
- Combined power and heat generation systems
- Environmental Impacts of Central Cooling Systems
- Modeling Solar Radiation in the Tropics
- In-Situ Evaluation of Airflow in Ducts.

- Field Evaluation of Fans and Pumps Performance.
- Demand Controlled Ventilation in Buildings.
- Indoor Air Quality Modeling in Commercial Buildings.
- Optimal Control Strategies for Ice Storage Systems.
- Evaluation of Energy Conservation Measures.
- Artificial Neural Networks Applied to Building Load Prediction.
- Calculation of Foundation Heat Loss/Gain.
- Expert System for Standardized Greenhouse Designs.
- Expert System for HVAC systems Diagnostics.

Sponsors of the research projects include ASHRAE, ASME, DOE, UNDP, USAID, DOS, NREL, PG&E, and NSF. A selected list of sponsored research projects is listed below:

- Establishment of Building Energy Smart Technologies (BEST) Center, IUCRC NSF, $1,500,000, (2021-2026). An additional contribution from industry members exceeds $1,500,000 over an initial 5-year phase.
- REU funding for AREN students, $16,000, NSF, Supplemental funds for the BEST Center (2022-2023).
- Passive Strategies for Mitigation Heatwaves in France, Various EU funding, $50,000 (2022-2023).
- Optimal Control for Refrigerated Greenhouses and Controlled Agricultural Environments, Heatcraft, $180,000 (2019-2021).
- Large Scale Modeling and Evaluation of Energy and Water Nexus in Saudi Arabia, KAPSARC, $250,000 (2018-2021).
- Development of Automated Energy Management Tools, $575,000, Qatar Foundation (2014-2017).
- Partnership between CU and ISETs-Tunisia on Promoting Energy Efficiency and Sustainable Technologies, $1,000,000, PI, HED, USAID (2012-2015).
- Partnership between UG and CU on Promoting Energy Efficiency and Sustainable Technologies in Buildings, $300,000, PI, TIES-HED, USAID (2010-2012).
- Evaluation of Condensing Boilers, $380,000, PI, NREL, (2009-2013).
- Analysis and Design of Renewable Energy Systems for Federal Facilities, $280,000, PI, NREL-FEMP, (2010-2012).
- Computer Modeling of Existing Building Energy Systems, $389,000, PI, NREL, (2009-2013).
- Impact of Dirty Filters and Duct Leakage on Energy Consumption of Buildings, $240, Co-PI (share $50,000), (2008-2011).
- Solar Systems Analysis, $350,000, PI, NREL, (2009-2013).
- Analysis of Ground Source Heat Pumps for Colorado, $30,000, PI, State Energy Office of Colorado, (2008-2009).
- Modeling And Optimization of Renewable Energy Generation Technologies, $260,000, PI, NREL, (2008-2009)
- Modeling Solar Radiation for the Tropics, $77,450, PI, ASHRAE, (2005-2008).
- Real-Time Predictive Optimal Control of Active and Passive Thermal Storage Systems, $335,150, PI, DOE-NASEO, (2004-2007)
- Curriculum Development for Environmental Sustainability and Energy Efficiency for CEFET-Brazil", $100,000, PI, USAID-Association Liaison Office for Higher Education Development, (2004-2006).

- Evaluation of Solar Collectors, $29,000, PI, NREL, (2004-2005).
- Computer Modeling of Building Energy Use and Renewable Energy Systems", $20,000, PI, NREL, (2004-2005).
- Optimization of Energy Use for Residential Buildings, $277,300, Co-PI, NREL, (2003-2004).
- Advanced Low-Cost Solar Water Heating, $160,700, Co-PI, NREL, (2003-2004).
- Optimal Controller for Active and Passive Storage Systems, $160,000, PI, DOE, (2002-2005).
- Curriculum Development for EPT, $118,300, PI, DOS, (2002-2004).
- Updated Energy Calculation Models for Residential HVAC Systems, $48,895, co-PI, ASHRAE, (2002-2003).
- Development of Energy Efficiency Courses for CEFEFT, Minais Gerais, $20,000, PI, CEEFT-MG, Brazil, (2003-2004).
- Integration of Building Foundation Models Into EnergyPlus, $15,000, PI, LNBL, (1999-2002).
- Moisture and Heat Transfer In Soils, $48,621, PI, ASHRAE, (1999-2002).
- Foundation Heat Transfer from Refrigerated Structures, $25,000, PI, KIER, (1997-2000).
- Techniques for Measuring and Controlling Outside Air Intake Rates in VAV Systems, $93,892, PI, ASHRAE, (1997-1999).
- Ventilation Requirements for Enclosed Parking Facilities, $85,500, PI, ASHRAE, (1997-1999)
- CO_2 demand ventilation Controls for Office Buildings, $12,500, PI, Ecole des Mines de Paris, (1997-1999).
- Model Based Optimization for Thermal Energy Storage Systems, Part I, $90,500, co-PI, PG&E, (1996-1998).
- Model Based Optimization for Thermal Energy Storage Systems, Part II, $62,780, PI, PG&E, (1997-1999).
- Experimental Evaluation of CO_2-Based Ventilation Controls, $13,125, PI, University of Bahrain, (1996-1997).
- Building Energy Conservation Measures Evaluation, $25,500, PI, KIER, (1996-1997).
- Soil Thermal Conductivity Testing, $ 1,000, PI, Bill-Hill & Associates, (1996-1997).
- Module Development for Refrigeration Cycle, ITLL, $20,000, PI, (1995-1996).
- Evaluation of CO_2-Based Ventilation Controls}, $3,500, PI, CRCW, (1995-1996).
- Optimal Control Strategies for Ice Storage Systems, $60,500, PI, ASHRAE, (1994-1995).
- In-situ Measurement of Chillers, Fans, and Pumps Performance, $90,500, Co-PI, ASHRAE, (1994-1995).
- Modeling and Testing of Indirect Ice Storage Systems, $10,500, PI, Various Sources, (1994-1996).
- Simplified Method for Ground Heat Loss Calculation, $29,350, PI, ORNL, (1994-1995).
- Artificial Neural Networks Applied to Building Load Prediction, $15,000, PI, Texas A & M University, (1992-1993).
- Testing of HVAC Controllers, $55,000, Co-PI, Honeywell (1993-1994).
- Energy Calculations for Basements, Slabs, and Crawl Spaces, $105,000, PI, ASHRAE, (1991-1992).

d) Technical Reports

A part list is provided:

1. “Evaluation of Automated Calibration Approaches for Detailed Energy Models for Buildings” M. Krarti and F. Ali, reported from QF NPRP, p. 157, (2017).
2. “Collaborative Education and Research In Energy Efficiency and Renewable Energy Technologies in the Agricultural Sector for ISET Sidi Bouzid”, Final Report for HED, p. 120, (2016).
3. “Collaborative Education and Research In Energy Efficiency and Renewable Energy Technologies in the Industrial Sector for ISET Medenine and Tataouine”, Final Report for HED, p. 135, (2016).
4. “Analysis of Cost-Effectiveness of Ground Source Heat Pumps for Colorado Homes” M. Krarti, D. Studer, report prepared for the Governor’s Office of Colorado, p. 120, (2009).
5. “Verification of Energy Savings from Weatherization Program in Denver, CO”, M. Krarti and N. Kalinic, report prepared for ICAST, p. 90, (2008).
6. “*Optimal Design of Building Envelope for Residential Buildings*”, M. Krarti, D. Tuhus-Stewart, Final Report prepared for ICAST, p.120, (2007).
7. “Implementation of Optimal Controller for TES Systems – Final report”, M. Krarti. G. Henze, and S. Morgan, report prepared for Department of Energy, p. 175, (2007)
8. “Implementation of Optimal Controller for TES Systems – Phase III”, M. Krarti. G. Henze, and S. Morgan, report prepared for Department of Energy, p. 65, (2007)
9. “Implementation of Optimal Controller for TES Systems – Phase-II”, M. Krarti. G. Henze, and S. Morgan, report prepared for Department of Energy, p. 76, (2006)
10. “Implementation of Optimal Controller for TES Systems – Phase I”, M. Krarti. G. Zhou , and S. Morgan, report prepared for Department of Energy, p. 80, (2005)
11. “Demand Side Management for Homes in Colorado”, Final report, M. Krarti and J. Dard, report prepared for ICAST, p. 90, (2004)
12. *“Predictive Optimal Control for of Active and Passive Building Thermal Storage Inventory-Phase II”,* Report prepared for Department of Energy, Henze and M. Krarti, *p. 130, (2003).*
13. *Curriculum Development for Environmental Sustainability Program at EPT in Tunisia-Year 2*”, Report prepared for the Department of State, M. Krarti, p. 45, (2003).
14. ``*Predictive Optimal Control for of Active and Passive Building Thermal Storage Inventory-Phase I”,* Report prepared for Department of Energy, Henze and M. Krarti, *p. 130, (2002).*
15. “*Curriculum Development for Environmental Sustainability Program at EPT in Tunisia-Year 1*”, Report prepared for the Department of State, M. Krarti, p. 58, (2002).
16. *Cooler Floor Heat Gain In Refrigerated Structures - Final Report 3'',* M. Krarti, A. Alanzi, and P. Chuangchid, p. 255 (2000).
17. ``*Techniques for Measuring and Controlling Outside Air Intake Rates in Variable Air Volume Systems - Final Report'',* M. Krarti, M. Brandemuehl, C. Schroeder, and E. Jeanette, p. 132 (1999)
18. ``*Cooler Floor Heat Gain In Refrigerated Structures - Progress Report no. 2''*, M. Krarti, and P. Chuangchid, p. 80 (1998).

19. ``*Techniques for Measuring and Controlling Outside Air Intake Rates in Variable Air Volume Systems - Progress Report no. 2", M*. Krarti, M. Brandemuehl, and C. Schroeder, p. 30 (1998)
20. ``*Cooler Floor Heat Gain In Refrigerated Structures - Progress Report no. 1"*, M. Krarti, and P. Chuangchid, p. 60 (1998).
21. ``*Techniques for Measuring and Controlling Outside Air Intake Rates in Variable Air Volume Systems - Progress Report no. 1",* M. Krarti, M. Brandemuehl, and C. Schroeder, p. 40 (1998)
22. ``*Evaluation of Fixed and Variable Rate Ventilation System Requirements for Enclosed Parking Facilities- Progress Report no. 2"* A. Ayari and M. Krarti, p. 35 (1997).
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24. ``*Model Based Optimization for TES Systems- Task 2.9",* J. Kreider, M. Brandemuehl, J. Elleson, L. Norford, and M. Krarti, prepared for PG&E, p. 88 (1997).
25. ``*Model Based Optimization for TES Systems- Task 2.8",* J. Kreider, M. Brandemuehl, J. Elleson, L. Norford, and M. Krarti, prepared for PG&E, p. 65 (1997).
26. ``*Model Based Optimization for TES Systems- Task 2.7",* J. Kreider, M. Brandemuehl, J. Elleson, L. Norford, and M. Krarti, prepared for PG&E, p. 46 (1997).
27. ``*Model Based Optimization for TES Systems- Task 2.6"*, M. Krarti, D. Bell, and G. Henze prepared for PG&E, p. 33 (1997).
28. ``*Model Based Optimization for TES Systems- Tasks 2.1, 2.2, and 2.3",* D. Bell, A. Marken, and M. Krarti, prepared for PG&E, p. 75 (1996).
29. ``*Model Based Optimization for TES Systems- Task 2.4",* J. Elleson, L. Norford, and M. Krarti, prepared for PG&E, p. 35 (1996).
30. ``*Model Based Optimization for TES Systems- Task 2.5",* M. Krarti, M. Brandemuehl, and J. Kreider, prepared for PG&E, p. 25 (1996).
31. ``*Energy Audit for the Samsung Main Building -Final Report-"* S. Choi and M. Krarti, prepared for KIER, p. 145 (1996).
32. ``*Methodology, Development to Measure In-Situ Chiller, Fan, and Pump Performance, Volume-I: Final Report",* M. Brandemuehl, M. Krarti, and J. Phelan, prepared for ASHRAE, TR-927, p. 70, (1996).
33. ``*Methodology, development to Measure In-Situ Chiller, Fan, and Pump Performance, Volume-II: Guidelines",* M. Brandemuehl, M. Krarti, and J. Phelan, prepared for ASHRAE, TR-927, p. 34, (1996).
34. ``*Soil Test Results for IBACOS Lab House C",* M. Krarti and S. Choi, prepared for Burt Hill and Associates, p. 6, (1996).
35. ``*User Manual for Heat Conduction Experiments"*, D. Lopez and M. Krarti, prepared for ITL and CIMD, p. 33, (1995).
36. ``Sample Results for Heat Conduction Experiments", D. Lopez and M. Krarti, prepared for ITL and CIMD, p. 47, (1995).
37. ``Evaluation of Optimal Control for Ice Storage Systems - Final Report ,'' M. Krarti, G. Henze, and M.J. Brandemuehl, prepared for ASHRAE, TR-809, p. 224 (1995).
38. ``A Simplified Design Tool for Ground Heat Transfer Calculations, Final Report'' M. Krarti and S. Choi, prepared for Oak Ridge National Laboratory (ORNL), p. 45 (1995).

39. ``In-Situ Tests for Chillers, Pumps, and Fans - Progress Report # 3,'' J. Phelan, M. Brandemuehl, and M. Krarti prepared for ASHRAE - TR-827, p. 35 (1995).
40. ``Energy Calculations for Basements, Slabs, and Crawlspaces'', M. Krarti, J. Kreider, and D. Claridge report prepared for American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE), TR-666, pp. 256 (1994).
41. ``Artificial Neural Networks Applied to Loan-star Data, Final Report'', M. Krarti and J. Kreider report prepared for Texas Energy Experiment Station, pp. 97, (1993).
42. ``Catalog of Thermal Bridges in Commercial and Multifamily Residential Construction,'', M. Krarti and A. Tuluca report prepared for Oak Ridge National Laboratory, Under contract # ORNL/ SUB/88-SA 40711, (1989).
43. ``Measured Energy Impact of Infiltration in a Test Cell,'' M. Krarti report prepared for CEMR, Texas A & M University, (1987).
44. ``Validation of Variable Base Degree Day Method,'' M. Krarti and D. Claridge, report prepared for ASHRAE, contract #384-PR, (1986).

6. Patents and Businesses

Patents

1. "Dynamic Insulation System for Switchable Building Envelope", 2019, U.S. Patent No. 62/879,655.
2. "Switchable Phase Change Material Systems for Building Envelopes", 2021, U.S. Patent No. 17/511,080.
3. "Moveable Shading Devices and Methods of Use", 2021, U.S. Patent No. 63/247,530.

Businesses

1. M.K. Associates Inc., A consultant company for industries and governmental agencies on projects specific to evaluations and assessments of energy efficiency and renewable energy systems for the buildings, 1997-Present

2. IBEES LLC., A start-up firm to design and build intelligent building energy efficient systems including dynamic building envelope technologies, 2020-Present

7. Teaching Accomplishments

a) New Course Development and Teaching

- *AREN 2020 Energy Fundamentals*: the course incorporates an engineering project to apply Thermodynamics and Heat Transfer concepts to analyze building energy systems. Two hands-on modules have been developed for this course: the heat conduction bench, and the basic vapor compression refrigeration cycle module. In addition, a design project has incorporated in this course.

- *AREN 2110*: Thermodynamics: This course has been developed specifically for AREN students and incorporate hands-on-laboratory tests and computer assignments.

- *AREN 2120*: Fluids and Heat Transfer: This course has been developed specifically for AREN students and incorporate hands-on-laboratory tests and computer assignments.
- *AREN 3010: Mechanical Systems*: The course provides an overview of heating and cooling systems to maintain thermal comfort and indoor air quality in buildings. The course presents heating and cooling loads calculation methods as well as methods to assess thermal comfort within buildings.
- *AREN 3130: Energy Building Laboratory*: The course provides an overview of basic measurement techniques of temperature, pressure, air and water flows, and solar radiation. In addition, the course includes field testing of building air infiltration and indoor air quality as well as assessment of power quality of various electrical systems such as motors, lighting fixtures, and appliances.
- *AREN 4570 Electrical Systems in Buildings*: The course was revised in 1993 to include field visits and two design projects to size the electrical system for both residential and commercial buildings.
- AREN 4317 *Architectural Engineering Design:* The course has been modified to consider the same building design in the *Architecture Studio* and involve mentors in various disciplines to guide and judge design specifications for students in five areas electrical, lighting, mechanical, structural, and construction management.
- *AREN 5001 Building Engineering Systems*: Taught annually for all incoming graduate students with non-Architectural Engineering major. It has been modified so fundamental principles for three building energy systems are covered including mechanical, lighting, and electrical.
- *AREN 5020 Building Energy Audits*: Taught annually since 1993. Major revisions of the course have been implemented in 1993 to focus on hands-on field testing of building systems.
- *AREN 5070 Thermal Analysis*: This course provides basic solution techniques to carry out a thermal analysis of building energy systems. Both analytical and numerical techniques are taught.
- *AREN 5080 Building Computer Simulations*: Taught annually since 1992. Complete overhaul of the course in 1992 to focus on training students to be familiar with the state-of-the art building computer simulation tool (i.e., DOE-2). Hands-on projects are included to simulate residential, commercial, and institutional buildings.
- *AREN 5060, Distributed Electrical Generation*: New course taught in Spring 2010. The course focuses of fuel-based power generation technologies and renewable energy systems such as wind, photovoltaics, and solar thermal to produce electricity to meet demand of buildings or small communities to reduce greenhouse gas emissions.

In addition Dr. Krarti has supervised research work over 40 undergraduate students as part of various grants (McNair, UROP, CIMD)

b) Teaching Materials

For his classes, Dr. Krarti has developed teaching materials include:

- "Energy Audit for Building Systems: An Engineering Approach" M. Krarti, textbook, CRC Press, 500 pages, published in 2000. This book is used to teach CVEN 5020.
- "Energy Efficient Building Electrical Systems" M. Krarti, textbook, 494 pages, Taylor and Francis, published in 2017. This textbook in used in AREN 4570.
- Lectures Notes for AREN 2110 and AREN 2120 to facilitate understanding of materials related to Thermodynamics, Fluids, and Heat Transfer.
- "Analytical and Numerical Techniques for Thermal Analysis of Buildings" class notes for CVEN 5070 and CVEN 5080 to overview the various solution techniques used to model building energy systems.
- A program to estimate building foundation heat loss/gain based on the Inter-zone Temperature Profile Estimation (ITPE) technique. This tool is used as part of CVEN 5070 and CVEN 5080.
- A series of training guides for VisualDOE (a computer simulation tool for building energy systems). These guides are used for CVEN 5020 and CVEN 5080.
- Helped developed a computer program called "ParamDOE" to carry out several (over 100) parametric runs using DOE-2.1E simulation program. This tool is used in CVEN 5080.
- A textbook on "Electrical Systems for Buildings" in-preparation to be used for AREN 4570.

c) Students Supervised

Dr. Krarti has been the main advisor of over 20 PhD and 80 MS graduates. Most of the PhD students are now faculty members in respected U.S. and international universities. A selected list of PhD students who have graduated and were mentored by Dr. Krarti is provided below.

Student	Year of Graduation	Current Position
Jose Henrique Neto	1995	Professor, CEFET Minas Gerais, Brazil.
Gregor Henze	1995	Professor, University of Colorado
Sangho Choi	1996	Manager, Honeywell Inc., Seoul, South Korea
Pirawas Chuangchid	1998	Professor, University of South Thailand.
Adnan Al-Anzi	1999	Associate Professor, University of Kuwait, Kuwait
Mohsin Al-Alawi	1999	Professor, University of Bahrain, Bahrain
Arslan Ayari	2000	Associate Professor, University of al-Ain, United Arab Emirates
Ali Hajiah	2002	Research Principle, Kuwait Institute for Scientific Research
Pyongchang Ihm	2004	Associate Professor and Dean Dong-A University, Busan, Korea.
Junghyon Mun	2010	University of Southern Texas, Denton, TX
Donghuyn Seo	2011	Korea Institute for Energy Research, Korea

Yoonsuk Kang	2014	Associate, Nexant, Boulder, CO
Neal Kruis	2014	National Renewable Energy Laboratory
Byung Kang	2015	Principal Engineer, LG
Alaa Alaidroos	2016	Consultant Engineer, Tampa, FL
Benjamin Park	2016	National Renewable Energy Laboratory, Golden, CO
Baqer Ameer	2020	Senior Scientist, Kuwait Institute for Scientific Research
Ammar Dehwah	2021	Pacific Northwestern National Laboratory
Mohamad Dabbagh	2022	Naresco, Boulder, CO

Over 100 Graduate MS and undergraduate students who were supervised and mentored by Dr. Krarti. Selected graduates are listed below:

Student (MS/BS, year)	**Thesis/Project**	**Student (MS/BS, year)**	**Thesis/Project**
A. Wansart (MS, 93)	MS Report	M. McCullum (MS 09)	MS Report
P. Koenig (MS, 93)	MS Report	S. Albertsen (MS 09)	MS Report
M. Carley (MS, 93)	MS Report	T. Guiterman (MS 10)	MS Report
R. Grob (MS, 94)	MS Report	E. Wilson (MS 10)	MS Thesis
C. Dymond (MS, 94)	MS Thesis	P. Kearns (MS 10)	MS Report
S. Gabbard (MS, 94)	MS Report	P. Grant (MS10)	MS Thesis
S. Liang (MS, 95)	MS Report	S. Casey (MS 10)	MS Thesis
R. Vanderwall (MS, 95)	MS Report	K. Man-Hen (MS 10)	MS Report
J. Mastaloudis (MS, 95)	MS Report	Y. Bichiou (MS 10)	MS Report
K. Kelly (MS, 95)	MS Report	K. Rouissi (MS 10)	MS Report
D. Cohen (MS, 95)	MS Thesis	D. Griego (MS 11)	MS Thesis
D. Lopez (MS, 96)	MS Report	W.Mahmoud (MS 11)	MS Thesis
O. Piot (MS, 96)	MS Report	J. Sustar (MS 11)	MS Thesis
T. Jobe (MS, 96)	MS Report	T. Gibson (MS 11)	MS Thesis
P. Switenki (MS, 96)	MS Thesis	P. Goodman (MS 11)	MS Report
C. Pirawas (MS, 96)	MS Report	C. Kalttreider (MS 11)	MS Thesis
V. Salcido (MS, 97)	MS Report	D. Slusher (MS 11)	MS Thesis
M. Ketcham (MS, 97)	MS Report	M. Solupe (MS 11)	MS Thesis
K. Kosol (MS, 97)	MS Thesis	L.H. Almanza (MS 11)	MS Thesis
D. Jung (MS, 97)	MS Report	A. Deneuville (MS 12)	MS Thesis
D. Keith (MS, 97)	MS Thesis	J. Romdhane (MS 12)	MS Thesis
P. Ihm (MS, 97)	MS Report	A. Boujelben (MS 12)	MS Thesis
J. Yoon (MS, 97)	MS Report	B. Kang (MS 12)	MS Thesis
A. Marken (BS, 97)	MS Report	B. Park (MS 12)	MS Thesis
D. Bell (MS, 98)	MS Thesis	J. Wanner (MS 12)	MS Report
E. Christensen (MS,98)	MS Report	A. Roche (MS 12)	MS Thesis
C. Schroeder (MS, 98)	MS Thesis	M. Charfi (MS 12)	MS Thesis
M. Conchilla (MS, 00)	MS Thesis	C.P. Boudec (MS 12)	MS Report
D. Ley (MS, 01)	MS Report	H. Kasemir (MS 12)	MS Report
E. Christensen(MS, 01)	MS Report	C. Anderson (MS 13)	MS Report
M. Salehi (MS, 02)	MS Report	A. Osborn (MS 13)	MS Thesis
S. Puttagunta (MS, 03)	MS Thesis	B. Ameer (MS 13)	MS Thesis
A. Nunez (BS, 03)	MS Report	H. Kasemir (MS 12)	MS Report
B. Max (MS, 04)	MS Thesis	C. Anderson (MS 13)	MS Report

S. Menzli (MS, 04)	MS Report	A. Osborn (MS 13)	MS Thesis
A. Nemri (MS, 04)	MS Report	B. Ameer (MS 13)	MS Thesis
K. Mozes (MS, 05)	MS Thesis	A.Deneuville (MS 14)	MS Thesis
T. S-Stewart (MS 05)	MS Report	H. Nekelar (MS 14)	MS Report
J. Dark (MS, 05)	MS Thesis	J. Romdhane (MS 14)	MS Thesis
A. Smith (MS, 05)	MS Report	M.B. Adamu (MS 14)	MS Thesis
M. Ramzi (MS, 05	MS Thesis	V. Shekar (MS 16)	MS Report
R. Somrani (MS 05)	MS Thesis	J. Testa (MS 16)	MS Report
P. Salmon (MS 05)	MS Report	K. Menyhart (MS 16)	MS Report
R. Ruthford (MS 06)	MS Report	T. Gallet (MS 16)	MS Thesis
K. Ouertani (MS 06)	MS Thesis	G. Luddeni (MS 17)	MS Thesis
A. Fateh (MS 07)	MS Thesis	D. Fehrer (MS 17)	MS Report
D. T-Stewart (MS 07)	MS Thesis	F. Chiu (MS 18)	MS Thesis
B. Mahmoud (MS 08)	MS Thesis	F. Ashraf (MS 18)	MS Report
L. Cooper (MS 08)	MS Thesis	K. Joshi (MS 19)	MS Report
G. Zhou (MS 08)	MS Thesis	P. Dash (MS 19)	MS Thesis
N. Kalinic (MS 08)	MS Report	M. Steen (MS 20)	MS Thesis
C. Lee (MS 08)	MS Thesis	J. Thompson (MS 20)	MS Report
A. Khilifi (MS 08)	MS Thesis	A.C. Shah (MS 20)	MS Thesis
S. Andermann (MS 08)	MS Thesis	M. Almansour (MS 20)	MS Thesis
K. Burman (MS 08)	MS Report	R. Rajabi (MS 21)	MS Thesis
D. Alspector (MS 08)	MS Thesis	H. Kinlaw (MS 21)	MS Report
D. Studer (MS 09)	MS Report	A.B. Salib (MS 21)	MS Thesis
C. Caramichael (MS09)	MS Report	D. Alwelayti (MS 21)	MS Report

Dr. Krarti is currently the main advisor of 5 PhD students and 7 MS students.

In addition, Dr. Krarti has been member of over 30 additional PhD and 100 MS thesis committees in Civil, Mechanical, Electrical, and Chemical Engineering departments at the University of Colorado and other universities throughout the World.

d) Other Scholarly Work

Dr. Krarti has been keynote speaker, panelist, and guest speaker in over 250 workshops, seminars, and conferences as well as lecturer in several universities and research laboratories including:

- Ecole des Ponts et Chaussees, Paris, France.
- Ecole des Mines de Paris, Paris, France.
- Dalian University of Technology, Dalian, China.
- Korea Institute for Energy Research, Daejon, Korea.
- Oak Ridge National Laboratory, Oak Ridge, TN.
- National Renewable Energy Laboratory, Golden, CO.
- Texas A&M University, College Station, TX
- Lawrence Berkeley Laboratory, Berkeley, CA.
- Public Utility Commission of Colorado, Denver, CO.
- King Fahd University of Petroleum and Minerals, Dhahran, Kingdom of Saudi Arabia.
- University of Kuwait, Kuwait City, Kuwait.

- University of Cairo, Cairo, Egypt
- Technical University, Singapore
- Ecole Polytechnique de Tunisie, Tunisia.
- Ecole Nationale des Ingenieurs de Tunis, Tunisia.
- University of Murathawa, Colombo, Sri Lanka
- Office of Energy Conservation, Denver, CO.
- University of Hong-Kong, HK, China
- TERI, New Delhi, India

7. Service

Professional Service

- Editor, ASME Journal of Engineering for Sustainable Buildings and Cities (JESBC). The journal has been approved in July 2018 and Initiated in January 2019.
- Associate Editor for several journals including Energy Efficiency Journal, ASCE Architectural Engineering, MDPI Energies.
- Chair of ASME Integrated Buildings Systems and Equipment Track, since 2014.
- Chair of ASME Solar Energy Division, 2010-2014.
- General Chair of ASME Energy Sustainability Conference, Phoenix, AZ, 2010
- Vice Chair of ASME Solar Division, 2008-2009
- Member of Executive Committee, ASME Solar Division, since 2006.
- Chair of Handbook Committee, TC 7.4, ASHRAE, 2009-2014.
- Chair of Handbook Committee, TC 6.9, ASHRAE, 2007-2009.
- Registered Professional Engineering (PE) in Colorado
- LEED Accredited professional since 2009.
- NSF Panel Review Committee since 2004.
- DOE Panel Review Committee since 2005.
- Technical Chair of ASME Solar Conference, Denver, CO, 2006.
- Associate Editor of ASME Solar Energy Engineering Journal, since 2001.
- Member and Chair of various Technical Committees for Solar Energy Division, ASME, since 1995.
- Member of the American Solar Energy Society (ASES).
- ASHRAE TC 4.9 Thermal Storage Systems, Member, since 1997.
- ASHRAE TC 4.7 Energy Calculations, Member, since 2000-
- ASHRAE TC 4.6 Building Operation Dynamics, Corresponding Member, 1996-1998.
- Chair of the Conservation and Solar Buildings Committee, ASME, since 1995.
- Symposium Chair, ASME/JSME International Solar Energy Conference, Maui, 1995.
- Symposium Chair, ASME/JSME International Solar Energy Conference, San Francisco, 1994.
- Seminar Chair, ASME Annual Meeting, Chicago, 1994.
- Reviewer, ASHRAE Transactions, International Journal of Heat and Mass Transfer, ASME Transactions Journal of Heat Transfer, ASME Transactions Solar Energy Engineering Journal, Energy and Buildings Journal, International Journal of Energy Research.

University Service

- Chair of CEAE Faculty Search Committees, 2002-2003, 2006-2007, 2008-2009, 2013-2014, 2015-2016, 2019-2020
- Chair of First Level Review Committee, Engineering College, 2007-2008.
- Member of First Level Review Committee, Engineering College, 2004-2008.
- Member of CU-Campus Carbon Neutral Committee, Campus wide Committee, since 2008.
- Associate Chair, CEAE department, 2006-2008.
- Member, CEAE Graduate Committee, 2000-2003, 2009-2013.
- Member, CEAE Executive Committee, 2003-2010, 2014-2018.
- College of Engineering Integrated Teaching Laboratory: Chair of the Heat Transfer Committee, 1993-1998.
- College of Engineering Integrated Teaching Laboratory: Faculty Advisor for Development of Heat Conduction Module, 1994-1997.
- College of Engineering High School Honors: Faculty Advisor for the Solar Module, 1993-1998.
- CEAE Computer Committee, 1992-1995.
- CEAE Graduate Committee, 1993-1995.
- CEAE Facilities Committee, 1992-1993.
- CEAE Operations Committee, 1994-1998.
- CEAE Executive Committee, 1995-1998.
- JCEM Interim Director, summer 1996.
- Faculty Advisor, Student Chapter ASHRAE, 1993-1997.