

## **1. Education Background**

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

## **2. Professional History**

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

- 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, Universite de Jussieu, Ecole Nationale des Ingenieurs 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:

- 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 Chapters:

All publications are peer-reviewed:

1. "Introduction Energy Audit" M. Krarti, Chapter in Building Energy Efficiency, edited by F. Kreith, CRC Press, 30 pages, published in 1999.
2. "Ground-Coupled Heat Transfer" M. Krarti, chapter in *Advances in Solar Energy*, edited by Y. Goswami, ASES publication, 90 pages, published in 1999.
3. "Ventilation of Enclosed Parking Garages", M. Krarti and A. Ayari, Part of Chapter 12 *Enclosed Vehicular Facilities* of ASHRAE Handbook of HVAC Applications, 1999.
4. "Energy Audit for Building Systems: An Engineering Approach" M. Krarti, book, CRC Press, 500 pages, published in 2000.
5. "HVAC Electrical Systems " M. Krarti, Chapter in Handbook of Building Energy Systems, edited by J. Kreider, CRC Press, 50 pages, published in 2001.
6. "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>).
7. "Energy Efficient Electrical Systems for Buildings" M. Krarti, Book, in-preparation, 2005.
8. "Cogeneration", M. Krarti, Chapter in IEEE Handbook, edited by J. Webster , CRC Press, 28 pages, 2005.
9. "Thermal Storage" Edited by M. Krarti, Chapter in the ASHRAE HVAC Applications Handbook, Atlanta, GA., 90 pages, 2006

10. "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.
11. "Energy Audit for Building Systems: An Engineering Approach- Second Edition" M. Krarti, book, CRC Press, 600 pages, 2011.
12. "Weatherization of Residential Buildings; An Engineering Approach" M. Krarti, book, 400 pages, Taylor and Francis Publishing, 2012.
13. "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.
14. "Thermo-active Foundations for Sustainable Buildings", M. Krarti, monograph, 150 pages, ASME Press, 2015.
15. "Energy Efficient Building Electrical Systems" M. Krarti, book, 494 pages, Taylor and Francis, Boca Raton, FL, 2017.
16. "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.
17. "Optimal Design and Retrofit of Energy Efficient Buildings, Communities, and Urban Centers", Krarti, M., Book, 416 pages, Butterworth-Heinemann Elsevier, Oxford, UK, 2018.

Journal Articles:

All the publications listed below are peer-reviewed.

1. 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).
2. 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).
3. 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).
4. V. Shekar, and M. Krarti, Control strategies for dynamic insulation materials applied to commercial buildings, Energy and Buildings, 154, 305-320, (2017).
5. A. Alidroos, and M. Krarti, Optimized controls for ventilated wall cavities with spray evaporative cooling systems, Energy and Buildings, 154, 356-372, (2017).
6. 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).
7. 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).

8. 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).
9. Kathleen Menyhart, Moncef Krarti
10. 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).
11. 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).
12. 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).
13. 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)
14. M. Krarti and P. Ihm, "Evaluation of Net-Zero Energy Residential Buildings in the MENA Region", *Sustainable Cities and Society*, 22, 116-125, (2016).
15. Park and M. Krarti, "Energy performance analysis of variable reflectivity envelope systems for commercial buildings" *Energy and Buildings*, 124, 88-98, (2016).
16. B. Ameer and M. Krarti, "Impact of Subsidization on High Energy Performance Designs for Kuwaiti Residential Buildings, *Energy and Buildings*, 116, 249-262, (2016).
17. J. Mun, and M. Krarti, "Optimal Insulation for Ice Rink Floors", *Energy and Buildings*, *In Press*, Available online 25 September, (2015).
18. M. Krarti "Evaluation of large scale building energy efficiency retrofit program in Kuwait", *Renewable and Sustainable Energy Reviews*, 50, 1069-1080, (2015).
19. 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).
20. 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).
21. B. Park, and M. Krarti, "Development of a simulation analysis environment for ventilated slab systems", *Applied Thermal Engineering*, 87, 66-78, (2015).
22. A. Deneuille and M. Krarti, "Comparative Analysis of Optimal Designs for French and US office Buildings" *Energy and Buildings*, 93, 332-344, (2015).
23. 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).
24. C. Kaltreider, M. Krarti, and J.S. McCartney, "Heat Transfer Analysis of Thermo-Active Foundations". *Energy and Buildings*, 86, 492-501, (2015).
25. 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).
26. T. Gibson and M. Krarti, "Comparative Analysis of Prediction Accuracy from Daylighting Simulation Tools", *Leukos, Journal of the Illuminating Engineering Society of North America*, DOI:101080/15502724.2014.986274, (2014).

27. 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).
28. 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).
29. 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)
30. 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).
31. 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).
32. 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).
33. 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).
34. Wilson E J H, Mcneill J S, Zhai Z J, 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)
35. "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).
36. "Optimal controls of building storage systems using both ice storage and thermal mass – Part II: Parametric analysis" A. Hajiah and M. Krarti, *Energy Conversion and Management*, Vol. 64, pp: 509-515, (2012).
37. "Optimal controls of building storage systems using both ice storage and thermal mass – Part I: Simulation Environment", A. Hajiah and M. Krarti, *Energy Conversion and Management*, Vol. 64, pp: 499-508, (2012).
38. "Optimization of energy efficiency and thermal comfort measures for residential buildings in Salamanca, Mexico", Danielle Griego, Moncef Krarti, Abel Hernández-Guerrero, *Energy and Buildings*, Vol. 54, Pages 540-549, (2012).
39. "Design optimization of energy efficient residential buildings in Tunisia", Pyeongchan Ihm and Moncef Krarti, *Building and Environment*, Volume 58, Pages 81-90, (2012).
40. "Impact of window selection on the energy performance of residential buildings in South Korea", Pyeongchan Ihm, Lyool Park, Moncef Krarti, Donghyun Seo, *Energy Policy*, Volume 44, Pages 1-9, (2012).
41. "Analysis of Thermo-Active Foundations With U-Tube Heat Exchangers" Khaled Rouissi, Moncef Krarti, and John S. McCartney, *J. Sol. Energy Eng.*, Vol. 134, pp: 210-219, (2012).
42. "Impact of Layered Soil on Foundation Heat Transfer for Slab-On Grade Floors"
43. Nizar Khaled, Khaled Rouissi, and Moncef Krarti, *J. Sol. Energy Eng.*, Vol. 134, pp: 201-209, (2012).
44. "Impact of Layered-Soil on Foundation Heat Transfer from Slab-on-Grade Floors", *Solar Energy Engineering Journal*, K. Rouissi, N. Khaled, and M. Krarti, Vol. 133, (2011).

45. "Development of an optimal daylighting controller", D. Seo, P. Ihm, and M. Krarti, *Building and Environment*, 46 (5), p.1011 (2011).
46. "Analysis of impact of daylight time savings on energy use of buildings in Kuwait", M. Krarti and A. Hajiah, *Energy Policy*, 39 (5), p.2319, (2011).
47. "Assessment of natural and hybrid ventilation models in whole-building energy simulations" Z. Zhai, M-H. Johnson, and M. Krarti, *Energy and Buildings*, 43 (9), p.2251 (2011).
48. "An ice rink floor thermal model suitable for whole-building energy simulation analysis", J. Mun and M. Krarti, *Building and Environment*, 46 (5), p.1087 (2011).
49. "A frequency-domain regression method for estimating building foundation heat transfer", A. Khlifi and M. Krarti, *Journal of Building Performance Simulation*, Vol. 4(4), (2011).
50. "Hourly Solar Radiation Model Suitable for Worldwide Typical Weather File Generation", *Journal of Solar Energy Engineering*, D. Seo and M. Krarti, Vol. 133, (2011).
51. "Verification of Energy Savings from a Weatherization Programs", T. Guiterman and M. Krarti, *ASHRAE Transactions*, Vol. 117, Part 2, (2011).
52. "Optimization of Envelope and HVAC Systems Selection for Residential Buildings", Y. Bichiou and M. Krarti, *Energy and Buildings*, Vol. 43, (2011).
53. "Impact of Window Selection on the Energy Performance of Residential Buildings in South Korea", P. Ihm, D. Seo, and M. Krarti, *Energy Policy*, Vol. 39, (2011).
54. "Impact of Typical Weather Year Selection Approaches on Energy Analysis of Buildings", D. Seo, J. Huang, and M. Krarti, *ASHRAE Transactions*, Vol. 116, Part 1, (2010).
55. "Field Testing for Optimal Controls of TES Systems", S. Morgan and M. Krarti, *ASHRAE Transactions*, Vol. 116, Part 1, (2010).
56. "Genetic-Algorithm Based Approach to Optimize Building Envelope Design for Residential Buildings", D. Tuhus-Dubrow and M. Krarti, *Building and Environment*, Vol. 44 (2010).
57. "Comparative Analysis of Optimization Approaches to Design Building Envelope for Residential Buildings", D. Tuhus-Stewart and M. Krarti, *ASHRAE Transactions*, Vol. 115, Part 2, (2009).
58. "Estimation of Lighting Energy Savings from Daylighting", P. Ihm, A. Nemri, and M. Krarti, *Building and Environment*, Vol. 44(3), 509-514 (2009).
59. "Implementation of a building foundation heat transfer model in Energyplus" M. Krarti and P. Ihm, *Journal of Building Performance Simulation*, 2(2), 127-147, (2009).
60. "Evaluation of Typical Weather Year Selection Approaches for Energy Analysis of Buildings (RP-1477)", D. Seo, J. Huang, and M. Krarti, *ASHRAE Transactions*, Vol. 115, Part 2 (2009).
61. "Impact of Solar Model Selection on Building Energy Analysis for Kuwait", A. Al-Anzi, D. Seo, and M. Krarti, *ASME Journal of Solar Energy Engineering*, Vol. 130, (2008).
62. "Development of Models for Hourly Solar radiation Prediction", D. Seo, J. Huang, and M. Krarti, *ASHRAE Transactions*, Vol. 114, Part 1 (2008).
63. "Overview of Energy Efficient HVAC Systems for Buildings", M. Krarti, *Green Building Journal*, May (2008).
64. "Comparative Analysis of Four Solar Models for Tropical Sites", M. Krarti and D. Seo, *ASHRAE Transactions*, Vol. 113, Part 1, (2007).
65. "Impact of Solar Model on Building Energy Analysis for Tropical Sites", D. seo and M. Krarti, *ASHRAE Transactions*, Vol. 113, Part 1 (2007).

66. "Impact of Electricity Rate Structures on Energy Cost Savings of Pre-cooling Controls for Office Buildings", S. Morgan and M. Krarti, *Building and Environment*, Vol. 42(8), 2810-2818 (2007).
67. "A Simplified Analysis Tool to Predict the Impact of Shape on Annual Energy Use for Office Buildings", R. Ouarghi, A. Al-Anzi, and M. Krarti, *Energy Conversion and Management*, Vol. 48(1), 300-305 (2007).
68. "Experimental and Numerical Investigation on Cooling Characteristics of Partition Air Supply System", K. Jeong, J. Zhai, and M. Krarti, *ASHRAE Transactions*, Vol. 112, Part 2, (2006).
69. "Building Shape Optimization Using Neural Network and Genetic Algorithm Approach", R. Ouarghi and M. Krarti, *ASHARE Transactions*, Vol. 112, Part 1, (2006).
70. "Comparative Analysis of Three Solar Models for Tunis", M. Krarti and D. Seo, *ASHRAE Transactions*, Vol. 112, Part 1, (2006).
71. "Cooling the Cities: a Book Review", M. Krarti, *ASME Solar Energy Engineering*, Vol. 128, (2006).
72. "Parametric Analysis of Passive and Active Building Thermal Storage Systems" G. Zhou, M. Krarti, and G. Henze, *ASME Solar Energy Engineering*, Vol. 127 (2005).
73. "Optimal Control Strategies for Heated Radiant Floor Systems" P. Ihm, and M. Krarti, *ASHRAE Transactions*, Vol. 111, Part 1, (2005).
74. "A simplified Method to Estimate Energy Savings of Artificial Lighting Use from Daylighting", P. Erickson, T. Hollman, and M. Krarti, *Building and Environment*, (2005).
75. "Analysis of Daylighting Benefits for Office Buildings in Egypt", M. El Mohimen, G. Hanna, and M. Krarti, *ASME Solar Energy Engineering*, Vol. 127, (2005).
76. "Local/Global Analysis of Transient Heat Transfer from Building Foundations", A. Al-Anzi and M. Krarti, *Building and Environment*, Vol. 39(5), 495-504, (2004).
77. "Integration of Thermal Energy Storage Model Within EnergyPlus", P. Ihm, M. Krarti, and G. Henze, *Energy and Buildings*, Vol. 36, (2004).
78. "Analysis of Moisture and Heat Transfer Beneath Freezer Foundations, Part I", P. Chuangchid, P. Ihm, and M. Krarti, *ASME Journal of Solar Energy Engineering*, Vol. 126, No. 2 (2004).
79. "Analysis of Moisture and Heat Transfer Beneath Freezer Foundations, Part II", P. Chuangchid, P. Ihm, and M. Krarti, *ASME Journal of Solar Energy Engineering*, Vol. 126, No. 2 (2004).
80. "CFD Analysis of Ventilation System Performance for Enclosed Parking Garages", M. Krarti and A. Ayari, *ASHRAE Transactions*, Vol. 109, Part 2, 455-469 (2003).
81. "Guidelines for Improved Performance of Ice Storage Systems", G.P. henze, M. Krarti, and M.J. Brandemuehl, *Energy and Buildings*, Vol. 35, pp: 111-127, (2003).
82. "Overview of Artificial Intelligence Based Methods for Building Energy Systems", M. Krarti, *ASME Journal of Solar Energy Engineering*, Vol. 125, No. 3, 331-342 (2003).
83. "Analysis of the Impact of CO<sub>2</sub>-Based Demand Controlled Ventilation Strategies on Energy Consumption", M. Alalawi and M. Krarti, *ASHRAE Transactions*, Vol. 109, Part 1, pp: 135-147 (2003).
84. "Local/Global Analysis Applications to Ground-Coupled Heat Transfer", A. Al-Anzi and M. Krarti, *International Journal of Thermal Sciences*, Vol. 115, 971-880 (2003).
85. "Experimental Analysis of Demand Ventilation Controls", M. Alalawi and M. Krarti, *ASHRAE Transactions*, Vol. 108, Part 2, 105-135 (2002).

86. "Evaluation of an Internal Melt Ice-on-Coil Storage Tank During Partial Charging and Discharging Cycles", K. Kiatreungwattana and M. Krarti, *ASHRAE Transactions*, Vol. 108, Part 2, 560-578 (2002).
87. "Placement of Thermal Insulation for Slab-on-Grade Foundations", M. Krarti, *Journal of Light Construction*, Vol. 30, 24-27 (2002).
88. "Interactions of Water and Energy Use in Residential Buildings: Part I-Modeling", M. Conchilla and M. Krarti, *ASHRAE Transactions*, Vol. 108, Part 1, 345-356 (2002).
89. "Interactions of Water and Energy Use in Residential Buildings: Part II-results", M. Conchilla and M. Krarti, *ASHRAE Transactions*, Vol. 108, Part 1, 357-367 (2002).
90. "Steady-State Component of Three-Dimensional Slab-on-Grade Foundation Heat Transfer", P. Chuangchid, and M. Krarti, *ASME Journal of Solar Energy Engineering*, Vol. 123, No. 1, 18-29, (2001).
91. "Ventilation for Enclosed Parking Garages", M. Krarti and A. Ayari, *ASHRAE Journal*, Vol. 43, No. 2, 52-57 (2001).
92. "Foundation Heat Loss from Heated Concrete Slab-on-Grade Floors", P. Chuangchid and M. Krarti, *Building and Environment*, Vol. 36, 637-655 (2001).
93. "Steady-Periodic Three-Dimensional Foundation Heat Transfer from Refrigerated Structures", P. Chuangchid, and M. Krarti, *ASME Journal of Solar Energy Engineering*, Vol. 122, 69-83, (2000).
94. "Error Analysis of Measurement and Control Techniques of Outside Air Intake Rates in VAV Systems", C. Schroeder, M. Krarti, and M. Brandemuehl, *ASHRAE Transactions*, Vol. 106, Part 2, 221-233 (2000).
95. "Experimental Analysis of Measurement and Control Techniques of Outside Air Intake Rates in VAV Systems", M. Krarti, C. Schroeder, E. Jeanette, M. Brandemuehl, *ASHRAE Transactions*, Vol. 106, Pt. 2, 234-255 (2000).
96. "Field Evaluation of Design Ventilation System Performance in Enclosed Parking Garages", A. Ayari, M. Krarti, and G. Grot, *ASHRAE Transactions*, Vol. 106, Part 1, 90-106 (2000).
97. "Parametric Analysis and Development of a Design Tool for Foundation Heat Gain for Refrigerated Warehouses", P. Chuangchid, and M. Krarti, *ASHRAE Transactions*, Vol. 106, Pt 2, 367-379 (2000).
98. "Thermally Optimal Insulation Distribution for Underground Structures", S. Choi, and M. Krarti, *Energy and Buildings*, Vol. 32, 251-265 (2000).
99. "Planning Horizon for a Predictive Optimal Controller for Thermal Energy Storage Systems", M. Krarti, G. Henze, and D. Bell, *ASHRAE Transactions*, Vol. 105, Pt 2, 480-496 (1999).
100. "Simplified Prediction Tool for Peak Occupancy Rate in Office Buildings", D. Keith, and M. Krarti, *Journal of the Illuminating Engineering Society*, Vol. 38, No. 1, 43-56 (1999).
101. "Overview of Existing Regulations for Ventilation System Requirements for Enclosed Vehicular Parking Garages", M. Krarti, and A. Ayari, *ASHRAE Transactions*, Vol. 105, Part 2, 145-158 (1999).
102. "Ice Storage System Controls for the Reduction of Operating Cost and Energy Use", G. Henze, and M. Krarti, *ASME Journal of Solar Energy Engineering*, Vol. 120, No. 1, 26-34 (1998).
103. "Heat Transfer for a Slab-on-Grade Floor with Prescribed Heat Flux", S. Choi, and M. Krarti, *ASME Journal of Solar Energy Engineering*, Vol. 120, No. 1, 17-25 (1998).

104. "Estimation of Energy Savings for Building Retrofits Using Neural Networks" M. Krarti, J. Kreider, D. Cohen, and P. Curtiss, *ASME Journal of Solar Energy Engineering*, Vol. 120, No. 3, 211-216 (1998).
105. "Ice Storage System Controls for the Reduction of Operating Cost and Energy Use", G. Henze and M. Krarti, *ASME Journal of Solar Energy Engineering*, Vol. 120, No. 4, (1998)
106. "Heat Transfer for Slab-on-Grade Floor with Stepped Ground", M. Krarti, *Energy Conversion and Management Journal*, Vol. 39, No. 7, 691-701, (1998).
107. "Time-Varying Heat Transfer from Adjacent Slab-on-Grade Floors", M. Krarti and O. Piot, *Int. Journal of Energy Research*, Vol. 22, No. 4, pp. 289-301, (1998).
108. "A Simulation Method for Fluctuating Temperatures in Crawlspace Foundations", M. Krarti and S. Choi, *Energy and Buildings*, Vol. 26, No. 2, 183-188, (1997).
109. "Review of Laboratory and Field Methods to Measure Fan, Pump, and Chiller Performance", J. Phelan, M. Brandemuehl, and M. Krarti, *ASHRAE Transactions*, Vol. 103, Part 2, 356-367 (1997).
110. "Parametric Analysis of an Internal-Melt Ice-on-Coil Tank", J. Neto, and M. Krarti, *ASHRAE Transactions*, Vol. 103, Part 2, 321-334 (1997).
111. "Deterministic Model for an Indirect Ice Storage Tank", J. Neto and M. Krarti, *ASHRAE Transactions*, Vol. 103, Part 1, 113-124, (1997).
112. "Experimental Validation of a Numerical Model for an Indirect Ice Storage Tank", J. Neto and M. Krarti, *ASHRAE Transactions*, Vol. 103, Part 1, 125-138, (1997).
113. "Evaluation of the Thermal Bridging Effects on the Thermal Performance of Slab-on-Grade Floor Foundations", A. Alanzi, and M. Krarti, *ASHRAE Transactions*, Vol. 103, Part 1, 563-572, (1997).
114. "Development of a Simulation Environment for Cool Storage Controls", G. Henze, M. Krarti, and M. Brandemuehl, *HVAC&R Journal*, Vol. 3, No. 2, 128-148, (1997).
115. "In-Situ Performance testing of Fans and Pumps for Energy Analysis", J. Phelan, M.J. Brandemuehl, and M. Krarti, *ASHRAE Transactions*, Vol. 103, Part 1, pp. 318-332, (1997).
116. "In-Situ Performance testing of Chillers for Energy Analysis", J. Phelan, M.J. Brandemuehl, and M. Krarti, *ASHRAE Transactions*, Vol. 103, Part 1, pp. 290-302, (1997).
117. "Development of a Predictive Optimal Controller for Thermal Energy Storage Systems", G. Henze, R. Dodier, and M. Krarti, *HVAC&R Journal*, Vol. 3, No. 3, pp. 233-264, (1997).
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## **b) conference Papers**

All the papers listed below are peer-reviewed.

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2. "The Economic and Environmental Benefits from Distributed PV and Wind Technologies in a Colorado Community", M. Krarti and T. Cureton, Proceedings of ASME Power and Energy Conversion Conference, San Diego, June 28-July 2 (2015).
3. "Impact of Passive Cooling Strategies on Energy Consumption Reduction of Residential Buildings in the Kingdom of Saudi Arabia, A. Alaidroos and M. Krarti, Proceedings of ASME Power and Energy Conversion Conference, San Diego, June 28-July 2 (2015).

4. "A New Protocol to Increase the Accuracy and Precision of Savings Estimates for VFDs", R. Del Basio and M. Krarti, Proceedings of Association of Energy Services professionals, AESP National Conference, Orlando, FL, February 9-12 (2015).
5. "Automated Solar Water Pumping Systems for agricultural irrigation applications", H. Chaouch, Y. Abdellaoui, and M. Krarti, World Sustainable Energy Forum, EnerSol Conference, Tunis, Tunisia, November 26- 28 (2014).
6. "Design and construction of a solar concentrator for waste water evaporation in oil drilling applications", S. Chibani and M. Krarti, World Sustainable Energy Forum, EnerSol Conference, Tunis, Tunisia, November 26- 28 (2014).
7. "Design of a Grid-Connected PV System For a company (SICEM) in Tataouine – Tunisia", A. Guemri and M. Krarti, World Sustainable Energy Forum, EnerSol Conference, Tunis, Tunisia, November 26- 28 (2014).
8. "Optimal Design of a Hybrid Systems for GSM Radio Base Station in Tataouine, Tunisia" A.H. Gabsi and M. Krarti, World Sustainable Energy Forum, EnerSol Conference, Tunis, Tunisia, November 26- 28 (2014).
9. "Design and Development of a Self-Adjusting Solar Dryer Prototype", Y. Abdellaoui, H. Chaouch, S. Elgaied and M. Krarti, World Sustainable Energy Forum, EnerSol Conference, Tunis, Tunisia, November 26- 28 (2014).
10. "Design of an Optimal Cogeneration System for a Brick Manufacturing Facility in Tunisia", F. Guemri, Y. Kang, and M. Krarti, World Sustainable Energy Forum, EnerSol Conference, Tunis, Tunisia, November 26- 28 (2014).
11. "Development of a response Factor Model for Thermo-Active Building Foundation", B.C. Kwag and M. Krarti, Proceedings of the ASME 2014 International Mechanical Engineering Congress & Exposition, IMECE2014, November 14-20, Montreal, Quebec, Canada (2014).
12. "Development of a Simulation Analysis Environment for Ventilated Slab Systems", B. Park and M. Krarti, Proceedings of the ASME 2014 International Mechanical Engineering Congress & Exposition, IMECE2014, November 14-20, Montreal, Quebec, Canada (2014).
13. "Estimation of Lighting Energy Savings from atrium Daylighting for office Buildings", M. Krarti, Proceedings of ASME Fuel Cells and Energy Sustainability Conference, Boston, MA, June 30 – July 2 (2014).
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16. "Design of Distributed Generation Systems for an Apartment Complex in Korea", J. Kim , H. Lim, and M. Krarti, Proceedings of ASME Energy Sustainability Conference, San Diego, CA, July 23-26 (2012).
17. "Evaluation of Distributed Generation Systems for Residential Communities in Mexico", L. H. Huerta Almanza and M. Krarti, Proceedings of ASME Energy Sustainability Conference, San Diego, CA, July 23-26 (2012).
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30. "Analysis of Energy and Water Use of Recreation Facilities" K. Mozes and M. Krarti, ASME Energy Sustainability Conference, (2010).
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32. "Methods to Perform Energy Efficiency for Rented Buildings", C. Caramichael and M. Krarti, ASME Energy Sustainability Conference (2010).
33. "Screening Methods for Energy Auditing of Existing Homes", S. Casey, D. Roberts, and M. Krarti, ASME Energy Sustainability Conference, (2010).
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36. "Impact of daylight Saving Time on Building Energy Use in Kuwait", M. Krarti and A. Hajiah, Proceedings for the ASME Energy Sustainability Conference (2009).
37. "Impact of Layered Soil on Foundation Heat Transfer ", S. Khaled and M. Krarti, Proceedings of ASME Energy Sustainability Conference, San Francisco (2009).

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104. "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).
105. "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).
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### **c) Research Funding**

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

- Insulation Materials for 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 are listed below:

- 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 CEEFET, Minas Gerais, \$20,000, PI, CEEFET-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<sub>2</sub> 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<sub>2</sub>-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<sub>2</sub>-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).
23. *Evaluation of Fixed and Variable Rate Ventilation System Requirements for Enclosed Parking Facilities- Progress Report no. 1*" A. Ayari and M. Krarti, p. 25 (1997).
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 Crawlspace", 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. 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.

- *CVEN 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.
- *CVEN 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.
- *CVEN 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.
- *CVEN5830, Distributed Electrical Generation*: New course taught in Spring 2010. The course focuses on 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 is 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 60 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.

<b>Student</b>	<b>Year of Graduation</b>	<b>Current Position</b>
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	Associate Professor, University of South Thailand.
Adnan Al-Anzi	1999	Associate Professor, University of Kuwait, Kuwait
Mohsin Al-Alawi	1999	Associate Professor, University of Bahrain, Bahrain
Arslan Ayari	2000	Associate Professor, University of al-Ain, United Arab Emirates
Ali Hajjah	2002	Research Associate, 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	Nexant, Boulder, CO
Neal Kruis	2014	National Renewable Energy Laboratory
Byung Kang	2015	Principal Engineer, LG
Alaa Alaidroos	2016	Consultant Engineer, Tampa, FA
Benjamin Park	2016	Post-Doc, University of Colorado

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

<b>Student (MS/BS, year)</b>	<b>Thesis/Project</b>	<b>Student (MS/BS, year)</b>	<b>Thesis/Project</b>
A. Wansart (MS, 93)	MS Report	A. Khilifi (MS 08)	MS Thesis
P. Koenig (MS, 93)	MS Report	S. Andermann (MS 08)	MS Thesis
M. Carley (MS, 93)	MS Report	K. Burman (MS 08)	MS Report
R. Grob (MS, 94)	MS Report	D. Alspector (MS 08)	MS Thesis

C. Dymond (MS, 94)	MS Thesis	D. Studer (MS 09)	MS Report
S. Gabbard (MS, 94)	MS Report	C. Caramichael (MS09)	MS Report
S. Liang (MS, 95)	MS Report	M. McCullum (MS 09)	MS Report
R. Vanderwall (MS, 95)	MS Report	S. Albertsen (MS 09)	MS Report
J. Mastaloudis (MS, 95)	MS Report	T. Guiterman (MS 10)	MS Report
K. Kelly (MS, 95)	MS Report	E. Wilson (MS 10)	MS Thesis
D. Cohen (MS, 95)	MS Thesis	P. Kearns (MS 10)	MS Report
D. Lopez (MS, 96)	MS Report	P. Grant (MS10)	MS Thesis
O. Piot (MS, 96)	MS Report	S. Casey (MS 10)	MS Thesis
T. Jobe (MS, 96)	MS Report	K. Man-Hen (MS 10)	MS Report
P. Switenki (MS, 96)	MS Thesis	Y. Bichiou (MS 10)	MS Report
C. Pirawas (MS, 96)	MS Report	K. Rouissi (MS 10)	MS Report
V. Salcido (MS, 97)	MS Report	D. Griego (MS 11)	MS Thesis
M. Ketcham (MS, 97)	MS Report	W.Mahmoud (MS 11)	MS Thesis
K. Kosol (MS, 97)	MS Thesis	J. Sustar (MS 11)	MS Thesis
D. Jung (MS, 97)	MS Report	T. Gibson (MS 11)	MS Thesis
D. Keith (MS, 97)	MS Thesis	P. Goodman (MS 11)	MS Report
P. Ihm (MS, 97)	MS Report	C. Kalttreider (MS 11)	MS Thesis
J. Yoon (MS, 97)	MS Report	D. Slusher (MS 11)	MS Thesis
A. Marken (BS, 97)	MS Report	M. Solupe (MS 11)	MS Thesis
D. Bell (MS, 98)	MS Thesis	L.H. Almanza (MS 11)	MS Thesis
E. Christensen (MS,98)	MS Report	A. Deneuille (MS 12)	MS Thesis
C. Schroeder (MS, 98)	MS Thesis	J. Romdhane (MS 12)	MS Thesis
M. Conchilla (MS, 00)	MS Thesis	A. Boujelben (MS 12)	MS Thesis
D. Ley (MS, 01)	MS Report	B. Kang (MS 12)	MS Thesis
E. Christensen(MS, 01)	MS Report	B. Park (MS 12)	MS Thesis
M. Salehi (MS, 02)	MS Report	J. Wanner (MS 12)	MS Report
S. Puttagunta (MS, 03)	MS Thesis	A. Roche (MS 12)	MS Thesis
A. Nunez (BS, 03)	MS Report	M. Charfi (MS 12)	MS Thesis
B. Max (MS, 04)	MS Thesis	C.P. Boudec (MS 12)	MS Report
S. Menzli (MS, 04)	MS Report	H. Kasemir (MS 12)	MS Report
A. Nemri (MS, 04)	MS Report	C. Anderson (MS 13)	MS Report
K. Mozes (MS, 05)	MS Thesis	A. Osborn (MS 13)	MS Thesis
T. S-Stewart (MS 05)	MS Report	B. Ameer (MS 13)	MS Thesis
J. Dark (MS, 05)	MS Thesis	H. Kasemir (MS 12)	MS Report
A. Smith (MS, 05)	MS Report	C. Anderson (MS 13)	MS Report
M. Ramzi (MS, 05)	MS Thesis	A. Osborn (MS 13)	MS Thesis
R. Somrani (MS 05)	MS Thesis	B. Ameer (MS 13)	MS Thesis
P. Salmon (MS 05)	MS Report	A.Deneuille (MS 14)	MS Thesis
R. Ruthford (MS 06)	MS Report	H. Nekelar (MS 14)	MS Report
K. Ouertani (MS 06)	MS Thesis	J. Romdhane (MS 14)	MS Thesis
A. Fateh (MS 07)	MS Thesis	M.B. Adamu (MS 14)	MS Thesis
D. T-Stewart (MS 07)	MS Thesis	V. Shekar (MS 16)	MS Report
B. Mahmoud (MS 08)	MS Thesis	J. Testa (MS 16)	MS Report
L. Cooper (MS 08)	MS Thesis	K. Menyhart (MS 16)	MS Report
G. Zhou (MS 08)	MS Thesis	T. Gallet (MS 16)	MS Thesis
N. Kalinic (MS 08)	MS Report	G. Luddeni (MS 17)	MS Thesis
C. Lee (MS 08)	MS Thesis	D. Fehrer (MS 17)	MS Report

Dr. Krarti is currently the main advisor of 5 PhD students and 15 MS students.

In addition, Dr. Krarti has been member of over 20 additional PhD and 70 MS thesis committees in Civil, Mechanical, Electrical, and Chemical Engineering departments.

#### **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, Daejeon, 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**

- 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.
- 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-
- 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.