

## DAVID E. CLARIDGE

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### EDUCATION

B.S. (cum laude), 1964, Engineering Physics, Walla Walla College

M.S., 1966, Physics, Stanford University

Ph.D., 1976, Physics, Stanford University

### PROFESSIONAL REGISTRATION

1991 - Professional Engineer (Mechanical), State of Texas #69305

### EXPERIENCE

9/21 – 6/23	Interim Director, Architectural Engineering degree program, Department of Multidisciplinary Engineering, Texas A&M University, College Station, Texas.
5/21 – Present	Affiliate Professor, Department of Multidisciplinary Engineering, Texas A&M University, College Station, Texas.
9/07 – Present	Director, Energy Systems Laboratory, Texas A&M Engineering Experiment Station, Texas A&M University System, College Station, Texas
1/05 – 5/18	Leland Jordan Professor of Mechanical Engineering, Texas A&M University, College Station, Texas.
9/99 – Present	Senior Fellow, Texas Engineering Experiment Station, College Station, Texas
9/95 – Present	Professor, J. Mike Walker '66 Mechanical Engineering Department, Texas A&M University, College Station, Texas.
3/07 – 8/07	Deputy Director, Energy Systems Laboratory, Texas Engineering Experiment Station, Texas A&M University System, College Station, Texas
9/01 – 8/02	E.D. Brockett Professor, Dwight Look College of Engineering, Texas A&M University
6/00 – 5/01	Northrup Grumman Fellow, Dwight Look College of Engineering, Texas A&M University
7/00 - 9/00	Visiting Erskine Fellow, Canterbury University, Christchurch, New Zealand
9/97 - 8/99	Fellow, Texas Engineering Experiment Station, College Station, Texas
9/96 – 8/97	Dresser Industries Professor, Dwight Look College of Engineering, Texas A&M University
9/86 - 8/95	Associate Professor, Mechanical Engineering Department, Texas A&M University, College Station, Texas. Tenured 9/1/92.
1/82 - 8/86	Associate Professor of Civil, Environmental & Architectural Engineering, University of Colorado, Boulder.
1/80 - 1/82	Manager, Analysis Group (10/80-1/82) and Senior Program Planner/Senior Research Analyst (1/80-10/80), Solar Energy Research Institute, Golden, Colorado.
1/76 - 1/80	Project Director (7/79-1/80), Professional Staff Member/Analyst (1/77- 7/79) and Congressional Science Fellow (1/76-1/77), Office of Technology Assessment (OTA), U. S. Congress.

### HONORS AND AWARDS

Congressional Science Fellow of the American Association for the Advancement of Science, 1976.

Honorary Sponsor, American Council for an Energy Efficient Economy, 1984-88.

Panel Member, Panel on Technology Changes and Impacts on the Building Industry, Office of Technology Assessment, U.S. Congress, 1984.

Service Award, University of Colorado, Department of Civil, Environmental and Architectural Engineering, 1985.

ASHRAE Appreciation Award, 1985.

Exxon Faculty Assistance Grant, 1986.

1988-89 Best Paper on Conservation and Solar Buildings, ASME Solar Energy Division.

1991-92 Best Paper on Conservation and Solar Buildings, ASME Solar Energy Division.

1993-94 Best Paper on Conservation and Solar Buildings, ASME Solar Energy Division.

Recipient on behalf of the Energy Systems Laboratory of a Special Recognition Award from the U.S. Department of Energy, October, 1995.

Listed in Marquis *Who's Who in the South and Southwest*, 24th Edition, 1995-96.

Listed in Turnbull, H. ed., *Men of Achievement* - 17th Edition, International Biographical Centre, Cambridge, England, 1996.

Distinguished Service Award, American Society of Heating, Refrigerating and Air Conditioning Engineers, June, 1997

Graduate Teaching Award, Texas A&M Mechanical Engineering Department, October. 1997

Listed in the *International Directory of Distinguished Leadership*, 7th Edition, 1997.

E.K. Campbell Award of Merit from the American Society of Heating, Refrigerating and Air Conditioning Engineers for outstanding service and achievement in teaching, January, 1998

Listed in *Asian/American Who's Who*, 1999.

Listed in *Lexington Who's Who Registry*, 1999/2000 Millennium Edition

Listed in *Biography Today*, 1999

ASME Fellow, 2001

Faculty Distinguished Achievement in Research Award, Texas A&M University Association of Former Students, 2003

ASHRAE Fellow, 2008

Honorary International Member, Society of Heating, Air-Conditioning and Sanitary Engineers of Japan, 2011

Molecular Membrane Air Conditioner start-up recognized as one of the top 35 university start-ups in all fields (the only one from a Texas university) by the National Council of Entrepreneurial Tech Transfer, and featured at the University Startups Demo Day, September 20, 2016, in Washington, D.C.

Molecular Membrane Air Conditioner was one of five U.S. DOE ARPA-E projects featured in five minute plenary videos at the ARPA-E Energy Innovation Summit, July 8-10, 2019, Denver, CO.

Listed in Marquis *Who's Who in America*, 2021.

Exceptional Service Award, ASHRAE, 2021.

Louise and Bill Holladay Distinguished Fellow Award, ASHRAE, 2022.

Dean's Excellence Award, College of Engineering, Texas A&M University, 2022.

ASHRAE Technical Paper Award, 2023

## **PUBLICATIONS**

### **1. Refereed Journal Publications**

1. Claridge, D. E., Gifford, R. P., Fairbank, W. M. and Michelson, P., "9 GHz Impedance Measurements on Ta and Nb Point-Contacts," *IEEE Transactions on Magnetics*, MAG-13, pp. 593-596, 1976.
2. Claridge, D. E., "RF Current Dependence of the 8.9-GHz Impedance of Tantalum Point-Contact Josephson Junctions," *Journal of Applied Physics*, Volume 48, pp. 1762-1764, 1977.
3. Claridge, D., "Window Management and Energy Savings," *Energy and Buildings*, Volume 1, pp. 57-63, 1977.
4. Claridge, D. E., "Design Methods for Earth-Contact Heat Transfer," *Advances in Solar Energy*, Volume 4, New York: American Solar Energy Society/Plenum Press, pp. 305-351, 1987.
5. Claridge, D. E., Bida, M., Krarti, M., Jeon, H., Hamzawi, E., Zwack, W., and Weiss, I., "A Validation Study of Variable-Base Degree-Day Heating Calculations," *ASHRAE Transactions-Research*, Volume 93, Part 2, pp. 57-89, 1987.
6. Claridge, D. E., Krarti, M. and Bida, M., "A Validation Study of Variable-Base Degree-Day Cooling Calculations," *ASHRAE Transactions-Research*, Volume 93, Part 2, pp. 90-104, 1987.
7. Brotherton, T., Kreider, J., Claridge, D. E., and Norford, L., "A Multiclimatic Comparison of the Simplified ASHRAE Building Consumption Model with DOE-2 Results," *ASHRAE Transactions-Research*, Volume 93, Part 2, pp. 600-620, 1987.
8. Krarti, M., Claridge, D. E. and Kreider, J. F., "The ITPE Technique Applied to Steady-State Ground-Coupling Problems," *International Journal of Heat and Mass Transfer*, Volume 31, No. 9, pp. 1885-1898, 1988.
9. Krarti, M., Claridge, D. E. and Kreider, J. F., "ITPE Technique Applications to Time-Varying Two-Dimensional Ground-Coupling Problems," *International Journal of Heat and Mass Transfer*, Volume 31, No. 9, pp. 1899-1911, 1988.
10. Krarti, M., Claridge, D. E. and Kreider, J. F., "ITPE Technique Applications to Time-Varying Three-Dimensional Ground-Coupling Problems" *ASME Journal of Heat Transfer*, Volume 112, pp. 849-856, 1990.
11. Krarti, M. and Claridge, D., "Two Dimensional Heat Transfer from Earth-Sheltered Buildings," *ASME Journal of Solar Energy Engineering*, Volume 112, pp. 43-50, 1990.

12. Claridge, D. E. and Bhattacharyya, S., "The Measured Energy Impact of Infiltration in a Test Cell," *ASME Journal of Solar Energy Engineering*, Volume 112, pp. 132-139, 1990.
13. Claridge, D., Haberl, J., O'Neal, D., Heffington, W., Turner, W. D., Tombari, C., Roberts, M. and Jaeger, S., "Improving Energy Conservation Retrofits with Measured Savings," *ASHRAE Journal*, Volume 33, No. 9, pp. 14-22, 1991.
14. Ruch, D. and Claridge, D. E., "A Four-Parameter Change-Point Model for Predicting Energy Consumption in Commercial Buildings," *ASME Journal of Solar Energy Engineering*, Volume 114, pp. 77-83, 1992.
15. Claridge, D. E., Norford, L. K. and Balasubramanya, R., "A Thermal Mass Treatment for the TC 4.7 Simplified Energy Analysis Procedure," *ASHRAE Transactions: Research*, Volume 98, Part 1, pp. 320-327, 1992.
16. Balasubramanya, R., Claridge, D. E., Norford, L. K. and Kreider, J. F., "A Multiclimatic Comparison of the TC 4.7 Simplified Energy Analysis Procedure Using Improved Treatment of Mass and Solar Gains with DOE-2 Results and the Original SEAP," *ASHRAE Transactions: Research*, Volume 98, Part 1, pp. 305-319, 1992.
17. Ruch, D., Chen, L., Haberl, J. S. and Claridge, David E., "A Change-Point Principal Component Analysis (CP/PCA) Method for Predicting Energy Usage in Commercial Buildings," *ASME Journal of Solar Energy Engineering*, Volume 115, pp. 77-84, 1993.
18. Katipamula, S. and Claridge, D. E., "Use of Simplified Models to Measure Retrofit Energy Savings," *ASME Journal of Solar Energy Engineering*, Volume 115, pp. 57-68, 1993.
19. Reddy, T. A. and Claridge, D. E., "A Simplified Model to Assess the Influence of Air-Conditioner Oversizing and Occupant Control of the Thermostat on Residential Electricity Peak Loads," *Energy*, Vol. 18, pp. 1139-1152, 1993.
20. Ruch, D. and Claridge, D. E., "A Development and Comparison of NAC Estimates for Linear and Change-Point Energy Models for Commercial Buildings," *Energy and Buildings*, Volume 20, pp. 87-95, 1993.
21. Reddy, T. A., Kissock, J. K., Katipamula, S. and Claridge, D. E., "An Energy Delivery Efficiency Index to Evaluate Simultaneous Heating and Cooling Effects in Large Commercial Buildings," *ASME Journal of Solar Energy Engineering*, Volume 116, pp. 79-87, 1994.
22. Krarti, M., Kreider, J. F., and Claridge, D. E., "Schwartz-Christoffel Transformation Applied to Steady-State Ground Coupling Problems," *Energy and Buildings*, Vol. 20, pp. 193-203, 1994.
23. Reddy, T. A. and Claridge, D. E., "Using Synthetic Data to Evaluate Multiple Regression and Principal Component Analyses for Statistical Modeling of Daily Building Energy Consumption," *Energy and Buildings*, Vol 21, pp. 35-44, 1994.
24. Reddy, T. A., Katipamula, S. K. and Claridge, D. E., "The Functional Basis of Steady-State Thermal Energy Use in Air-Side HVAC Equipment," *ASME Journal of Solar Energy Engineering*, Vol. 117, pp. 31-39, 1995.
25. Atif, M.R., Claridge, D.E., Boyer, L.O., and Degelman, L.O., "Atrium Buildings: Thermal Performance and Climate Factor," *ASHRAE Transactions: Research*, Vol. 101, Part 1, pp. 454-460, 1995.
26. Krarti, M., Claridge, D.E. and Kreider, J., "Frequency Domain Analysis of Below-Grade Building Envelope Surfaces," *ASHRAE Transactions: Research*, Vol. 101, Part 1, pp. 355-369, 1995.

27. Krarti, M., Nicoulin, V., Claridge, D.E. and Kreider, J., "Comparison of Energy Prediction of Three Ground-Coupling Heat Transfer Calculation Methods," *ASHRAE Transactions: Research*, Vol. 101, Part 1, pp. 158-172, 1995.
28. Krarti, M., Lopez-Alonzo, C., Claridge, D.E., and Kreider, J.F., "Analytical Model to Predict Annual Soil Surface Temperature Variation," *ASME Journal of Solar Energy Engineering*, Vol. 117, pp. 91-99, 1995.
29. Krarti, M., Claridge, D.E., and Kreider, J.F., "Analytical Model to Predict Nonhomogeneous Soil Surface Temperature Variation," *ASME Journal of Solar Energy Engineering*, Vol. 117, pp. 100-107, 1995.
30. Liu, M. and Claridge, D. E., "A Non-Calorimetric Method for Heat Transfer Coefficient Measurement of Building Thermal Envelopes," *ASME Journal of Solar Energy Engineering*, Vol. 117, pp. 108-113, 1995.
31. Liu, M. and Claridge, D. E., "Is the Actual Heat Loss Factor Substantially Smaller than You Calculated?" *ASHRAE Transactions-Research*. Volume 101, Part 2, pp. 174-184, 1995.
32. Katipamula, S., Reddy, T.A., and Claridge, D.E., "Effect of Time Resolution on Statistical Modeling of Cooling Energy Use in Large Commercial Buildings," *ASHRAE Transactions-Research*. Volume 101, Part 2, 321-334, 1995.
33. Kreider, J.F., Claridge, D.E., Curtiss, P., Dodier, R., Haberl, J.S., and Krarti, M., "Building Energy Use Prediction and System Identification Using Recurrent Neural Networks," *ASME Journal of Solar Energy Engineering*, Vol. 117, pp. 161-166, 1995.
34. Bhattacharyya, S., and Claridge, D.E., "The Energy Impact of Air Leakage Through Insulated Walls," *ASME Journal of Solar Energy Engineering*, Vol. 117, pp. 167-172, 1995.
35. Claridge, D.E., Liu, M., and Bhattacharyya, S., "Impact of Air Infiltration in Frame Walls on Energy Loads: Taking Advantage of the Interaction between Infiltration, Solar Radiation, and Conduction," *Airflow Performance of Building Envelopes, Components, and Systems, ASTM STP 1255*, Mark P. Modera and Andrew K. Persily, Eds., American Society for Testing and Materials, Philadelphia, 1995, pp. 178-196.
36. Claridge, D.E. and Liu, Mingsheng, "The Measured Energy Impact of Infiltration in an Outdoor Test Cell," *ASME Journal of Solar Energy Engineering*, Vol. 118, pp. 162-167, 1996.
37. Liu, M., Zhu, Y. and Claridge, D., "Use of EMCS Recorded Data to Identify Potential Savings Due to Improved HVAC Operations and Maintenance," *ASHRAE Transactions-Research*. Volume 103, Part 2, pp. 122-129, 1997.
38. Liu, M., Zhu, Y., Claridge, D. and White, E., "Impacts of Static Pressure Set Level on the HVAC Energy Consumption and Indoor Conditions," *ASHRAE Transactions-Research*. Volume 103, Part 2, pp. 221-228, 1997.
39. Liu, M., Claridge, D., and Park, B.Y., "An Advanced Economizer Controller for Dual Duct Air Handling Systems with a Case Study," *ASHRAE Transactions-Research*. Volume 103, Part 2, pp. 256-263, 1997.
40. Reddy, T.A., Saman, N.F., Claridge, D.E., Haberl, J.S., Turner, W.D. and Chalifoux, A.T., "Baselining Methodology for Facility-Level monthly Energy Use -- Part 1: Theoretical Aspects," *ASHRAE Transactions-Research*. Volume 103, Part 2, pp. 336-347, 1997.

41. Reddy, T.A., Saman, N.F., Claridge, D.E., Haberl, J.S., Turner, W.D. and Chalifoux, A.T., "Baselining Methodology for Facility-Level monthly Energy Use -- Part 2: Application to Eight Army Installations," *ASHRAE Transactions-Research*. Volume 103, Part 2, pp. 348-359, 1997.
42. Abraham, M.M., Annamalai, K., and Claridge, D.E., "Optimization of the Storage Process for a Cool Thermal Storage System," *ASME Journal of Energy Resources Technology*, Vol. 119, No. 4, pp. 236-241, 1997.
43. Reddy, T.A., Liu, M., Katipamula, S., and Claridge, D.E., "Extending the Concept of Energy Delivery Efficiency of HVAC Systems," *ASHRAE Transactions-Research*, Vol. 104, Part I, pp. 1998.
44. Liu, M. and Claridge, D.E., "Use of Calibrated HVAC System Models to Optimize System Operation," *ASME Journal of Solar Energy Engineering*, Vol. 120, pp. 131-138, 1998.
45. Claridge, D.E., "A Perspective on Methods for Analysis of Measured Energy Data from Commercial Buildings," *ASME Journal of Solar Energy Engineering*, Vol. 120, pp. 150-155, 1998.
46. Kissock, J.K., Reddy, T.A., and Claridge, D.E., "Ambient-Temperature Regression Analysis for Estimating Retrofit Savings In Commercial Buildings," *ASME Journal of Solar Energy Engineering*, Vol. 120, pp. 168-176, 1998.
47. Katipamula, S., Reddy, T.A., and Claridge, D.E., "Multivariate Regression Modeling," *ASME Journal of Solar Energy Engineering*, Vol. 120, pp. 177-184, 1998.
48. Dhar, A., Reddy, T.A., and Claridge, D.E., "Modeling Hourly Energy use in Commercial Buildings With Fourier Series Functional Forms," *ASME Journal of Solar Energy Engineering*, Vol. 120, pp. 217-223, 1998.
49. Reddy, T.A., Liu, M., and Claridge, D.E., "A Study of Energy Use and Satisfactory Zone Ventilation of Different Outdoor Air Ventilation Strategies for Terminal Reheat Variable Air Volume Systems," *Energy and Buildings*, Vol. 29, pp. 65-75, 1998.
50. Reddy, T.A., Deng, S., and Claridge, D.E., "Development off an Inverse Method to Estimate Overall Building and Ventilation Parameters of Large Commercial Buildings," *ASME Journal of Solar Energy Engineering*, Vol. 121, pp. 40-46, 1999.
51. Dhar, A., Reddy, T.A., and Claridge, D.E., "A Fourier Series Model to Predict Hourly Heating and Cooling Energy Use in Commercial Buildings With Outdoor Temperature as the Only Weather Variable," *ASME Journal of Solar Energy Engineering*, Vol. 121, pp. 47-53, 1999.
52. Dhar, A., Reddy, T.A., and Claridge, D.E., "Generalization of the Fourier Series Approach to Model Hourly Energy Use in Commercial Buildings," *ASME Journal of Solar Energy Engineering*, Vol. 121, pp. 54-62, 1999.
53. Liu, M., D. E. Claridge, and W. D. Turner, "Improving Building Energy Systems Performance by Continuous Commissioning," *Energy Engineering*, Vol. 96, No. 5, pp. 46-57, 1999.
54. Liu, M. and Claridge, D.E., "Converting Dual-Duct Constant Volume Systems to Variable Air Volume Systems Without Retrofitting the Terminal Boxes," *ASHRAE Transactions-Research*, Vol. 105, Part I, pp. 66-70, 1999.
55. Liu, M., Zhu, Y., Park, B.Y., Claridge, D.E., Feary, D.K. and Gain, J., "Airflow Reduction to Improve Building Comfort and Reduce Building Energy Consumption – A Case Study," *ASHRAE Transactions-Research*, Vol. 105, Part I, pp. 384 – 390, 1999.

56. Liu, M. and Claridge, D. E., "The Maximum Potential Energy Savings from Optimizing Cold and Hot Deck Reset Schedules for Dual Duct VAV Systems," *ASME Journal of Solar Energy Engineering*, Vol. 121, 1999, pp. 171-175.
57. Reddy, T. Agami and Claridge, David E., "Uncertainty of "Measured" Energy Savings from Statistical Baseline Models," *International Journal of Heating, Ventilating and Air-Conditioning Research*, Vol. 6, pp. 3-20, 2000.
58. Wei, Guanghua, Liu, Mingsheng, and Claridge, David E., "In-situ Calibration of Boiler Instrumentation Using Analytic Redundancy," *International Journal of Energy Research*, Vol. 25, pp. 375-387, 2001.
59. Beasley, R., Haberl, J. Turner, W.D., and Claridge, D.E., "Development of a Methodology for Baselineing the Energy Use of Large Multi-Building Central Plants," *ASHRAE Transactions-Research*, Vol. 108, Part 1, pp. 251-259, 2002.
60. Deng, S. Turner, W. D. , Claridge, D. E., Liu, M., Bruner, H., Chen, H. and Wei, G. "Retrocommissioning of Central Chilled/Hot Water Systems," *ASHRAE Transactions-Research*, Vol. 108, Part 2, pp. 75-81, 2002.
61. Wei, G., M. Liu, Y. Sakurai, D. E. Claridge, W. D., Turner, "Practical Optimization of Full Storage Systems Operation," *ASHRAE Transactions-Research*, Vol. 108, Part 2, pp. 360-368, 2002.
62. Liu, M., Claridge, D.E. and Deng, S., "Air-Filter-Associated Fan Energy Consumption in Variable Air Volume Systems," *ASHRAE Transactions-Research*, Vol. 109, Part 1, pp. 45-51, 2003.
63. Liu, M., Claridge, D.E. and Deng, S., "An Air Filter Pressure Loss Model for Fan Energy Calculation in Air Handling Units," *International Journal of Energy Research*, Vol. 27, No. 6, pp. 589-600, 2003.
64. Kissock, J.K., Haberl, J., and Claridge, D., "Inverse Modeling Toolkit – Numerical Algorithms," *ASHRAE Transactions-Research*, Vol. 109, Part 2, pp. 425-434, 2003.
65. Haberl, J., Sreshthaputra, A., Claridge, D., and Kissock, J.K., "Inverse Modeling Toolkit – Application and Testing," *ASHRAE Transactions-Research*, Vol. 109, Part 2, pp. 435-448, 2003.
66. Yoon, J., Lee, E.J., and Claridge, D.E., "Calibration Procedure for Energy Performance Simulation of a Commercial Building," *ASME Journal of Solar Energy Engineering*, Vol. 125, 2003, pp. 251-257.
67. Liu, M., Claridge, D.E. and Turner, W.D., "Continuous Commissioning<sup>SM</sup> of Building Energy Systems," *ASME Journal of Solar Energy Engineering*, Vol. 125, 2003, pp. 275-281.
68. Claridge, David E., Abushakra, Bass, and Haberl, Jeff S., "Electricity Diversity Profiles for Energy Simulation of Office Buildings," *ASHRAE Transactions-Research*, Vol. 110, Part 1, pp. 365-377, 2004.
69. Abushakra, Bass, Haberl, Jeff S., and Claridge, David E., "Overview of Literature on Diversity Factors and Schedules for Energy and Cooling Load Calculations," *ASHRAE Transactions-Research*, Vol. 110, Part 1, pp. 164-176, 2004.
70. Liu, M., Song, L., Wei, G., and Claridge, D.E., "Simplified Building and Air Handling Unit Model Calibration and Applications," *ASME Journal of Solar Energy Engineering*, Vol. 126, No. 1, pp. 601-609, 2004.

71. Claridge, D.E., Turner, W.D., Liu, M., Deng, S., Wei, G., Culp, C., Chen, H., and Cho, S.Y., "Is Commissioning Once Enough?" *Energy Engineering*, Vol. 101, No. 4, 2004, pp. 7-19.
72. Wei, G., Liu, M., and Claridge, D.E., "Integrated Damper and Pressure Reset for VAV Supply Air Fan Control," *ASHRAE Transactions-Research*, Vol. 110, Part 2, 2004, pp. 309-313.
73. Zhou, J., Wei, G., Turner, W.D., Deng, S., Claridge, D.E., Contreras, O., "Control Optimization of a Chilled Water Thermal Storage System Under a Complicated Time-of-Use Electricity Rate Schedule," *ASHRAE Transactions-Research*, Vol. 111, Part 1, 2005, pp. 184-195.
74. Wei, G., Claridge, D.E., Turner, W.D., and Liu, M., "Choosing the Right Parameter for Single-Duct Constant Air Volume System Supply Air Temperature Reset," *ASCE Journal of Architectural Engineering*, Vol. 11, No. 3, Sept. 2005, pp. 76-80.
75. Baltazar, J.C. and Claridge, D.E., "Study of Cubic Splines and Fourier Series as Interpolation Techniques for Filling in Short Periods of Missing Building Energy Use and Weather Data," *ASME Journal of Solar Energy Engineering*, Vol. 128, pp. 226-230, May 2006.
76. Claridge, David E. and Chen, Hui, "Missing Data Estimation for 1-6h Gaps in Energy Use and Weather Data Using Different Statistical Methods," *Int. Journal of Energy Research*, Vol. 30, pp. 1075 – 1091, 2006.
77. Shao, X. and Claridge, D.E., "Use of First Law Energy Balance as a Screening Tool for Building Energy Data, Part I – Methodology," *ASHRAE Transactions - Research*, Vol. 112, Part 2, QC-06-068, 2006.
78. Claridge, D.E., "Methodologies for Determining Persistence of Commissioning Benefits," *Journal of Harbin Institute of Technology*, Volume 13, Sup., Oct. 2006. ISSN 1005-9113.
79. Gong, X. and Claridge, D.E., "Investigation of a Radiantly Heated and Cooled Office with an Integrated Desiccant Ventilation Unit," *Journal of Harbin Institute of Technology*, Volume 13, Sup., Oct. 2006. ISSN 1005-9113.
80. Gong, Xiangyang and Claridge, David E., "Impact of the Position of the Radiators on Energy Consumption and Thermal Comfort in a Mixed Radiant and Convective Heating System," *ASHRAE Trans.*, Vol. 113, 2007, Pt. 1, pp. 494-503.
81. Wang, G., Liu, M. and Claridge, D.E., "Decoupled Modeling of Chilled Water Cooling Coils," *ASHRAE Trans.*, Vol. 113, 2007, Pt. 1, pp. 484-493.
82. Lee, S.U., Painter, F.L. and Claridge, D.E., "Whole Building Commercial HVAC Systems Simulation for Use in Energy Consumption Fault Detection," *ASHRAE Trans.*, Vol. 113, 2007, Pt. 2, pp. 52-61.
83. Abushakra, B., Claridge, D.E., "Modeling Office Building Occupancy in Hourly Data-Driven and Detailed Energy Simulation Programs," *ASHRAE Transactions*, Vol. 114, 2008, Pt. 2, pp. 472-481.
84. Gong, X., Claridge, D.E. and Archer, D., "Infiltration Investigation of a Radiantly Heated and Cooled Office," *ASHRAE Transactions*, Vol. 116, 2010, Pt. 1, pp. 437-446.
85. Koomey, J., Akbari, H., Blumstein, C., Brown, M., Brown, R., Calwell, C., Carter, S., Cavanagh, R. Chang, A., Claridge, D., et al., "Defining a Standard Metric for Electricity Savings," *Environmental Research Letters* Vol. 5 014017, 2010, 10 pp.
86. Wang, G., Liu, M. and Claridge, D.E., "Demonstration of an Energy Meter Using a Pump Flow Station," *ASHRAE Transactions*, Vol. 116, 2010, Pt. 2, pp..
87. Liu, J., Baltazar, J.C. and Claridge, D.E. "Improvements to a Methodology for Estimating Potential Energy Savings from Existing Building-Commissioning/Retrofit Measures," *ASHRAE Trans.*, Vol. 117, Pt. 1, pp. 868-883, 2011.



88. Zhou, J.Q., and Claridge, D.E., "PI Tuning and Robustness Analysis for Air Handler Discharge Air Temperature Control," *Energy and Buildings*, Vol. 54, pp. 1-6, 2012.
89. Bynum, J.D., Claridge, D.E. and Curtin, J.M., "Development and Testing of an Automated Building Commissioning Analysis Tool (ABCAT)," *Energy and Buildings*, Vol. 55, pp. 607-617, 2012.
90. Lin, G., and Claridge, D., "A Statistical Approach to Detect Abnormal Building Energy Consumption with ABCAT," *ASHRAE Trans.*, Vol. 119, Pt.1, Paper D-DA-13-005, 9 pp., 2013.
91. Masuda, H. and Claridge, D.E., "Statistical Modeling of the Building Energy Balance Variable for Screening of Metered Energy Use in Large Commercial Buildings," *Energy and Buildings*, Vol. 57, pp. 292-303, 2014.
92. Paulus, M.T., Claridge, D.E. and Culp, C. "Algorithm for Automating the Selection of a Temperature Dependent Change Point Model," *Energy and Buildings*, Vol. 87, pp. 95-104, 2015.
93. Masuda, Hiroko and Claridge, D.E., "Continuous Building Energy Data Monitoring Using Recursive Least Squares Filter and CUSUM Change Detection: Application to Energy Balance Load Data," *ASHRAE Trans. Vol. 121*, Pt. 1, 2015.
94. Lin, G. and Claridge, D.E., "A Temperature-Based Approach to Detect Abnormal Building Energy Consumption," *Energy and Buildings*, Vol. 93, pp. 110-118, 2015.
95. Gangiseti, K., Claridge, D.E., Srebric, J. and Paulus, M.T., "Influence of Reduced VAV Flow Settings on Indoor Thermal Comfort in an Office Space," *Building Simulation*, Vol. 9, pp. 101-111, 2016.
96. Chen, W.J., Claridge, D.E., Rohrs, C., and Liao, J., "Modeling to predict positive pressurization required to control mold growth from infiltration in buildings in a hot and humid climate," *Building and Environment*, Vol. 104, pp. 102 – 113, 2016.
97. Chen, W.J., Claridge, D.E., and Atif, M.R., "Using Internal Fan Balancing System to Avoid Excessive Pressurization on High Rise Buildings in Hot and Humid Climates," *Energy and Buildings*, Vol. 152, pp. 86-95, 2017.
98. Chen, W.J., Claridge, D.E., and Liao, J., "Using a Chain Recooling System on Buildings in Hot and Humid Climates," *Building and Environment*, Vol. 129, pp. 85-95, 2018.
99. Wang, L., Sakurai, Y., Bowman, S.J. and Claridge, D.E., "Commissioning an Existing Heat Recovery Chiller System at a Large District Plant," *ASHRAE Transactions*, Vol. 124, Pt. I, pp. 52-60, 2018. Also published in *ASHRAE Journal*, December 2018, pp. 44-52.
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Sun, Y.; Baltazar, J.C.; Claridge, D., "Energy Use Patterns and Savings Analysis Report for Caterpillar Financial, Nashville, TN," Energy Systems Laboratory, Texas A&M University, Nov. 2012, 5 pp.

## RESEARCH PROJECTS

\$4,974,574 as single P.I.

\$25,030,100 as PI/Co-P.I. share of \$109,917,476 in multi-investigator projects.

**a. External**

"Analysis of the Colorado 50/50 Retrofit Program," Solar Energy Research Institute, D. E. Claridge, P.I., one graduate student, \$9,987, February, 1983 - February, 1984.

"Validation of Variable-Base Degree-Day Method," American Society of Heating, Refrigerating and Air Conditioning Engineers, D. E. Claridge, P.I., four graduate students, \$94,535, June, 1983 - October, 1985.

"Study of Building and Component Energy Performance Using Fourier Transform Techniques," Solar Energy Research Institute, D. E. Claridge, P.I., one graduate student, \$12,800, February, 1985 - December, 1985.

"Preliminary Energy Analysis for the Austin City Hall Complex," Flack & Kurtz, Inc., D. E. Claridge, P.I., two graduate students, \$14,891, March, 1985 - July, 1985.

"Study of Utility Rate Structures and Optimized Building Operation to Minimize Utility Costs," Colorado State Department of Institutions, D. E. Claridge, P.I., one graduate student, \$3,718, April, 1985 - July, 1985.

"Utility Bill Analysis - Before and After Furnace Tune-up," Solar Energy Research Institute, D. E. Claridge, P.I., one graduate student, \$9,806, June, 1985 - December, 1985.

"Evaluate the Limitations of the TC 4.7 Simplified Energy Analysis Procedure," American Society of Heating, Refrigerating and Air Conditioning Engineers, D. E. Claridge, P.I., one graduate student, \$22,344 (Co-PI), July, 1985 - December, 1985.

"Research Needs for Environmental Control Systems Design in Buildings," National Science Foundation, D. E. Claridge, P.I., \$32,506, July, 1985 - June, 1986.

"Analytic Studies of Building Ground Coupling," American Society of Heating, Refrigerating and Air Conditioning Engineers, Grant-in-aid for thesis research of M. Krarti, one graduate student, \$5,000, September, 1985 - May, 1986.

"Building Test Cell Analysis," Solar Energy Research Institute, D. E. Claridge, P.I., one graduate student, \$5,700, January, 1986 - December, 1986.

"Ground Heat Loss Calculations," Solar Energy Research Institute, D. E. Claridge, P.I., one graduate student, \$4,999, April 9, 1986 - March 15, 1987.

"Comprehensive Study of Building Techniques as Compared to Current Energy Codes," City of College Station, Texas, D. E. Claridge, P.I., one graduate student, October 28, 1986 - March 15, 1987, \$7,906.

"Residential Energy Building Code," City of College Station, Texas, D. E. Claridge, P.I., one graduate student, March 18, 1987 - January 31, 1988, \$11,712.

"Symposium on Improving Building Energy Efficiency," Various Sponsors, D. E. Claridge and D. L. O'Neal, Co-P.I.s, \$12,000, September 1, 1987 - August 31, 1988.

"State Energy Project - Extension," Energy Management Center, Governor's Office of Budget and Planning, Austin, Texas, had primary responsibility for work (design assistance and review provided to the Texas Department of Corrections) performed under this extension, W. D. Turner, W. M. Heffington, D. L. O'Neal, S. Somasundaram and D. E. Claridge, Co-P.I.s, one-postdoctoral research associate, \$7,829, December 1, 1987 - January 15, 1988.

"State Energy Project - Continuation," Energy Management Center, Governor's Office of Budget and Planning, Austin, Texas, W. D. Turner, W. M. Heffington, D. L. O'Neal, S. Somasundaram and D. E. Claridge, Co-P.I.s, one graduate student, \$103,793, January 15, 1988 - August 31, 1988.

"Development of Improvements for the TC 4.7 Simplified Energy Analysis Procedure," American Society of Heating, Refrigerating and Air Conditioning Engineers, D. E. Claridge, P.I., one graduate student, \$31,811, April 1, 1988 - June 30, 1989.

"Annual Symposium on Improving Energy Efficiency in Hot and Humid Climates," Martin Marietta Energy Systems, Inc. (Oak Ridge National Laboratory), D. E. Claridge, P.I., \$12,500, June 1, 1988 - June 30, 1990.

"State Energy Project - Continuation," Texas Governor's Energy Management Center, D. E. Claridge, W. D. Turner, W. M. Heffington, D. L. O'Neal and S. Somasundaram, one graduate student, September 1, 1988 - August 31, 1989, \$154,911, (Responsibility for Monitoring Task (\$22,542) with O'Neal on this contract).

"Symposium on Improving Building Energy Efficiency," Various Sponsors, D. E. Claridge, P.I., \$34,000, September 1, 1988 - August 31, 1992.

"Improved Analysis Methods for Retrofit Savings and Energy Accounting," Energy Research and Applications Program, Texas Higher Education Coordinating Board, D. E. Claridge, P.I., two graduate students, one research associate, \$313,506, 1989-1993.

"Measured Energy Impact of Infiltration on Energy Use in Homes," Energy Research and Applications Program, Texas Higher Education Coordinating Board, D. E. Claridge, P.I., two graduate students, \$200,000, 1989-1993.

"State Energy Project - Amendment," Texas Governor's Energy Management Center, W. D. Turner, Project Manager, D. E. Claridge, W. M. Heffington, D. L. O'Neal and S. Somasundaram, Co-P.I.s, February 1, 1989 - August 31, 1989, \$85,059, (Responsibility for Monitoring Task (\$56,953) with O'Neal on this contract.)

"Monitoring and Analysis Program - Task 5 - Monitoring Plans, Analysis and Reporting," D. E. Claridge, P.I., 4 graduate students, 2 research associates, \$269,926, September 1, 1989 - August 31, 1990.

"Energy Management and Control Systems for Performance Monitoring of Retrofit Systems," US DOE, D. E. Claridge and J. Haberl, Co-P.I.s, two graduate students, \$91,717, September, 1990 - September, 1992.

"Monitoring and Analysis Program - Task 5 - Monitoring Plans, Analysis and Reporting," GEMC, D. E. Claridge, P.I., 4 graduate students, 3 research associates, \$414,568, September, 1990 - August, 1991.

"Monitoring and Analysis Program - Task 5 - Monitoring Plans, Analysis and Reporting," D. Claridge, P.I., Texas Governor's Energy Office, four graduate students, 3 research associates, \$253,072, September 1, 1991 - August 31, 1992.

"Data Exploration Technology Development," J. Haberl and D. Claridge, Co-P.I.s, Honeywell Corporation, two graduate students, \$80,000, September 1, 1992 - June 1, 1994.

"Symposium on Improving Building Systems in Hot and Humid Climates," various sponsors, D. Claridge, P.I., \$25,000, March 1, 1992 - June 1, 1994.

"Monitoring and Analysis Program, Task D, Monitoring Analysis and Development," D. Claridge, P.I., Texas Governor's Energy Office, 3 graduate students, 1 research engineer, 2 research associates, \$176,118, September 1, 1992 - May 31, 1994.

"Monitoring and Analysis Program, Task E, Reporting and Technology Transfer," Texas Governor's Energy Office, D. Claridge, P.I., J. Haberl, Co-P.I., four graduate students, 2 research engineers, 2 research associates, \$199,956, September 1, 1992 - May 31, 1994.

"Monitor the Effectiveness of a Thermal Storage System," City of Austin, Texas, D. Claridge, D. O'Neal and J. Haberl, Co-P.I.s, one graduate student, \$31,991, March 15, 1993 - August 31, 1994.

"Development of a Low Water Consumption Stainless Steel Water Closet," Texas Department of Criminal Justice, D. Claridge, P.I., \$49,113, October 1, 1992 - August 31, 1994.

"An Evaluation of Energy Savings from LoanSTAR Retrofits and Improved Commercial Air Conditioning Systems," U.S. Environmental Protection Agency, D. L. O'Neal, D. E. Claridge and J. S. Haberl, P.I.s one graduate student, \$125,000, October 18, 1993 - May 31, 1996.

"Annual Symposium on Improving Energy Efficiency in Hot and Humid Climates," Martin Marietta Energy Systems, Inc. (Oak Ridge National Laboratory), D. E. Claridge, P.I., \$5,000, November 1, 1993 - June 30, 1994.

"Analysis of Energy Conservation Options for U.S. Department of Energy Forrestal Child Development Center for FEMP Office Subtask," D.E. Claridge, J. Haberl, W.D. Turner and D.L. O'Neal, pi's \$82,551, one graduate student, one research associate, January 1, 1994 - December 31, 1995.

"Symposium on Improving Energy Efficiency in Hot and Humid Climates," Electric Power Research Institute, D.E. Claridge, P.I., \$5,000, March 31, 1994 - August 31, 1994.

"Retrofit Technical and Analytical Support," Martin Marietta Energy Systems, Inc. (Oak Ridge National Laboratory), D. E. Claridge and T. A. Reddy, P.I.s., \$99,217, November 9, 1993 - November 9, 1996.

"Methodology Development to Measure In-Situ Chiller, Fan and Pump Performance," American Society of Heating, Refrigerating and Air Conditioning Engineers - University of Colorado, J. S. Haberl and D. E. Claridge, P.I.s \$17,549, May 1, 1994 - December 31, 1995.

"Preliminary Study of O&M Opportunities," University of Texas Medical Branch at Galveston, D. E. Claridge, J. S. Haberl and M. Liu, P.I.s \$25,440, February 15, 1994 - July 31, 1994.

"Monitoring and Analysis Program, Task D, Monitoring Analysis and Development," D. Claridge, P.I., Texas Governor's Energy Office, 3 graduate students, 1 research engineer, 2 research associates, \$223,000, July 1, 1994 - August 31, 1995.

"Monitoring and Analysis Program, Task E, Reporting and Technology Transfer," Texas Governor's Energy Office, D. Claridge, P.I., J. Haberl, D. O'Neal, and W.D. Turner, Co-P.I.s., four graduate students, 2 research engineers, 2 research associates, \$298,425, July 1, 1994 - August 31, 1995.

"PRISM Training and Reporting," Texas Department of Housing and Community Affairs, D. Claridge and J. Haberl, Co-PIs, one graduate student, \$7,500, August 1, 1994 - February 28, 1995.

"Development of Calibrated Simulation Models," Enviro-Management and Research, Inc., D. Claridge, P.I., one research engineer, \$45,000, June, 1994 - September, 1995.

“Development of Comprehensive HVAC Operations Optimization Procedures,” M.D. Anderson Cancer Research Center, D. Claridge, M. Liu, Co-P.I.s, one research engineer, one post-doc, \$24,770, September 15, 1994 - December 31, 1994.

“Energy Efficient Building Design Assistance,” Texas Department of Criminal Justice, D.E. Claridge, J. Haberl, W.D. Turner and D.L. O’Neal, P.I.s 4 graduate students, 4 research associates, \$387,147, December 21, 1994 - May 31, 1996.

“Implementation and Support Service for the Energy STAR Showcase Buildings Program at Mobil Research Facilities,” ICF International, Inc., D.E. Claridge, J. Haberl, M. Liu, P.I.s one graduate student, one research associate, \$15,550, May 1, 1995 - July 31, 1995.

“U.S. Army CERL - Fort Hood Project,” U.S. Army Construction Engineering Research Laboratory, \$11,858, June 28, 1995 -December 31, 1995.

“Monitoring and Analysis Program, Task D, Monitoring Analysis and Development,” D. Claridge, P.I., Texas Governor’s Energy Office, 3 graduate students, 1 research engineer, 2 research associates, \$257,900, September 1, 1995 - August 31, 1996.

“Monitoring and Analysis Program, Task E, Reporting and Technology Transfer,” Texas Governor’s Energy Office, D. Claridge, P.I., J. Haberl, Co-P.I., four graduate students, 2 research engineers, 2 research associates, \$223,500, September 1, 1995 - August 31, 1996.

“Savings Monitoring System,” Minnesota Department of Administration through NCAT Development Corporation, W.D. Turner, D.E. Claridge and J.S. Haberl, Co-P.I.s, \$160,014, 3 graduate students, 3 research associates, June 1, 1995 – March 31, 1999.

“Energy Conservation Services to Midwestern State University,” Midwestern State University, D. Claridge, W.D. Turner, D.L. O’Neal and J. Haberl, PIs, \$8,567, 1 res. assoc., 5/1/96 - 12/31/96.

“Technical Support for Monitoring Energy Use at Tulane University,” Finnin & Assoc., D. Claridge, D.L. O’Neal and W.D. Turner, P.I.s, \$ 11,790, 2 research associates, July 14, 1996 - September 30, 1996.

“Monitoring and Analysis Program, Task D, Monitoring Analysis and Development,” D. Claridge, P.I., Texas Governor’s Energy Office, 3 graduate students, 1 research engineer, 2 research associates, \$238,652, September 1, 1996 - August 31, 1997.

“Monitoring and Analysis Program, Task E, Reporting and Technology Transfer,” Texas Governor’s Energy Office, D. Claridge, P.I., J. Haberl, Co-P.I., four graduate students, 2 research engineers, 2 research associates, \$266,903, September 1, 1996 - August 31, 1997.

“Commissioning HVAC System and Providing Design Review of the Estelle High Security Unit,” Texas Department of Criminal Justice, W. D. Turner, D. Claridge and M. Liu, P.I.s, \$40,000, August 11, 1997 - August 10, 1998.

“Baseline and Modeling Project for Prairie View A&M University,” Prairie View A&M University, D. Claridge and J. Haberl, P.I.s, \$10,000, 2 research associates, September 1, 1997 - August 31, 1998.

“Building Commissioning, Simulation and Training for the M.D. Anderson Cancer Center,” University of Texas M.D. Anderson Cancer Center, D. Claridge and M. Liu, P.I.s, \$66,000, 1 research engineer, 3 research associates, 1 graduate student, 7/1/97 - 6/30/98.

“Building Commissioning and Monitoring,” University of Texas at Austin, W.D. Turner, D. Claridge, and J. Haberl, P.I.s, \$68,800, 1 research engineer, 3 research associates, 1 graduate student, 5/1/97 - 8/31/97.

“Building Monitoring and Reporting,” University of Texas at Austin, W.D. Turner, D. Claridge, and J. Haberl, P.I.s, \$25,600, 1 research engineer, 1 research associate, 1 graduate student, 5/1/97 - 8/31/97.

“Methodology Development to Determine the Long Term Performance of Cool Storage Systems from Short Term Measurements,” American Society of Heating, Refrigerating and Air Conditioning Engineers, J.S. Haberl, T.A. Reddy and D.E. Claridge, P.I.s, \$86,963, 1 research engineer, 1 graduate student, 8/1/97 - 8/31/00.

“Agreement for Professional Services (Metering) Between New Mexico State University and TEES,” New Mexico State University, W.D. Turner, D. Claridge, and D.L. O’Neal, P.I.s, \$19,907, 2 research associates, June 17, 1997 - June 30, 1998.

“The Pennsylvania State University’s Utility Systems Opportunity Assessment and the Utilities Strategic Plan,” E3C, Inc., W. D. Turner, D. Claridge, D. O’Neal and J. Haberl, P.I.s, \$126,336, 2 research engineers, 4 research associates, November 1, 1997 - June 30, 1998.

“LoanSTAR Program,” Texas State Energy Conservation Office, W.D. Turner, D. Claridge, J. Haberl, \$475,000, 2 research engineers, 6 research associates, 5 graduate students, November 1, 1997 - August 31, 1998.

“Revise Outside Air Quantities at Brooke Army Medical Center,” Johnson Controls, Inc., D. Claridge, P.I., \$46,200, 1 graduate student, December 16, 1997 - June 30, 2000.

“Energy Management Baseline Measurement and Monitoring Agreement,” Dallas County Commissioners’ Court, D. Claridge, P.I., \$14,373, 1 grad student, 11/18/97 – 5/17/99.

“Subrecipient Agreement Between TEES and New Horizon Technologies, Inc.,” New Horizon Technologies, Inc., D.E. Claridge and J. Haberl, P.I.s, \$13,433, 1 research associate, 3/25/98 – 12/31/98.

“Continuous Commissioning Program,” Pennsylvania State University, D.E. Claridge and W.D. Turner, P.I.s, \$12,989, 7/3/98 – 12/31/99.

“Commissioning Contract with Texas Tech University,” Texas Tech University, \$122,000, D.E. Claridge, D.L. O’Neal, and J. Haberl, P.I.s, 3 research associates, 1 grad student, 7/1/98 – 8/31/01.

“LoanSTAR Program,” Texas State Energy Conservation Office, W.D. Turner, D. Claridge, J. Haberl, \$425,000, 2 research engineers, 6 research associates, 5 graduate students, 9/1/98 – 8/31/99.

“Commissioning Demonstration Project and Produce Building Commissioning Guidebook,” U.S. Dept. of Energy, \$205,854, W. Dan Turner, and David E. Claridge, P.I.s, 1 research associate, 9/14/98 - 9/13/02.

“Compilation of Diversity Factors and Schedules for Energy and Cooling Load Calculations,” American Society of Heating, Refrigerating and Air Conditioning Engineers, David E. Claridge, P.I., \$24,625, 1 research assistant, 1/1/99 - 7/1/01.

“Development of a Toolkit for Calculating Linear, Change-point Linear and Multiple Linear Inverse Building Energy Analysis Models (1050-RP),” \$14,977, American Society of Heating, Refrigeration and Air Conditioning Engineers through University of Dayton, David E. Claridge, P.I., 1 research assistant, 2/1/99 – 9/30/01.

"Recommissioning Plan for Fairview University Medical Center," Fairview University Medical Center, \$132,578, Mingsheng Liu, David Claridge, and W. Dan Turner, P.I.s, 1 research associate, 1/4/99 - 12/31/01.

"Commissioning for One Shoreline Plaza in Corpus Christi, TX," T.G.F.W., L.P., \$45,625, W. Dan Turner and David E. Claridge, P.I.s, 2/15/99 - 12/31/01.

"Research Agreement Between TEES and CSISD," College Station Independent School District, \$195,000, W. Dan Turner and David E. Claridge, P.I.s, 2 research associates, 2 graduate students, 6/1/99 - 5/31/02.

"MHMR Terrell State Hospital Pipe Failures," Texas Mental Health and Mental Retardation, \$12,000, David E. Claridge and W. Dan Turner, P.I.s, 6/14/99 - 8/31/2000.

"Interagency Agreement between TEES and Terrell State Hospital," Terrell State Hospital, \$18,300, David E. Claridge and W. Dan Turner, P.I.s, one research associate, 9/1/99 - 8/31/00.

"LoanSTAR Program," Texas State Energy Conservation Office, \$400,000, W.D. Turner, D. Claridge, J. Haberl, and D. O'Neal, P.I.s, 2 research engineers, 6 research associates, 4 graduate students, 9/1/99 - 8/31/00.

"Installation of Metering System for Central Plant at Fort Hood, Texas," U.S. Army - Construction Engineering Research Laboratory, \$17,100, David E. Claridge and W. Dan Turner, P.I.s, one research associate, 9/29/99 - 9/15/01.

"Assistance in Testing, Adjusting, and Balancing (TAB) and Related Activities at Central Middle School, Eden Prairie, MN," Center for Energy and Environment, \$4,000, W. Dan Turner and David E. Claridge, P.I.s, one research associate, 10/7/99 - 12/31/00.

"Detailed Feasibility Study of the Veterans Administration Medical Facility in Albuquerque," Energy Partners, Inc., \$69,278, David E. Claridge and W. D. Turner, P.I.s, one research associate, 12/20/99 - 5/20/00.

"Building Commissioning Workshops," Northern States Power Company and State of Minnesota, David E. Claridge and W. D. Turner, P.I.s, 3/01/00 - 7/01/00, \$19,996.

"Detailed Feasibility Study of the Veterans Administration Medical Facility in Albuquerque," Energy Partners, Inc., David E. Claridge and W. D. Turner, P.I.s, one research associate, 4/15/00 - 8/31/00, \$5,300.

"Technical Assistance to State Energy Conservation Office," Texas State Energy Conservation Office, W. D. Turner, David E. Claridge, C. Culp and J.S. Haberl, P.I.s, two research associates, 2 research assistants, 9/01/00 - 8/31/02, \$282,200.

"LoanSTAR Program," Texas State Energy Conservation Office, W. D. Turner, David E. Claridge, and J.S. Haberl, P.I.s, four research associates, 6 research assistants, 9/01/00 - 8/31/02, \$641,000.

"Extended Service To Terrell State Hospital," Terrell State Hospital, W. D. Turner and David E. Claridge, P.I.s, one research associate, 9/01/00 - 8/31/01, \$22,692.

"Installation of Metering System for Central Plant at Fort Hood, Texas," U.S. Army - Construction Engineering Research Laboratory, David E. Claridge and W. Dan Turner, P.I.s, one research associate, 10/23/00 - 2/15/01, \$8,250.

"Rebuild Texas," Texas State Energy Conservation Office, B. Yazdani, W. D. Turner, J. Haberl, and D. Claridge, P.I.s, two research associates, two graduate students, 11/30/00 - 7/31/01, \$189,498.

"Letter Agreement for Engineering Services," Enershop, Inc., David E. Claridge, P.I., one research associate, one research assistant, 12/10/00 - 3/10/01, \$4,000.

"Monitoring and Verification Technology Transfer," Texas State Energy Conservation Office, W. D. Turner, David E. Claridge, D. O'Neal and J.S. Haberl, P.I.s, two research associates, 2 research assistants, 9/01/01 - 8/31/02, \$150,000.

"The Brazos Valley Energy Conservation Coalition," U.S. Dept. of Energy, D. Claridge, W.D. Turner, N. Saman, T.A. Reddy, P.I.s, \$499,552, 2 research associates, 1 graduate student, Sept. 1, 1996 – Dec. 30, 2003.

"Energy Management Baseline Measurement and Monitoring Agreement," Dallas County Commissioners' Court, W. Dan Turner, D. Claridge, and Jeff Haberl, P.I.s, \$195,093, 1 research associate, 1 grad student, 5/18/99 – 3/31/2004.

"Services Agreement between TEES and Federal Reserve Bank of Dallas," Federal Reserve Bank of Dallas, Jeff Haberl, W.D. Turner, and David E. Claridge, P.I.s, 2/09/00 - 12/31/02, \$58,918.

"Technical Assistance for Texas Department of Mental Health and Mental Retardation for Commissioning Services," Texas Mental Health and Mental Retardation, W. D. Turner and David Claridge, P.I.s, 1 research associate, 2/1/02 – 8/31/03, \$41,868.

"Technical Assistance for Texas Department of Mental Health and Mental Retardation – Analysis of Energy Management," Texas Mental Health and Mental Retardation, W. D. Turner and David Claridge, P.I.s, 1 research associate, 2/1/02 – 8/31/02, \$5,278.

"Recommissioning Plan for Fairview University Medical Center - Central Plant," Fairview University Medical Center, Mingsheng Liu, David Claridge,, and W. Dan Turner, P.I.s, 1 research associate, 6/19/00 - 12/31/02, \$32,001.

"Recommissioning Plan for Fairview University Medical Center - Riverside East," Fairview University Medical Center, David Claridge and W. Dan Turner, P.I.s, 1 research associate, 6/19/00 - 12/31/02, \$139,371.

"Integrated Commissioning and Diagnostics," Lawrence Berkeley National Laboratory, David E. Claridge, W. D. Turner, and C. Culp, P.I.s, 4 research assistants and 3 research associates, 9/29/00 – 7/31/03, \$725,970.

"Campus-Wide Energy Management Program Rebuild America Initiative," Alamo Community College District, W. Dan Turner, David E. Claridge, Bahman Yazdani, Jeff Haberl, and Malcolm Verdict, P.I.s, 2 research assistants and 3 research associates, 1/14/02 – 8/31/13, \$3,434,152.

"Texas A&M University Support for International Energy Agency Annex 40 on Commissioning of Building HVAC Systems for Improved Energy Performance," US DOE – National Institute of Standards and Technology, David E. Claridge, P.I., 8/8/02 – 12/7/02, \$24,984.

"Western Power Grid – Peak Demand and Energy Reduction Program," Army-Defense Contracting Command, Skip Mills and David E. Claridge, P.I.s, 5/02/02 – 7/01/02, \$508,865.99.

"Intrasystem Agreement between TEES and Prairie View A&M University," Prairie View A&M University, W. Dan Turner, David E. Claridge, Bahman Yazdani and Jeff Haberl, P.I.s, 6/15/02 – 5/31/08; \$1,462,650.

"Extended Services to Terrell State Hospital," Terrell State Hospital, G. Wei, D. Claridge, W.D. Turner, P.I.s, 1 research associate, 09-01-02/08-31-13; \$106,472.



“Western Power Grid Peak Demand and Energy Reduction – Air Force,” Intuitive Research and Technology, D.L. Schneider, W.H. Mills, K.H. Heinemeier, M. Verdict, D. Claridge, and W.D. Turner, P.I.s, 5 research associates, 1 research assistant, 10/01/02 – 9/30/03, \$599,668.

“Dallas/Fort Worth Airport Assessment,” U.S. DOE Golden Field Office, W.D. Turner, B. Yazdani, C.H. Culp, S. Deng, M. Verdict, and D.E. Claridge, P.I.s, \$125,000, 1 research engineers/research associates, 1 grad students, 1/1/03 – 8/31/04.

“Western Power Grid Peak Demand and Energy Reduction Phase II - Navy,” Intuitive Research and Technology, D.L. Schneider, W.H. Mills, D. Claridge, and W.D. Turner, P.I.s, 2 research associates, 01/02/03 – 3/31/04, \$122,371.

“Western Power Grid Peak Demand and Energy Reduction Phase II - Marines,” Intuitive Research and Technology, D.L. Schneider, W.H. Mills, D. Claridge, and W.D. Turner, P.I.s, 2 research associates, 01/02/03 – 3/31/04, \$85,319.

“Site Visit to Conduct Continuous Commissioning Assessment of Hospital at Osan AFB,” Datacraft Inc., D.E. Claridge, P.I., \$5,325, 8/1/03 – 9/30/03.

“Support for International Energy Agency Annex 40 on Commissioning of Building HVAC Systems,” Lawrence Berkeley National Laboratory, D.E. Claridge, P.I., \$23,792, 10/10/03 – 6/30/04.

“Costs and Benefits of Commercial Buildings Commissioning for Energy Savings in the United States,” Lawrence Berkeley National Laboratory, D.E. Claridge, P.I., 1 research associate, \$15,000, 2/9/04 – 10/31/04.

“ABCAT: Automated Commissioning Analysis Tool,” National Association of State Energy Officials, D.E. Claridge and Malcolm Verdict, P.I.s, 1 research associate, 1 research assistant, 7/1/04 – 6/30/07 \$170,000.

“Carnegie Mellon University Advanced Building Efficiency Test Bed Initiative,” Carnegie Mellon University, D.E. Claridge, P.I., Malcolm Verdict, Charles Culp, Jeff Haberl, W.D. Turner, Co-PI’s, 1 research associate, 1 research assistant, 8/31/04 – 12/31/07, \$323,200.

“Dallas Fort Worth Airport Commissioning Assessment,” Texas State Energy Conservation Office, W.D. Turner, B. Yazdani, C.H. Culp, S. Deng, M. Verdict, and D.E. Claridge, P.I.s, \$98,801, 1 research engineers/research associate, 1 grad student, 8/31/04 – 12/31/04.

“Continuous Commissioning Audits, Implementation, Metering, Monitoring at Prairie View A&M,” Prairie View A&M University, W. Dan Turner, David E. Claridge, Bahman Yazdani and Jeff Haberl, P.I.s, 2 research associates, 9/1/04 – 8/31/07, \$108,528.

“CC Assessments – Four Hospitals and Technical Assistance to MedCom Facilities,” Wingler and Sharp, Architects and Planners, Inc., S. Deng, W.D. Turner and D.E. Claridge, P.I.s, 2 research associates, 10/1/04 – 9/29/05, \$90,000.

“Texas A&M University Support for Planned International Energy Agency Annex on Cost-Effective Commissioning for Low Energy Buildings,” Lawrence Berkeley Laboratory; David E. Claridge, P.I., 1 grad student; 03-0-05/93 – 12-31-09; \$304,396.

“Conduct Continuous Commissioning for Sandia National Laboratory,” Sandia National Laboratories; David E Claridge, Song Deng, P.I.s; 1 research associate, 1 grad student; 01-03-05/09-30-06; \$130,071.

“Continuous Commissioning and Energy Assessment for Saks 5<sup>th</sup> Avenue Corporate and Other Retail Facilities;” Accenture; William D. Turner, David E. Claridge, Song Deng, Guanghua Wei, Malcolm E. Verdict, P.I.s; 08-01-05/10-30-05; \$53,850.

“TDCJ Energy Service Performance – Phase I,” D. Claridge, J. Eggebrecht and B. Yazdani, Co-PIs, Texas Department of Criminal Justice, 2 Research Associates, 3/1/07 – 8/31/09, \$125,000.

“Continuous Commissioning<sup>®</sup> of IBM Facilities at East Fishkill and Poughkeepsie, NY,” IBM Global Energy, D.E., Claridge, S. Deng, W.D. Turner and M. Verdict, Co-PIs, 3 Research Associates, 5/30/07 – 5/29/08, \$95,000.

“Continuous Commissioning<sup>®</sup> Assessment of an IBM Facility,” IBM Global Energy, D.E., Claridge, M. Verdict, G. Wei and J. Zhou, Co-PIs, 2 Research Associates, 7/23/07 – 10/31/07, \$11,500.

“Continuous Commissioning<sup>®</sup> Assessment of an IBM Facility,” IBM Global Energy, D.E., Claridge, M. Verdict and J. Zhou, Co-PIs, 1 Research Associate, 1 Research Assistant, 8/21/07 – 12/31/07, \$40,000.

“Continuous Commissioning<sup>®</sup> Assessment of an IBM Facility,” IBM Global Energy, D.E., Claridge, M. Verdict and J. Zhou, Co-PIs, 1 Research Associate, 8/15/07 – 12/31/07, \$25,000.

“Southern Energy Efficiency Center,” M. Verdict, D. Claridge, W.D. Turner, J. Haberl and C. Culp, Co-PIs, Florida Solar Energy Center, Univ. of Central Florida, 1 Research Engineer, 1 Research Assistant, 10/1/07 – 3/31/09, \$145,000.

“Continuous Commissioning of IBM Facility at Tucson, AZ – Initial Assessment,” M. Verdict and D. Claridge, Co-PIs, IBM Global Energy, 1 Research Engineer, 1 Engineering Research Associate, 3/1/08 – 5/31/08, \$20,000.

“Continuous Commissioning of IBM Facility at Boulder, CO – Initial Assessment,” M. Verdict, S. Deng, W. D. Turner and D. Claridge, Co-PIs, IBM Global Energy, 1 Research Engineer, 1 Engineering Research Associate, 2/15/08 – 12/31/08, \$120,000.

“Continuous Commissioning of IBM Facility at Columbus, OH – Initial Assessment,” M. Verdict, D. Claridge, and J. Zhou, Co-PIs, IBM Global Energy, 1 Research Engineer, 1 Engineering Research Associate, 7/25/08 – 12/31/08, \$20,000.

“Continuous Commissioning of IBM Facility at Atlanta, GA,” D. Claridge, G. Wei and M. Verdict, Co-PIs, IBM Global Energy, 2 Research Engineers, 1 Engineering Research Associate, 1 Research Assistant, 9/1/08 – 12/31/08, \$65,000.

“Science Building Renovation and Addition Commissioning,” D. Claridge and J. Martinez, PIs, Texas Women’s University, 1 Research Engineer, 10/1/09 – 12/31/11, \$138,620.

“Residential and Commercial Energy Code Training to Architects, Engineers, City Building Officials, State Agencies, Institutions of Higher Education, School Districts, Local Governments, and the General Public,” B. Yazdani, C. Culp, J. Haberl, and D. Claridge, PIs, State Energy Conservation Office, 2 Research Engineers, 12/1/2009 – 1/31/10, \$59,750.

“Science Building Renovation and Addition Commissioning,” D. Claridge and J. Martinez, PIs, Texas Women’s University, 1 Research Engineer, 10/1/09 – 12/31/10, \$138,620.

“Continuous Commissioning<sup>®</sup> Studies of the Operation and Maintenance of VA VISN 16 Medical Treatment & Medical Research Facilities,” VW International, Inc., D. Claridge and S. Deng, Co-PIs, 3 Research Engineers, 1 Research Assistant, Oct 1, 2009 – Sept. 30, 2011, \$7,778,000.

“Computation of Creditable Emissions Reductions,” Texas Commission on Environmental Quality, B. Yazdani, D. Claridge, C. Culp and J. Haberl, PIs, 2 Research Engineers, 3 GARS, 12/29/07 – 8/31/17, \$1,232,170.

“Review of Design Elements Under DFW Terminal Development Program (TDP),” Dallas-Fort Worth International Airport Board, B. Yazdani, D. Claridge, G. Wei and C. Culp, PIs, 1 student, June 1, 2010 - August 31, 2011, \$250,000.

“Continuous Commissioning Assessment and Implementation for IBM Somers NY,” IBM Global Energy, M. Verdict and D. Claridge, Co-PIs, 0 Students, October 1, 2010 – December 31, 2010, \$85,000.

“Development of Energy Performance Monitoring & Verification for the T-AKE Vessels,” Marine Design Dynamics, Inc., J. Haberl and D. Claridge, Co-PIs, 0 Grad Students, October 6, 2010 - January 20, 2011, \$12,000.

“UTA Continuous Commissioning® Measurement and Verification of Savings,” HHS Associates, LLC, D. Claridge and J.C. Baltazar, Co-PIs, 1 Research Engineer, 1 Research Assistant, Oct 1, 2010 – Nov. 30, 2012, \$24,037.

“ARPA-E: High-Efficiency On-Line Membrane, Air Dehumidifier Enabling Sensible Cooling for Warm and Humid Climates,” ADMA Products, Inc., D. Claridge, P.I., C. Culp, Co-PI, 2 grad students, \$269,965, Nov. 15, 2010 – March 31, 2014.

“TRIP: Commissioning (Cx) Services for Terminal A,” Dallas-Fort Worth International Airport Board, B. Yazdani, J.T. Martinez, D.E. Claridge and C.H. Culp, Co-PIs, 3 Research Engineers, 1 Research Assistant, Mar. 4, 2011 – Sept. 30, 2012, \$895,521.

“CUP Hydraulic Modeling Study for DFW Energy Plaza,” D. Claridge, J. Martinez and B. Yazdani, Co-PIs, Dallas-Fort Worth International Airport Board, 2 Research Engineers, 1 Research Assistant, May 9, 2011 –Jan. 31, 2013, \$121,844.

“Dehumidification Membrane ERV/Air Conditioning System Development,” D.E. Claridge, C.H. Culp and M.B. Pate, Co-PIs, Pacific Northwest National Laboratory, 3 Research Assistants, Oct. 24, 2011 – Mar. 31, 2013, \$200,000.

“Development of Energy Performance Monitoring and Verification for the T-AKE Vessels,” Innovative Decisions, Inc., J. Haberl, D. Claridge and J.S. Baltazar, Co-PIs, 1 Research Engineer, 1 Research Assistant, May 30, 2012 – Aug. 31, 2016, \$388,000.

“Novel Membrane Dehumidifier-enabled Air Cooling,” USDOE ARPA-E Program through ADMA Products, D. Claridge, PI, M. Pate and C Culp, Co-PIs, 2 Research Assistants, May 1, 2013 – April 30, 2014, \$320,000.

“Benchmarking and Profiling Airport Terminal Energy End Uses,” National Academy of Sciences-NRC-TRB-Airport Cooperative Research Program, J. Haberl, PI, B. Yazdani, J. Baltazar and D. Claridge, Co-PIs, 2 Research Assistants, Sept. 16, 2013 – Aug. 31, 2015, \$399,331.

“Project Management Oversight for a Detailed Conditions Valuation of Shelton State Community College’s Martin Campus Main Building,” Sain Engineering Associates, D. Claridge, PI, June 1, 2015 – Oct. 31, 2015, \$12,099.

“Computation of Creditable Emissions Reductions,” Texas Commission on Environmental Quality, J. Haberl, PI, B. Yazdani, D. Claridge, and J. Baltazar, Co-PIs, Aug 31, 2015 – Aug. 31, 2017, \$432,000.

“Campus-Wide Energy Management Program Rebuild America Initiative,” Alamo Community College District, Joseph Martinez, David E. Claridge, Juan-Carlos Baltazar, P.I.s, 2 research assistants and 3 research associates, 9/1/15 – 8/31/16, \$339,049.

“Molecular Membrane Air Conditioner/Dehumidifier,” U.S. DOE ARPA-E, Charles Culp, PI, David Claridge and Michael Pate, Co-PIs, 4/5/16 – 4/4/18, \$2,952,670.

“Preliminary CC Assessment,” Consolidated Edison, David Claridge, PI, Carlos Yagua and Charles Culp, Co-PIs, 3/16/16 – 12/31/16, \$42,351.

“TO-1 Services for TFC Project,” Texas Facilities Commission, David Claridge, PI, Bahman Yazdani and Joseph Martinez, Co-PIs, 7/15/16 – 10/31/19, \$31,256.

“ACCD TO-19 – Energy Management,” Alamo Community College District, Joseph Martinez, PI, David Claridge and Juan-Carlos Baltazar, Co-PIs, 9/1/16 – 8/31/17, \$339,049.

“Fort Hood Net-Zero M&V Project,” Ft. Hood, Jeff Haberl, PI, David Claridge and Juan-Carlos Baltazar, Co-PIs, 12/11/15 – 5/31/17, \$145,371.

“Development of Energy Performance,” U.S. Navy through IDI, Jeff Haberl, PI, David Claridge and Juan-Carlos Baltazar, Co-PIs, 7/1/2016 – 3/31/2017, \$145,553.

“Measurement and Verification Interagency Agreement for Performance Contract, Texas Facilities Commission, D. Claridge, PI, 3/1/2017 – 2/28/2018, \$11,000.

“Continuous Commissioning® Services for VA Hospital, Salem, VA,” ConEdison Solutions, David Claridge, PI, Charles Culp and Carlos Yagua, Co-PIs, 5/2/17 – 9/15/18, \$540,300.

“Continuous Commissioning® Services for VA Hospital, Fayetteville, NC,” ConEdison Solutions, David Claridge, PI, Charles Culp and Carlos Yagua, Co-PIs, 5/2/17 – 9/15/18, \$356,080.

“Continuous Commissioning® Services for VA Hospital, Durham, NC,” ConEdison Solutions, David Claridge, PI, Charles Culp and Carlos Yagua, Co-PIs, 5/2/17 – 9/15/18, \$726,260.

“Continuous Commissioning® On-Site Assessment for Texas Tech Health Science Center, D. Claridge, PI, Charles Culp, Co-PI, 9/1/2017 – 12/31/2017, \$7,869.

“LOA#009: Combined Heat and Power Project Evaluation,” Houston Airport System, D. Claridge, PI, B. Yazdani, Co-PI, 4/2/18 – 9/30/18, \$118,964.

“CC Assessment for New York VA Hospitals,” D. Claridge, PI, Carlos Yagua and Charles Culp, Co-PIs, 8/30/2018 – 5/15/2019, \$328,620.

“Task Order #3: Umbrella TO to Master Agreement M1602944,” Texas Facilities Commission, D. Claridge, PI, 8/31/2018 – 8/30/2019, \$700,000.

“Task Order 23 – Alamo College Energy and Sustainability Management,” Alamo Community College District, Joe Martinez, PI, JC Baltazar and D. Claridge, Co-PIs, 9/1/2018 – 8/31/2019, \$400,981.

“Energy Management and Technical Support Services for the Toronto Pearson International Airport,” Toronto Pearson International Airport, A. Ugursal, PI, D. Claridge, J.T. Martinez, B.Y. Yazdani and J.C. Baltazar, Co-PIs, 10/15/2018 – 12/31/2019, \$62,445.

“Task Order #4 – Review and Update CC Plan,” Texas Facilities Commission, D. Claridge, PI, C. Yagua and J. Martinez, Co-PIs, 1/31/19 – 8/31/19, \$118,860.

“Comprehensive Energy Reduction Program,” City of Houston, B. Yazdani, PI, A. Ugursal, D. Claridge, J. Martinez, J.C. Baltazar and C. Yagua, Co-PIs, 7/5/19 – 11/2/20, \$28,370,167.

“Measurement and Verification for Fayetteville, Durham and Salem VA Sites,” Consolidated Edison Company of New York, Inc., 8/5/19 – 2/2/20, D. Claridge, PI, C. Yagua, Co-PI, \$36,000.

“Statewide Emissions Calculations,” Texas Commission on Environmental Quality, J.C. Baltazar, PI, J. Haberl, D. Claridge and B. Yazdani, Co-PIs, 9/1/19 – 8/31/21, \$432,000.

“CC® Implementation at Three NY VA Hospitals – St. Albans,” Consolidated Edison Company of New York, Inc., D. Claridge, PI, C. Yagua and C. Culp, Co-PIs, 4/16/21 – 5/15/23, \$261,893.

“CC® Implementation at Three NY VA Hospitals - Brooklyn,” Consolidated Edison Company of New York, Inc., D. Claridge, PI, C. Yagua and C. Culp, Co-PIs, 4/28/21 – 4/24/23, \$435,600.

“CC® Implementation at Three NY VA Hospitals - Manhattan,” Consolidated Edison Company of New York, Inc., D. Claridge, PI, C. Yagua and C. Culp, Co-PIs, 6/7/21 – 3/10/23, \$696,600.

“CC® On-site Assessment for Three TxDOT Buildings, Austin HQ Complex,” D. Claridge, PI, B. Yazdani and C. Culp, Co-PIs, 6/10/21 – 6/9/22, \$25,000.

Task Order No. 1 - Central Plant Optimization for TFCs SHB,” Texas Facilities Commission, D. Claridge, PI, J. Martinez, Co-PI, 7/16/21 – 8/31/21, \$124,533.

Statewide Air Emissions Calculations from Wind and Other Renewables, Texas Council on Environmental Quality, J. Baltazar, PI, J. Haberl, D. Claridge and B. Yazdani, Co-PIs, 7/21/21 – 8/31/23, \$432,000.

“Texas A&M University Industrial Assessment Center Award Number: BPAC M2103072,” DOE-Office of Energy Efficiency and Renewable Energy-EERE, B. Rasmussen, PI, C. Baltazar, C. Yagua, D. Claridge, H. Lewis, and J. Eggebrecht, Co-PIs, 9/1/21 – 8/31/22, \$2,249,997.

“Development and Validation of Smart Building Technology Modules for Academic and Professional Education,” Slipstream Group, Inc., Z. O’Neill, PI, D. Claridge, F. Walters and L. Osborne, Co-PIs, 10/1/21 – 12/31/24, \$407,393.

“Measurement and Verification at the Salem, Fayetteville, and Durham VA Medical Centers,” Consolidated Edison Company of New York, D. Claridge, PI, C. Yagua, Co-PI, 12/6/21 – 2/28/22, \$30,000.

“Implementation of UCRMs,” City of Houston, B. Yazdani, P.I., C. Yagua, D. Claridge and J.C. Baltazar, Co-PIs, 3/1/22 – 2/28/23, \$2,161,526.

“SHB CEP Optimization and Building Metering,” Texas Facilities Commission, J. Martinez, PI, D. Claridge and J.C. Baltazar, Co-PIs, 7/1/22 – 8/31/23, \$534,872.

“Continuous Commissioning Assessment for Albany VA Hospital,” Consolidated Edison Company of New York, Inc., D. Claridge, PI, C. Yagua, S. Eluvathingal and C. Culp, Co-PIs, 8/1/22 – 8/1/23, \$72,000.

“Measure Savings from Chiller Retrofit at the Federal Reserve Bank of Dallas,” J. Haberl, PI, D. Claridge and J.C. Baltazar, Co-PIs, 8/15/22 – 8/14/23, \$34,900.

“CC Preliminary Energy Assessment for Denver CO VAMC,” Consolidated Edison Company of New York, Inc., D. Claridge, PI, C. Yagua and S. Eluvathingal, Co-PIs, 9/26/22 – 10/31/22, \$36,500.

"Molecular Membrane Air Conditioner Demonstration," Electric Power Research Institute, C. Culp, PI, D. Claridge, Co-PI, \$71,161.

"VISN 06 LTSA M&V Year 04," Consolidated Edison Solutions, Inc., Carlos Yagua, PI, .....  
2/145/23 – 3/15/23, \$30,000.

"TO 2: M&V TFC ESPC II," Texas Facilities Commission, D. Claridge, PI, 3/1/23 – 5/31/25,  
\$27,000.

"TO 2: Implementation of Equipment Upgrades and Energy Efficiency Measures," B. Yazdani, PI,  
....., 11/1/22 – 10/31/25, \$20,080,000.

"TO 3: M&V TFC ESPC III," Texas Facilities Commission, D. Claridge, PI, 3/1/23 – 5/31/25,  
\$27,000.

"TO 4: M&V TFC ESPC IV," Texas Facilities Commission, D. Claridge, PI, 3/1/23 – 5/31/25,  
\$27,000.

"Computation of Creditable Emissions Reductions," Texas Commission on Environmental Quality,  
J. Haberl, PI, J. Baltazar, D. Claridge and B. Yazdani, Co-PIs, 9/1/23 – 8/31/25.

**b. Internal**

"Energy Conservation Study," University of Colorado Student Recreation Center, four graduate  
students, \$60,214, February, 1984 - March, 1986.

"Measured Energy Impact of Infiltration in a Test Cell," Center for Energy and Mineral Resources, D.  
E. Claridge and W. D. Turner, Co-P.I., one graduate student, \$11,100, September, 1986 - August,  
1987.

"Infiltration Test Cell Work," Engineering Excellence Fund, Texas A&M University, D. E. Claridge,  
P.I., one post-doctoral research associate, \$20,075, March, 1987 - October, 1987.

"Measured Energy Impact of Infiltration in a Test Cell, Continuation," Center for Energy and Mineral  
Resources, Texas A&M University, D. E. Claridge and W. D. Turner, Co-P.I.s, one graduate student,  
\$13,000, September, 1987 - August, 1988.

"Develop an Expert System for Building Energy Management, Energy Systems Industrial  
Consortium, D. E. Claridge, P.I., one graduate student, \$7,500, January, 1988 - August, 1988.

"Develop an Expert System for Building Energy Management," Energy Systems Laboratory  
Industrial Consortium, D. E. Claridge, P.I., one graduate student, \$6,500, August, 1988 - August,  
1989.

"Measured Energy Impact of Infiltration in a Test Cell," Center for Energy and Mineral Resources, D.  
E. Claridge and W. D. Turner, Co-P.I.s, one graduate student, \$11,000, September 1, 1988 - August  
31, 1989.

"Conduct Field Testing of Residential Cool Storage System," ESL Industrial Consortium, D. E.  
Claridge and R. Laster, Co-P.I.s, \$16,550, September 1, 1990 - December 31, 1991.

"Field Testing and Analysis of a Residential Cool Storage System," CEMR, D. E. Claridge, P.I., one  
graduate student, \$11,400, September 1, 1990 - August 31, 1992.

"Analysis of a Residential Cool Storage System," ESL Industrial Consortium, D. Claridge, P.I., one graduate student, \$12,000, January 1, 1992 - May 31, 1993.

"Purchase of DEC 3000 Model 900 Computer System and Software," Mechanical Engineering Equipment Fund, D. Claridge and W.D. Turner, P.I.s, \$22,572, October, 1995.

"Monitoring and Operational Improvements on A&M Campus Buildings," W. D. Turner, D. Claridge, D. O'Neal and J. Haberl, P.I.s, \$1,750,000, 3 graduate students, 3 research associates, June, 1995 - March, 1998.

"Commissioning and Engineering Services for the TAMU Physical Plant Energy Office," Texas A&M Physical Plant Energy Office, W.D. Turner, D. Claridge, D. O'Neal and J. Haberl P.I.s, \$341,000. 1 research engineer, 2 research associates, 6 graduate students, 3/24/97 - 3/23/98.

"Engineering Evaluations of the Central Utility Plant," Texas A&M Physical Plant Utilities Division, W.D. Turner, D. Claridge, J. Haberl, P.I.s, \$225,000. 1 research engineer, 2 research associates, 6 graduate students, 3/24/97 - 3/23/98.

"Physical Plant Engineering Services Agreement," Texas A&M University, D. E. Claridge, W.D. Turner, P.I.s, \$3,990,000, 5 research engineers/research associates, 3 grad students, 8/1/98 – 7/14/03.

"Physical Plant Engineering Services Agreement," Texas A&M University, S. Deng, D. E. Claridge, W.D. Turner, P.I.s, \$1,550,000, 5 research engineers/research associates, 3 grad students, 7/15/03 – 8/31/05.

"TAMU Physical Plant- FY 2006- TAMU Building Energy Management, Plant Performance, Saving Analysis & Field Study;" Texas A&M University, Physical Plant; William D. Turner, David E. Claridge, Jeff Haberl, Song Deng Co-PIs; 6 research engineers/research associates, 5 grad students, 09-01-05/08-31-06; \$999,500.

"FY 2007- TAMU Building Energy Management, Plant Performance, Saving Analysis & Field Study; Texas A&M University, Physical Plant; William D. Turner, David E. Claridge, Jeff Haberl, Song Deng Co-PIs; 6 research engineers/research associates, 5 grad students, 09-01-06/2/29/08; \$1,490,400.

"Retro-commissioning Services (RC) for Mechanical/Electrical Systems," S. Deng, D. Claridge and W. D. Turner, Co-PIs, Texas A&M University, 1 Research Engineer, 5 Engineering Research Associates, 5 Research Assistants 3/1/08 – 8/31/11, \$3,724,982.

"Retro-commissioning Services (RC) for Mechanical/Electrical Systems," J. Watt and D. Claridge Co-PIs, Texas A&M University, 1 Research Engineer, 5 Engineering Research Associates, 5 Research Assistants 9/1/2011 - 8/31/12, \$1,063,995.

"TAMU Building Energy Management," J. Watt, PI, D. Claridge, Co-PI, TAMU Utilities and Energy Services, 1 Research Engineer, 5 Engineering Research Associates, 5 Research Assistants, 12/1/2012 – 8/31/2014, \$1,103,169.

"TAMU Building Energy Management," D. Claridge, PI, J. Baltazar, Co-PI, TAMU Utilities and Energy Services, 2 Engineering Research Associates, 2 Research Assistants, 9/1/2014 – 8/31/16, \$837,755.

"Technology Development and Support Fees," D. Claridge and C. Culp, PIs, 2 Engineering Research Associates, 2 Research Assistants, 1/1/2013 – 8/31/2016, \$518,294.

“Intrasystem Agreement for Engineering and Technical Services,” J. Baltazar, PI, D. Claridge, Co-PI, TAMU Utilities and Energy Services, 1 Engineering Research Associates, 2 Research Assistants, 9/1/2016 – 8/31/2017, \$328,968.

“Intrasystem Agreement for Engineering and Technical Services,” J. Baltazar, PI, D. Claridge, Co-PI, TAMU Utilities and Energy Services, 11/1/2017 – 10/31/2018, \$324,696.

“Intrasystem Agreement for Engineering and Technical Services,” J. Baltazar, PI, D. Claridge, Co-PI, TAMU Utilities and Energy Services, 11/1/2018 – 10/31/2019, \$276,263.

## STUDENT RESEARCH ADVISING

### A. Masters

Chairman of M.S. Committee:

1. M.S. Thomas E. Brubaker, "Retrofit Effectiveness - An Analysis of the 50/50 Retrofit Program in Colorado" 1982
2. M.S. Samuel R. Jewell, "Thermal Performance and Cost Effectiveness of Prototypical Direct Gain Solar House in Denver, Colorado as Influenced by the Slope of the Solar Glazing" 1982
3. M.S. George R. MacDonald, "An Investigation of Variation Between Ground Temperature and Average Air Temperature, Physical Causes, and Impact on Building-Ground Energy Flow" 1983
4. M.S. Bruce Morrison, "A Validation Study of the Un-utilizability Method for Direct Gain Houses" 1983
5. M.S. Peter Oatman, "A Comparison of Five Design Methods for Computing Basement Heat Losses" 1983
6. M.S. Jennifer Adams, "Construction Details for Energy Conservation" 1984
7. M.S. Ednan Hamzawi, "Validation of the Variable-Base Degree-Day Method for Calculating Heat Loads on Residences" 1984
8. M.S. David Madigan, "HVAC Energy Conservation Study for the University of Colorado Recreation Center Utilizing DOE-2.1B Computer Simulation" 1984
9. M.S. Rick Teller, "Parametric Studies Using the Thermal Analysis Research Program" 1984
10. M.S. Jeffrey E. Hall, "An Investigation of Energy Conscious Design for Indoor Heated Swimming Pools Using the Thermal Analysis Research Program" 1985
11. M.S. Moncef Krarti, "Application of a New Approximate Analytical Method to the Ground Coupling Problem" 1985
12. M.S. Richard L. Tillotsen, "Comparison of Two Methods



	for Determining Heating Requirements of a Standard Residential Structure"	1985
13.	M.S. David A. Simms, "System Performance and Cost Studies of Linear Concentrating Fresnel Lens Solar Thermal Collectors"	1985
14.	M.S. William Zwack, "A Comparison of Seasonal Heating Calculations Using the Variable-Base and Standard Degree-Day Methods with Measured Data"	1985
15.	M.S. Robert J. Mowris, "Analytical and Numerical Models for Estimating the Effect of Exhaust Ventilation on Radon Entry in Houses with Basements or Crawl Spaces"	1986
16.	M.S. John F. Canfield, "Retrofitting Interior Lighting Systems"	1986
17.	M.S. Thomas W. Volckhausen, "A Portable Computer Based Building Energy Data Acquisition System"	1986
18.	M.S. Jeffrey Warner, "Use of the Princeton Scorekeeping Method to Evaluate Gas Furnace Retrofits in the Denver Area: Results and Limitations"	1986
19.	M.S. Derek Schrock, "Predicting Energy Usage in a Supermarket"	Dec., 1989
20.	M.S. Norberto Torres-Nunci, "Simulation Modeling of Energy Consumption in the Zachry Engineering Center" (Report)	Dec., 1989
21.	M.S. Ramarao Balasubramanya, "Improvements to the ASHRAE TC4.7 Simplified Energy Analysis Procedure"	Aug., 1990
22.	M.S. Lu Chen, "Developing a Change-Point Principal Component Predictive Model for Energy Use in a Supermarket"	May, 1991
23.	M.S. Michaela Abraham, "Investigations in Cool Thermal Storage: Storage Process Optimization and Glycol Sensible Storage Enhancement" - Co-Chair w/K. Annamalai	Aug., 1993
24.	M.S. Yue Liu, "Measuring Retrofit Savings in Commercial Buildings with Pre-Retrofit Utility Billing Data and Post-Retrofit Sub-Metered Data"	Aug., 1993
25.	M.S. Shilpa Vaidya, "The Measured Energy Impact of Air Leakage on a House"	Aug., 1993
26.	M.S. Kenneth McWatters - Mechanical Engineering, "A Prediction of Energy Savings Resulting from Building Infiltration Control"	May, 1995
27.	M.S. Michelle Schmode - Mechanical Engineering, "Performance of Energy Management Control Systems (EMCS) in Selected LoanSTAR Buildings" - Co-Chair w/J. Haberl	Aug., 1995
28.	M.S. Jinrong Wang - Mechanical Engineering, "Comparison of the Prediction Accuracy of Daily and Monthly Regression Models	

	for Energy Consumption in Commercial Buildings”	May, 1996
29. M.S.	Song Deng - Mechanical Engineering, “Development of a Procedure to Estimate Overall Building and Ventilation Parameters from Monitored Commercial Building Energy Use”	May, 1997
30. M.S.	Jason Fleming - Mechanical Engineering, “Simplified Thermoeconomic Approach to Cost Allocation in a Combined Cycle Cogeneration And District Energy System” - Co-Chair w/J. Haberl	May, 1997
31. M.S.	Guanghua Wei - Mechanical Engineering, “A Methodology for In-Situ Calibration of Steam Boiler Instrumentation”	Aug., 1997
32. M.S.	Eliezer Maldonado - Mechanical Engineering, “Development of a Simplified Model for Cooling and Dehumidifying Coils”	May, 1998
33. M.S.	Wen Yan Wang – Mechanical Engineering, “A Methodology to Develop Monthly Energy Use Models from Utility Billing Data for Seasonally Scheduled Buildings: Application to Schools”	August, 1998
34. M.S.	Joko Santosa – Mechanical Engineering, “The Use of ASEAM 3.0 to Analyze the Potential for Energy Efficiency in Indonesian Commercial Buildings”	August, 1998
35. M.S.	Heather Esmond Camden – Mechanical Engineering, “Recalibration of Baseline Models for LoanSTAR Buildings with Deterioration in Savings Using Data from Texas Capitol Complex Buildings”	August, 1999
36. M.S.	Hui Chen – Mechanical Engineering, “Rehabilitating Missing Energy Use and Weather Data When Determining Retrofit Energy Savings in Commercial Buildings”	December, 1999
37. M.S.	Huanyu Xue – Mechanical Engineering	May, 2000
38. M.S.	Juan-Carlos Baltazar-Cervantes– Mechanical Engineering, “Rehabilitating Missing Energy Use and Weather Data with Splines and Fourier Series”	December, 2000
39. M.S.	Javier O. Rodriguez – Mechanical Engineering, Report - “Simulation and Calibration of Thermal Energy Consumption for the Large Animal Hospital and Research Laboratory Buildings at Texas A&M”	May, 2002
40. M.E.	Asim Tahir – Mechanical Engineering Report – “Simulation and Calibration of Energy Consumption for the Scott M. Matheson Courthouse Complex, Salt Lake City, Utah”	May, 2002
41. M.S.	Young-Jun Nam – Mechanical Engineering Report – “A Procedure to Generate Thermal Utility Billings for Auxiliary Buildings on the TAMU Campus”	May, 2002
42. M.S.	Seung-Uk Lee – Mechanical Engineering, “Automatic Calibration of a Building Energy Performance Model and Remote Fault Detection for Continuous Commissioning Using A Global Optimization Program”	December, 2002
43. M.S.	Sarathy Narasimhan – Mechanical Engineering, Report – “Pressure Control Valves for High-Rise Buildings”	May, 2003

44. M.S.	Timothy Giebler – Mechanical Engineering, “Evaluation of Selected Economizer and Cold Deck Reset Strategies for Dual Duct Single Fan AHUs in Hot and Humid Climates”	August, 2003
45. M.S.	Nabil Bensouda – Mechanical Engineering, “A Procedure for Calibrating Building Energy Simulation Programs”	May, 2004
46. M.S.	Unameheswar Krishnan – Mechanical Engineering, non thesis	August, 2004
47. M.S.	Xiaojie Shao – Mechanical Engineering, “First Law Energy Balance as a Data Screening Tool”	May, 2005
48. M.S.	Chen Xu – Mechanical Engineering, “Hydraulic Modeling of Large District Cooling Systems For Master Planning”	May, 2006
49. M.S.	Frank Painter – Mechanical Engineering, Report “Whole Building Commercial HVAC Systems Simulation for Use in Energy Consumption Fault Detection”	May, 2007
50. M.S.	David Kowalczyk – Mechanical Engineering, Report “The Applicability of Continuous Commissioning® to the Coast Guard: A Pilot Project at USCG SFO Galveston”	May, 2007
51. M.S.	Jonathan M. Curtin – Mechanical Engineering, “Development and Testing of an Automated Building Commissioning Analysis Tool (ABCAT)”	August, 2007
52. M.S.	Kenneth Paul Engan, “A Comparison of Commissioning Savings Determination Methodologies and the Persistence of Commissioning Savings in Three Buildings”	August, 2007
53. M.Eng.	Alaina Jones	August, 2007
54. M.S.	Kathryn Elaine Clingenpeel, “Evaluation of Selected Energy Options for a Sustainable Campus in Texas”	December, 2007
55. M.Eng.	Hiroko Masuda	December, 2008
56. M.S.	Dave Hicks, “Investigation of Consumption Data as a Predictive Tool For CC Assessments”	December, 2008
57. M.S.	John Kimla, “Optimized Fan Control in Variable Air Volume HVAC Systems Using Static Pressure Resets: Strategy Selection And Savings Analysis	December, 2009
58. M.S.	Cory Toole, “The Persistence of Retro-Commissioning Savings in Ten University Buildings”	May, 2010
59. M.S.	Kevin Christman, “Methods for Rapid Estimation of Motor Input Power in HVAC Assessments”	May, 2010
60. M.S.	Jingjing Liu, “Improvements and Applications of the Methodology For Potential Energy Savings Estimation from Retro-Commissioning/ Retrofit Measures”	August, 2010
61. M.S.	Kavita Gangiseti, “Prediction of Room Air Diffusion for Reduced Diffuser Flow Rates”	December, 2010
62. M.S.	Oleksandr Tanskyi, “Analysis of Innovative HVAC System Technologies and Their Application for Office Buildings in Hot and Humid Climates”	December, 2010
63. M.S.	Liang Ma, “Methodology to Analyze the Sensitivity of Building Energy Consumption to HVAC System Sensor Error”	December 2011
64. M.S.	Steven Rivera, “Thermodynamic Modeling of HVAC Plant Cooling Equipment for Quantification of Energy Savings Through Continuous Commissioning® Measures”	December, 2011
65. M.S.	Aditya Kulkarni, “Impact of Continuous Commissioning® on the Energy Star® Rating of Hospitals and Office Buildings”	December, 2011
66. M.S.	Mir Ali, “Optimized Control of Steam Heating Coils”	December, 2011
67. M.S.	Nanxi Li, “Optimizing Air Handler Chilled Water Flow at Low Loads,”	December, 2012
68. M.E.	Kelly Guiberteau, “Navy Project Report”	May, 2014
69. M.S.	Francesco Schaff, “Design and Development of a Vacuum Dehumidification Test Facility” (Co-Chair with Pate)	August, 2014
70. M.S.	Agnes Almeida, “Low Delta-T Syndrome Diagnosis and Correction	

	for Chilled Water Plants”	December, 2014
71. M.S.	Vasiliy Khmelenko, “Performance and Optimization of an Underfloor Air Distribution System in an Educational Building in a Hot and Humid Climate”	May, 2015
72. M.S.	Linyan Wang, “Measuring Whole-Building HVAC System Energy Efficiency”	August, 2015
73. M.S.	Xie Xie, “Modeling and Optimization of Cooling Towers Under Unsaturated Outlet Air Conditions”	August, 2016
74. M.S.	Madison Likins, “A Comparison of WinAM and EnergyPlus Predicted Consumption Due to the Effects of Thermal Mass and Temperature Setback”	August, 2018
75. M.S.	Ryan Hallowell, “Existing Building Commissioning: Exploration of Uses and Impacts”	August, 2018
76. M.S.	Andrew Mackenzie, “Developing a Procedure to Correct WinAM Predictions of Savings from Temperature Setback	December, 2019
77. M.S.	Khanh Cu, “Evaluating and Optimizing Utility Plant Operation Using Trend Data”	May, 2020
78. M.S.	Kushan Abeyawardhane, “Optimization of a Combined Cooling, Heat, and Power Plan Design for Existing Central Utility Plants”	May, 2023
79. M.S.	Akshay Jindal, “Receding Horizon Control of Building Chilled Water Plant – an Integrated Optimization Approach for Chiller Sequencing And Temperature Setpoint Optimization”	May, 2023

## B. Doctorate

Chairman of Ph.D. Committee (completed)

1.	Ph.D.	Jeffrey S. Haberl, "An Expert System for the Analysis of Building Energy Consumption"	1986
2.	Ph.D.	Hong S. Jeon, "An Experimental Investigation of Thermal Frequency Response of a Test Cell"	1986
3.	Ph.D.	Moncef Krarti, "Developments in Ground Coupling Heat Transfer"	1987
4.	Ph.D.	Souvik Bhattacharyya, "The Measured Energy Impact of Air Leakage on Frame Wall Systems"	May, 1991
5.	Ph.D.	Mingsheng Liu, "Study of Air Infiltration Energy Consumption"	Aug., 1992
6.	Ph.D.	John Kelly Kisson, "A Methodology to Measure Retrofit Energy Savings in Commercial Buildings"	Dec., 1993
7.	Ph.D.	Amitava Dhar – Mechanical Engineering, “Development of Fourier Series and Artificial Neural Network Approaches to Model Hourly Energy Use in Commercial Buildings”	May, 1995
8.	Ph.D.	Qianghua Zhou – Mechanical Engineering, “A Real Time Self-Tuning Algorithm for PI Control of the Heating and Cooling Coils of Buildings”	May, 1999
9.	Ph.D.	Sabaratham Tamilseran– Mechanical Engineering, “An Inverse Bin Methodology to Measure the Savings from Energy Conservation Retrofits in Commercial Buildings” (Co-Chair with Haberl)	May, 1999

10.	Ph.D.	Bass Abushakra – Mechanical Engineering, “Short-Term Monitoring, Long-Term Prediction of Building Energy Use”	May, 2001
11.	D.E.	Qiang Chen – “Simulation of Thermal Distribution Loops and Plants on Large Campuses with Investigation of “Minor Losses””	May, 2004
12.	Ph.D.	Yiwen Zhu – “A Methodology To Pre-Screen Commercial Buildings For Potential Energy Savings Using Limited Information”	December, 2005
13.	Ph.D.	Juan-Carlos Baltazar – “A Procedure for Automated Calibration and Determination of Retrofit Potential from Hourly Energy Use Data”	December, 2006
14.	Ph.D.	Xiangyang Gong – “Investigation of a Radiantly Heated and Cooled Office with an Integrated Desiccant Ventilation Unit”	August, 2007
15.	Ph.D.	John Bynum – “Thermodynamic Modeling of a Membrane Dehumidification System”	December, 2012
16.	Ph.D.	Guanjing Lin, “Use of Whole Building Energy Data for HVAC Diagnostics”	December, 2012
17.	Ph.D.	Ian Nelson, “A Numerical Simulations Method of Thermal Load Configuration Effect for Passive Chilled Beams” (Co-Chair with Culp)	December, 2012
18.	Ph.D.	Oleksandr Tanskyi, “Zeolite Membrane Water Vapor Separation for Building Air-Conditioning and Ventilation Systems” (Pate Co-Chaired)	August, 2015
19.	Ph.D.	Wei-Jen Chen, “An Investigation of Optimal Pressurization for Buildings in Hot and Humid Climates”	May, 2017
20.	Ph.D.	Mitchell Paulus, “Active Remote Setpoint Optimization Utilizing BAS Trend Data”	December, 2017
21.	Ph.D.	Hiroko Masuda, “Development of a Data-Driven Model-Based Anomaly Detection Method for Whole Facility Level Energy Use Data Using the Energy Balance Load Variable”	May, 2018
22.	Ph.D.	Clinton Davis, “Building Energy Simulation Using Constrained Optimization” (Co-Chair with Culp)	May, 2019
23.	Ph.D.	Alaina Ruffin, “A Comprehensive Evaluation of the Impact of Continuous Commissioning®”	August, 2019
24.	Ph.D.	Jiajun Liao, “Optimized Heating and Cooling Systems Using Water Heated by Depleted Hydrocarbon Wells”	December, 2019
25.	Ph.D.	Hongxiang Fu, “An Expanded and Updated Framework for Whole-Facility Energy Consumption Statistical Models of Commercial Buildings”	August, 2021
26.	Ph.D.	Ahmed Morsy, “The Impact of Continuous Commissioning® on Peak Electric Demand in Buildings	August, 2022

## SERVICE

## 1. Professional Service

*ASME Journal of Solar Energy Engineering*, Associate Technical Editor, 1996 –2000  
Guest Editor, Special Issue on Conservation and Solar Buildings – Methods for Analysis of Measured Energy Data in Commercial Buildings, *ASME Journal of Solar Energy Engineering*, Vol. 120, No. 3, August, 1998

*International Journal of Energy Research*, Deputy Editor, 1988-97  
Editorial Board, 1998-2005

*Building Simulation: An International Journal*  
Editorial Board, 2007 - 2012

*Journal of Building Performance Simulation*  
Editorial Board, 2008 -

### **American Society of Mechanical Engineers (Fellow)**

Conservation and Solar Buildings Committee, Solar Energy Division, Chairman, 1989-93.  
1995 - International ASME-JSME-Solar Energy Conference, Technical Program Chairman  
Executive Committee, Solar Energy Division, Member 1994- 1999  
Conservation and Solar Buildings Committee, Solar Energy Division, Member, 1995 -  
Secretary-Treasurer, Solar Energy Division 1995-1996  
Vice-Chairman, Solar Energy Division, 1996-1997  
General Chairman for Solar Energy Division Sessions at 1996 IMECE, Atlanta, November 17-22.  
1997 - International ASME-ASES -Solar Energy Conference, General Program Chairman  
Chair, Solar Energy Division, July 1997 – June 1998  
Awards Committee, Solar Energy Division, Member 1999-2000, Chair, 2001  
Energy Committee, Council on Engineering, 2001 - 2008

### **ASHRAE (Fellow) 1981-**

Research Journal Policy Subcommittee of the Publishing and Education Council, Member 11/20 -  
Research Administration Committee, Member, 6/2019 – 7/20  
Presidential Ad Hoc Committee on Operational Excellence, Member, 3/19 – 7/20  
Conference and Exhibitions Committee, 2012 – 2019  
Chair, 2017 - 2018  
Vice-Chair, 2016-2017  
Executive Committee, 2013 – 2019  
Technical Chair, 2015 Annual Meeting, June 27 – July 1, Atlanta  
College of Fellows, Member, 2008 –  
Treasurer, 2010 – 2012, President Elect, 2012, President, 2012 – 2014, Past President, 2014 -  
2015  
ASHRAE Guideline Project Committee 30 which became GPC 1.2 - developed Guideline 0.2,  
“The Commissioning Process for Existing Systems and Assemblies” and then developed  
Guideline 1.2 “The Commissioning Process for Existing HVAC&R Systems,” 2006 – 2019  
Designated Representative of President Wm. Coad to Texas A&M 125<sup>th</sup> Anniversary  
Convocation, 2001  
Handbook Committee, Member 1997 – 2001  
IAQ and Energy '98 Conference Steering Committee, Member, 1996-98  
Special Publications Committee, Member, 1994-1997  
Vice-Chairman, 1995 - 1996, Chairman 1996-1997  
Publications Council, Member 1996-1997  
GPC-14 Guideline Project Committee on Measured Energy Savings, Corresponding Member,  
1996-2001  
TC-9.6 Committee on Systems Energy Utilization, Member, 1993-1996, Corresponding Member,  
1996 -  
TC-9.6 Subcommittee on Performance Monitoring, Chairman, 1992-1996

TC-4.7 Committee on Energy Calculations, Corresponding Member, 1983-84; Member, 1984-95, Secretary, 1990-93, Chairman, 1993-1995, Corresponding Member, 1995 -

TC-4.7 Subcommittee on Natural Heating, Cooling, and Lighting, Member, 1981-1982; Vice-Chairman, 1983; Chairman, 1984-90

TC-4.3 Committee on Ventilation Requirements and Infiltration, Secretary, 1986-88; Member, 1984-88; Corresponding Member, 1988-92

TC-1.5 Committee on Computer Applications, Member, 1989-91, Corresponding Member, 1991- Far East Conference Steering Committee, Member, 1990-91

Presidential Ad Hoc Committee on a Research Journal, Member, 1991-1993

**American Society for Engineering Education**  
Member, 2017 -

**Building Commissioning Association**  
Member, 2017 -

**California Energy Commission Public Interest Energy Research program**, member of Technical Advisory Group for Large Commercial HVAC projects, in the Integrated Energy Systems Productivity and Building Sciences Program, 2001 – 2003.

**Continental Automated Buildings Association**, member, Board of Directors, September, 2014 – 2018.

**International Energy Agency ECBCS Annex 40** on Commissioning of Building HVAC Systems, designated U.S. participant, 2001 – 2004.  
Chairman, Committee D2 on Use of Whole Building Simulation in Commissioning

**International Energy Agency ECBCS Annex 47** on Cost-Effective Commissioning for Existing and Low Energy Buildings, designated U.S. participant, 2005 – 2009  
Co-chair, Subtask C – Cost-Benefit and Persistence, 2005 – 2009

**“NSF Workshop** on Research Needs in HVAC Systems,” Washington, D.C., February 10-11, 1986, Co-Chairman.

**NSF Research Needs Workshop: Building Systems Integration for Performance and Environmental Quality**, October 6-7, 1997, participant and panel chair for afternoon session on “Computational Tools and the Building Delivery Process.

**Pacific Gas and Electric, Pacific Energy Center**, invited participant in “‘Cool Tools’ Thermal Cooling Load Profile Development Workshop,” October 30, 1998, San Francisco, California.

**Reviewer** for *ASHRAE Journal*, *ASHRAE Transactions*, *ASME Journal of Solar Energy Engineering*, *Energy and Buildings*, *International Journal of Heat and Mass Transfer*, *Journal of Building Performance and Simulation*, American Solar Energy Society *Progress in Passive Solar*, University of California University-Wide Energy Research Group National Science Foundation; Texas A&M Center for Energy and Mineral Resources.

**Society of Heating, Air-Conditioning and Sanitary Engineers of Japan, 2011 -**  
Honorary International Member

**Southwest Partnership for Energy Efficiency as a Resource**, member, Board of Directors, Feb., 2013 – 2019.

**Texas A&M University, Kingsville**, Founding Member of Advisory Board, Architectural Engineering Program, Dotterweich College of Engineering, 2010 – Present

**U.S. Department of Energy**, “Workshop on HVAC Systems Research,” Washington, D.C., conducted for DOE by Battelle/Pacific Northwest Laboratory, December 9, 1987, Invited Participant.

**U.S. Department of Energy**, member of Technical Committee for development of *North American Energy Measurement and Verification Protocol*, 1995 - 1997.

**U.S. Department of Energy**, member of Technical Subcommittee for development of *International Performance Measurement and Verification Protocol*, 1997-2001.

**U.S. Department of Energy**, Invited Participant in Quadrennial Technology Review, Nov. – Dec., 2014.

**U.S. Department of Energy**, peer reviewer for *Quadrennial Technology Review*, Feb – Mar., 2015.

**U.S. Department of Energy**, Building Technologies Office, member of National Lab Merit Review panel, April 16-17, 2015.

**University of Minnesota**, Minnesota Building Research Center, External Review Committee - Member, October, 1991.

**University of California-Berkeley**, California, Institute of Energy Efficiency, External Review Committee - Member, January, 1993.  
External Review Committee - Member, February, 1996.

**Conferences:**

**American Association of Airport Executives Energy Conference**, Member, Advisory Board, Jan., 2013 – 2017.

**Joint Meeting of 2<sup>nd</sup> European Conference on Energy Performance and Indoor Climate in Buildings and 3<sup>rd</sup> International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings**, 1999, member of conference Scientific Committee.

**2nd International Conference on IAQ, Ventilation and Energy Conservation in Buildings**, May 10-12, 1995, Member, International Technical Advisory Committee

**Symposium on Improving Building Systems Efficiency in Hot and Humid Climates**

Director and Technical Program Chairman, Eighth Symposium, Dallas, Texas, September 13-14, 1988.

Director and Technical Program Chairman, Eighth Symposium, Dallas, Texas, October 3-4, 1989.

Director and Technical Program Chairman, Eighth Symposium, Dallas, Texas, October 9-10, 1990.

Director and Technical Program Chairman, Eighth Symposium, Dallas, Texas, May 13-14, 1992.

Director and Technical Program Chairman, Ninth Symposium, Arlington, Texas, May 19-20, 1994.

Member, Organizing Committee, Tenth Symposium, Fort Worth, Texas, May 13-14, 1996.

Member, Organizing Committee, Eleventh Symposium, Fort Worth, Texas, June 1-2, 1998.

Member, Organizing Committee, Twelfth Symposium, San Antonio, Texas, May 15-16, 2000.

**International Conference for Enhanced Building Operation**

Chair of Organizing Committee for 6<sup>th</sup> Conference held in Shen Zhen, China, November 6-8, 2006.

Executive Committee Member for 8<sup>th</sup> Conference held in Berlin, Germany, October 22-24, 2008

Executive Committee Member for 10<sup>th</sup> Conference held in Kuwait City, Kuwait, October 24-25, 2010

Executive Committee Member for 11<sup>th</sup> Conference held in New York, NY, October 18-20, 2011

**International Conference on Building and the Environment**

Member of International Scientific Committee for 1<sup>st</sup> Conference held in Dalian, China, August 4-6 2008

**International Conference on Sustainable Development in Building and Environment**

Member of Scientific Committee for 2009 conference held in Chongqin, China, October 28-30, 2009

**International Conference on Sustainable Urbanization**

Member of Scientific Committee for 2009 conference held in Hong Kong, Dec. 17-19, 2009

**9<sup>th</sup> International Conference on Improving Energy Efficiency in Commercial Buildings and**

**Smart Communities (IEECB&SC'16)**, Member of International Programme Committee, Mar. 16 – 18, 2016, Frankfurt, Germany

**Session Chairman for:**

"Technical Session on Analysis Methods for Monitored Building Energy Use," Second ASME-JSES-JSME International Solar Energy Conference, Reno, Nevada, March 17-22, 1991.

"Panel on Successes in Passive Buildings," ASME Winter Annual Meeting, December, 1991, Atlanta.

"Analysis of Continuously Measured Energy Data in Commercial Buildings - Session I," ASME International Solar Energy Conference, San Antonio, Texas, March 31 - April 3, 1996.

"Analysis of Continuously Measured Energy Data in Commercial Buildings - Session II," ASME International Solar Energy Conference, San Antonio, Texas, March 31 - April 3, 1996.

"Ventilation and Energy," ASHRAE IAQ and Energy '98 Conference, New Orleans, Louisiana, October 24-27, 1998.



Panel Co-Leader (10 sessions), 1998 ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA, August, 1998.  
 Panel Co-Leader (11 sessions), 2000 ACEEE Summer Study on Energy Efficiency in Buildings, Pacific Grove, CA, August, 2000.  
 International Conference on Building Envelope Systems and Technology, June 26-29, 2001, Ottawa, Session chair for "Impact on Indoor Environment."

### **Invited Significant Seminars or Lectures**

1. "Institutional Factors and Government Policies Relating to Solar Energy Utilization and Storage," Plenary Working Meeting, Committee on Advanced Energy Storage Systems," Solar Energy Plan, National Research Council, Washington, D.C., August 9, 1978.
2. "Technology and Applications for Low Temperature Heat Engines," Nitinol Heat Engine Conference, Naval Surface Weapons Center, Silver Spring, Maryland, September 26-27, 1978.
3. Invited Participant, Response Panel, "Long-Range Energy Options--the Next Twenty Years," Conference on Energy Options for Industrial Users and Suppliers, California Institute of Technology, Pasadena, California, April 18-20, 1979.
4. "Can We Halve Energy Use in Buildings and be More Comfortable?" presented as the Quarterly Interdisciplinary Colloquium at Walla Walla College, April 13, 1981.
5. "Saving Energy in the Home," Alumni Seminar presented at Walla Walla College, April 20 and 22, 1984.
6. "Expected Impact of Energy Considerations on the Building Construction Industries," presented to the Panel on Technology Changes and Impacts on the Building Industry, August 29 and 30, 1984, Office of Technology Assessment (OTA), U.S. Congress, Washington, D.C.
7. "Passive Solar Heating," presented at American Physical Society Workshop, April 28, 1985, Washington, D.C.
8. "An Approximate Analytic Solution to the dynamic Building-to-Ground Heat Transfer Problem," presented at the Center for Energy and Environmental Studies, Princeton University, December 9, 1985.
9. "An Approximate Analytic solution to the Dynamic Building-to-Ground Heat Transfer Problem," presented at the Lawrence Berkeley Laboratory, University of California, January 16, 1986.
10. "An Approximate Analytic Solution to the Dynamic Building-to-Ground Heat Transfer Problem," Seminar for the School of Mechanical Engineering, Purdue University, March, 1986.
11. "An Approximate Analytic Solution to the Dynamic Building-to-Ground Heat Transfer Problem," Seminar for the Department of Mechanical Engineering, Texas A&M University, March, 1986.
12. Claridge, D. E., Plenary presentation "Building-to-Ground Heat Transfer," at 1986 Annual Meeting, American Solar Energy Society, Boulder, Colorado, June 11-14, 1986.
13. "Overview of Passive Solar Heating," presented at the Korea Institute of Energy and Resources, Taejon, June 25, 1987.
14. "Changing Views of Renewable Energy," presented at the Asian Chemical Congress '87, Seoul, Korea, July 3, 1987.
15. Claridge, D. E., "Energy Efficiency Research at the Texas A&M Energy Systems Laboratory," Staff Seminar, North Carolina Alternative Energy Corporation, Research Triangle Park, North Carolina, May 19, 1988.
16. Claridge, D. E., "Infiltration Research and Ventilative Effects on Building Loads," Texas Agricultural Extension Service Conference, College Station, Texas, July 13, 1988.
17. "Summary of Energy Efficiency on Infiltration, Design Evaluation and Energy Consumption Analysis at Texas A&M," presentation to the Houston Chapter of the Association of Energy Engineers, September 14, 1988.
18. "The College Station, Texas Residential Energy Code," at the Residential Energy Forum Technical Conference, Research Triangle Park, North Carolina, April 25-27, 1989.
19. "Energy Conservation in the United States," Engineering Seminar at Walla Walla College, College Place, Washington, April 24, 1989.
20. "Can 'Big Brother' Increase Energy Efficiency in Buildings?" seminar presented to the Department of Mechanical Engineering, University of Washington, April 5, 1990.

21. "The Texas LoanSTAR Monitoring and Analysis Program," presented at the U.S. DOE, August 4, 1990 for Deputy Assistant Secretary Milhorne and staff.
22. "Analyzing LoanSTAR Data," presented at the U.S. DOE, March 27, 1991, for Deputy Assistant Secretary Milhorne and DOE and Federal Agency staff.
23. "Infiltration Heat Exchange in Frame Walls and Components," Building Technology Seminar, Department of Architecture, March 28, 1991, Massachusetts Institute of Technology.
24. "The Texas LoanSTAR Program: Overview and Preliminary Monitored Savings," Office of Technology Assessment, U.S. Congress, October 11, 1991.
25. "The Texas LoanSTAR Program: Overview and Preliminary Monitored Savings," University of Minnesota Building Research Center Seminar, October 25, 1991.
26. "The Texas LoanSTAR Program: Overview and Preliminary Monitored Savings," Tongji University, Shanghai, Peoples Republic of China, November 12, 1991.
27. "The Texas LoanSTAR Program: Overview and Preliminary Monitored Savings," Harbin Architectural and Civil Engineering Institute, Harbin, Peoples Republic of China, November 15, 1991.
28. "Energy Saving Retrofits in Buildings - The Texas LoanSTAR Program," presented at the ASME ECO-World '92 Conference, Washington, D.C., June 14-19, 1992.
29. "Retrofit Savings in the Texas LoanSTAR Program," DOE/EPRI Conference on Energy Efficient Electric Motor Systems, Baltimore, Maryland, February 9-10, 1993.
30. "Evaluating Program Success," Conference on Institutional Building Energy Conservation, University of Minnesota, May 3-5, 1993.
31. "Heat Recovery in Building Walls," Oak Ridge National Laboratory Buildings Division Seminar, January 13, 1994.
32. "Use of Monitored Energy Data to Improve Retrofit Performance," University of Washington Mechanical Engineering Department seminar, April 22, 1994.
33. "Can You Achieve 150% of Predicted Retrofit Savings: Is It Time for Recommissioning?" Spotlight presentation at ACEEE 1994 Summer Study on Energy Efficiency In Buildings, Pacific Grove, CA, August 30, 1994.
34. "Can You Achieve 150% of Predicted Retrofit Savings: Is It Time for Recommissioning?" presented as a seminar to the Institute for Research in Construction of the National Research Council Canada, Ottawa, Ontario, CANADA, May 15, 1995..
35. "Energy Calculations for Analyzing Energy Savings from HVAC Modifications," presented at the ASHRAE seminar on "Energy Calculations for Measurement Analysis," Chicago, IL, January 31, 1995.
36. "Can You Achieve 150% of Predicted Retrofit Savings: Is It Time for Recommissioning?" presented as a seminar to the Advanced Engineering Development Group, Corporate Headquarters, Carrier Corp., Syracuse, NY, May 18, 1995..
37. "Use of Simplified Calibrated Simulation Models for System Diagnostics and Retrofit," presented at the ASHRAE seminar on "Innovative Uses of Building Energy Simulation Programs II," San Diego, CA, June 28, 1995.
38. "Measurement of Energy Savings Using a Whole-Building Before-After Approach," presented at the ASHRAE seminar on "Measurement of Energy and Demand Savings -- ASHRAE Guideline 14P," Winter Meeting, Atlanta, GA, February 21, 1996.
39. "Can You Achieve 150% of Predicted Retrofit Savings: Is It Time for Recommissioning?" presented as a seminar at the Korea Institute of Energy Research, Taejon, March 5, 1996.
40. "The Texas LoanSTAR Program: Enhancing Retrofit Performance with Savings Measurement" presented as a seminar at the Korea Institute of Energy Research, Taejon, March 6, 1996.
41. "Using Building Energy Data to Measure Retrofit Savings and Diagnose Operating Problems," presented as a seminar at the Korea Institute of Energy Research, Taejon, March 6, 1996.
42. "The Measured Energy Impact of Air Leakage," presented as a seminar at the Korea Institute of Energy Research, Taejon, March 7, 1996.
43. "The Interzone Temperature Profile Estimation Method for Ground Coupled Heat Transfer: Methodology and Comparisons with the Mitalas and Bahnfleth Methods," presented as a seminar at the Korea Institute of Energy Research, Taejon, March 7, 1996.

44. "The Texas LoanSTAR Program: Enhancing Retrofit and Building Performance with Measured Energy Data," presented as a seminar to the Energy and Nuclear Engineering Department at Cheju National University, Cheju City, Korea, March 8, 1996.
45. "Using Measured Energy Data to Diagnose Operating Problems in Buildings," presented to the Taejon Chapter of the Korea Society of Heating, Refrigerating and Air Conditioning Engineers, Taejon, March 12, 1996.
46. "The Texas LoanSTAR Program: Enhancing Retrofit and Building Performance with Measured Energy Data," presented as a seminar to the Department of Mechanical Engineering at Korea University, Seoul, Korea, March 13, 1996.
47. "The Texas LoanSTAR Program: Enhancing Retrofit and Building Performance with Measured Energy Data," presented as a seminar to the College of Engineering, Yonsei University, Seoul, Korea, March 8, 1996.
48. "Overview, Status and Applications of Analysis of Measured Energy Data in Commercial Buildings" presented at the 1996 ASME International Solar Energy Conference, March 31 - April 3, San Antonio, Texas.
49. "Use of Fourier Series and Extensions in Savings Measurement" presented at the 1996 ASME International Solar Energy Conference, March 31 - April 3, San Antonio, Texas.
50. "HVAC Research from Concept to Application," invited presentation to Houston ASHRAE Chapter for Research Promotion Day, September 25, 1996.
51. "Energy Conservation Technologies for Commercial Buildings: Experiences from the Texas LoanSTAR Program," presented to the United Nations Workshop on Energy Codes, Bangkok, Thailand, November 6, 1996.
52. "Processes Used in Performing Successful Energy Audits," presented at the Workshop on Improving Energy Efficiency in Commercial Buildings sponsored by the National Energy Policy Office of Thailand, Bangkok, November 7-8, 1996.
53. "Introduction to Energy Efficient Technologies for Regionally Appropriate Solutions," presented at the Workshop on Improving Energy Efficiency in Commercial Buildings sponsored by the National Energy Policy Office of Thailand, Bangkok, November 7-8, 1996.
54. "Advanced Approaches for Energy Efficient Buildings," presented at the Workshop on Improving Energy Efficiency in Commercial Buildings sponsored by the National Energy Policy Office of Thailand, Bangkok, November 7-8, 1996.
55. "Perspectives on HVAC Education," as recipient of the E.K. Campbell Award to the ASHRAE Life Members Luncheon, January 20, 1998, San Francisco, California.
56. "Is It Worth Commissioning Existing Campus Buildings? Experiences at Texas A&M," presented to the Annual Meeting of Texas Association of Physical Plant Administrators, April 27, 1998, College Station, Texas.
57. "Energy and Comfort Benefits of Continuous Commissioning in Buildings," at the International Conference on Improving Electricity Efficiency in Commercial Buildings, 21-23 September, 1998, Amsterdam, The Netherlands.
58. "An Integrated Approach to Building Design and Operation," Lawrence Berkeley National Laboratory Buildings Division Seminar, April 9, 1999, Berkeley, CA.
59. "Whole Building Diagnostics," Workshop on Diagnostics for Commercial Buildings: Research to Practice, San Francisco, CA, June 16-17, 1999.
60. "Monitoring Buildings for Performance Assurance and Accounting," *ABST 2000: Advanced Building Systems Technology Conference and Exposition*, Washington, D.C., June 6-8, 2000.
61. "Engineering Fundamentals in Building Operation," Department of Mechanical Engineering, Canterbury University, Christchurch, New Zealand, August 24, 2000.
62. "Continuous Commissioning<sup>SM</sup> for Comfort and Efficiency," special seminar sponsored by the New Zealand Energy Efficiency and Conservation Authority, the New Zealand Energy Management Association and the School of Architecture at Victoria University, Wellington, NZ, September 12, 2000.
63. "Calibrating AHU Models Using Whole Building Cooling and Heating Energy Consumption Data," seminar at the Building Research Authority of New Zealand, September 13, 2000.
64. "Introduction to the Continuous Commissioning Process," International Conference on Enhanced Operation for Buildings, Austin, Texas, July 18, 2001.

65. "Use of Whole Building Simulation in Commissioning," International Energy Agency Annex 40 meeting, Quebec City, Canada, September 27, 2001.
66. "Measurement Methods for Existing Buildings as Used in Continuous Commissioning<sup>SM</sup>," International Energy Agency Annex 40, Quebec City, Canada, September 27, 2001.
67. "Improved VAV AHU Control Schedules," Applications Engineering Group, Trane Company, LaCrosse, WI, April 19, 2002.
68. "Monitoring, Modeling and Data Analysis for Commissioning," ASHRAE seminar presentation at ASHRAE Winter Meeting, January 29, 2003, Chicago, IL.
69. "Continuous Commissioning<sup>SM</sup> Overview and Case Studies," presented at RECOM-Canada 2003, Sponsored by Public Works Canada, Ottawa, February 12-13, 2003.
70. "Using Whole Building Simulation Models in Commissioning HVAC Systems," presented at Belgian Royal Association of Heating, Ventilation and Air Conditioning Workshop, Brussels, Belgium, October 2, 2002.
71. "Commissioning of Existing Buildings – State of the Technology and It's Implementation," International Short Symposium on HVAC Commissioning, Kyoto, Japan, April 8, 2003.
72. "Procedures for Calibrating Simulations," presented to International Energy Agency Annex 40 meeting, Kyoto, Japan, April 9, 2003.
73. "Using Engineering Effort and Fundamentals in An Integrated Approach to Practical Optimization of HVAC Operation," Mechanical Engineering Department, Georgia Institute of Technology, Atlanta, GA, May 14, 2003.
74. "Use of Calibrated Simulation to Improve Building Operations," ASHRAE seminar presentation at ASHRAE Winter Meeting, January 27, 2004, Anaheim, CA.
75. "Why Do You Need an Engineer to Solve Simple Problems," Engineering Seminar at Walla Walla College, April 26, 2004.
76. "Retro-Commissioning Training," ASHRAE seminar presentation at ASHRAE Annual Meeting, June 30, 2004, Nashville, TN.
77. "Post-Design Applications of Simulation in Buildings," Keynote plenary presentation at *SimBuild 2004*, the First National Conference of the International Building Performance Simulation Association-USA, Boulder, CO, August 4-6, 2004.
78. "Costs and Benefits of Commissioning New and Existing Buildings: Recent Activities in the US," presented at the International Energy Annex 40 Workshop, Paris, France, October 21, 2004.
79. "Comparison of Five Techniques for Filling 1-6 Hour Gaps in Temperature, Heating and Cooling Data," presented Seminar 36 of the ASHRAE Winter Meeting, Feb. 2-5, 2005, Orlando, FL.
80. "Use of Engineering Fundamentals and Intuition in An Integrated Approach to Practical Optimization of HVAC Operation," presented to Houston ASHRAE Chapter, April 26, 2005.
81. "When do You Need Engineering Fundamentals in Building Operation? – or - The Limits of Intuition," presented to the Department of Thermal Engineering, Harbin Institute of Technology, July 7, 2005, Harbin, China.
82. "Post-Design Applications of Simulation in Buildings," presented to the Department of Thermal Engineering, Harbin Institute of Technology, July 8, 2005, Harbin, China.
83. "An Overview of Monitoring and Verification," presented to the Department of Thermal Engineering, Harbin Institute of Technology, July 11, 2005, Harbin, China.
84. "Post-Design Applications of Simulation in Buildings," presented to the Institute for Research in Construction, National Research Council of Canada, Ottawa, Ontario, Canada, August 18, 2005.
85. "Calibrating Building Energy Simulations Using Characteristic Signatures," in Seminar 43, "How and Why to Calibrate a Simulation to Measured Data" at ASHRAE Winter Meeting, January 24, 2006, Chicago, IL.
86. "Costs and Benefits of Commissioning: The Need for Life-Time Commissioning," presented to the Norwegian National Seminar on Life-Time Commissioning for Energy Efficient Operation of Buildings Trondheim, Norway, April 6, 2006.
87. "Continuous Commissioning® in the Austin Energy Building Tune-up Program," at the Engineering Green Buildings Conference, Austin, Texas, September 19, 2006
88. "Commissioning Existing Hospitals: What are the Opportunities?," at the Labs 21 2006 Conference, San Antonio, TX, October 17-19, 2006.

89. "Continuous Commissioning® Process and Technology," presented to the National Building Energy Audit and Management Seminar, sponsored by The Society of Air-Conditioning and Refrigerating Engineers of Korea (SAREK), Seoul, Korea, November 3, 2006.
90. "Continuous Commissioning® Applications and Case Studies," presented to the National Building Energy Audit and Management Seminar, sponsored by The Society of Air-Conditioning and Refrigerating Engineers of Korea (SAREK), Seoul, Korea, November 3, 2006.
91. "Buildings, Commissioning, and CO2," Plenary Keynote presentation at the Asian-Pacific Conference on Building Commissioning, Shenzhen, China, November 7, 2006.
92. "Commissioning: World Status and Practices," Closing Address at the Asian-Pacific Conference on Building Commissioning, Kyoto, Japan, October 26, 2007.
93. "Building Simulation for Practical Operational Optimization, presented to State of Art in Building Simulation Seminar, Rio di Janeiro, Brazil, November 3, 2008.
94. "ABCAT - A Tool for Aiding the Persistence of Energy Efficiency in Buildings," Architectural Engineering Seminar, Pennsylvania State University, April 3, 2009.
95. "Continuous Commissioning Benefits and ABCAT - A Prototype Tool for Aiding the Persistence of Energy Efficiency in Buildings," invited Engineering and Science Seminar, Walla Walla University, May 5, 2010.
96. "Use of Whole-Building Simulation for Fault Detection and Diagnostics in On-Going Commissioning," GSA Workshop on Commissioning of Existing and New Buildings, May 21, 2010, Washington, D.C.
97. "Important Measures Identified After the Existing Building Commissioning Assessment," Seminar presentation at ASHRAE Meeting, Albuquerque, NM, June 29, 2010.
98. "Bridging the Gap: Realizing the Full Potential of Existing Building Commissioning By Identifying Rapid Payback Building Retrofits," Invited Seminar, U.S. DOE ARPA-E Program and EERE Buildings Program Seminar, Washington, D.C., June 17, 2010.
99. "Exploring the Limits of Energy Efficiency," Keynote at International Conference for Enhanced Building Operation, Kuwait City, Kuwait, October 24, 2010.
100. "Exploring the Limits of Energy Efficiency in Office Buildings," Emerging Technologies Summit, Sacramento, CA, Nov. 9-10, 2010.
101. "Exploring the Limits of Energy Efficiency in Office Buildings," The Physics of Sustainable Energy, American Physical Society, Berkeley, CA, March 5-6, 2011.
102. "Important Measures Identified After the Existing Building Commissioning Assessment," 2011 Commercial Real Estate Expo, Kansas City, MO, May 11, 2011.
103. "The Role of Existing Building Commissioning and Pitfalls in Selecting Commissioning Measures," Building Services Commissioning Association of Japan Workshop, Nagoya, Japan, May 16, 2011.
104. "Exploring the Limits of Energy Efficiency in Office Buildings," Building Services Commissioning Association of Japan Workshop, Tokyo, Japan, May 19, 2011.
105. "Exploring the Limits of Energy Efficiency in Office Buildings," Toward Intelligent Net Zero Energy Buildings Symposium, Natural Resources Canada, Varennes, Quebec, Canada, June 30, 2011.
106. "Retro-Commissioning: Examples and Ongoing Commissioning," Govenergy 2011, Cincinnati, OH, August 7-10, 2011, David Claridge,
107. "Exploring the Limits of Energy Efficiency in Office Buildings," Keynote at International Symposium on Heating, Ventilating and Air Conditioning (ISHVAC2011), Tongji University, Shanghai, China, Nov. 6-9, 2011.
108. "Continuous Commissioning/Ongoing Commissioning," American Association of Airport Executives Energy Forum, West Palm Beach, FL, Feb. 16-17, 2012.
109. "What is the Ultimate Minimum Energy Level Needed?," American Institute of Architects/National Institute of Building Sciences, Building Energy Science and Technology 3 Conference, Atlanta, GA, April 3-4, 2012.
110. "What About Continuous Commissioning® in Canada?" Indoor Environment Program Seminar, National Research Council Canada, Ottawa, Ontario, Canada, Sept. 24, 2012.
111. "Continuous Commissioning®," Clean Air Through Energy Efficiency Conference, Galveston, TX, Oct. 10, 2012.

112. "Continuous Commissioning® Experiences from Texas," The Problem with Greening the Existing Buildings Stock: Experiences from Texas, Seoul and Doha, Qatar Green Buildings Council, Doha, Qatar, Oct. 17-18, 2012.
113. "Exploring the Limits of Energy Efficiency and Demand Reduction in Office Buildings," 2013 SEC Symposium, Atlanta, GA, Feb. 10-12, 2013.
114. "Exploring the Limits of Energy Efficiency and Demand Reduction in Office Buildings," Pacific Northwest National Laboratory Energy Systems & Technologies Building Seminar Series, Richland, WA, April 8, 2013.
115. "Exploring the Limits of Energy Efficiency and Demand Reduction in Office Buildings," Walla Walla University Engineering Seminar, April 8, 2013.
116. "The Impact and Promise of Energy Efficiency," Frank Dotterweich College of Engineering Seminar, TAMU Kingsville, October 30, 2015.
117. "The Impact and Promise of Energy Efficiency," Texas A&M University Mechanical Engineering Seminar, March 30, 2016.
118. "Molecular Membrane Air Conditioning: Refrigerant Free! Cool!" Texas A&M Energy Institute Lecture Series, October 26, 2016.
119. "Assessments for the Existing Building Commissioning Process," Texas Chapter of the Building Commissioning Association webinar, November 17, 2016.
120. "Energy Systems Laboratory Overview," 2016 American Council for an Energy Efficient Economy Intelligent Efficiency Conference, Austin, TX, December 4-6, 2016.
121. "Molecular Membrane Air Conditioning: Refrigerant-Free! Cool!," College of Engineering Seminar, University of Wyoming, April 14, 2017.
122. "Using Calibrated Simulation for Practical Optimization of Building Operation," International Building Performance Simulation Webinar, June 1, 2017.
123. "Energy Modeling," 7<sup>th</sup> Annual USGBC Texas Energy Summit, Houston, TX, Oct. 12, 2017.
124. "Molecular Membrane Air Conditioning: Refrigerant-Free! Cool!" Mechanical Engineering Seminar, University of Oklahoma, March 4, 2020.
125. "Molecular Membrane Air Conditioning Technology for Data Centers," Data Center World Conference, August 25, 2020.
126. "Membrane Dehumidification," Massachusetts Institute of Technology Innotherm Seminar, October 27, 2020.
127. "Membrane Dehumidification," DOE Low Temperature Industrial Processes Workshop, Virtual, February 3, 2021.
128. "Efficient Dehumidification Using Membranes in the CCL Process," North American Membrane Society 2021 Conference, Estes Park, CO, August 31, 2021.
129. "Building Operation and Continuous Commissioning®," College of Engineering Seminar (Virtual), National Taiwan Normal University, November 17, 2021.
130. "Smart Technologies and Energy Efficiency: Leveraging Digitalization to Optimize Resource Allocation," Invited Panelist, Texas A&M Conference on Energy, College Station, TX, September 28-29, 2023.

## University Service

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| University: | CEMR Advisory Committee for Energy Conservation Focus, 1988-1992<br>Faculty Review Panel, Energy Resources Program, CEMR, 1993.<br>Faculty Review Panel, Energy Resources Program, CEMR, 1994.<br>AFS Awards Committee, 2004<br>AFS Awards Committee, 2008<br>AFS Awards Committee, 2013 |
| College:    | Post-Tenure Review Implementation Committee, 1997<br>TEES Web Page Committee, 1997<br>Faculty Awards Committee, 1997<br>Nuclear Engineering Department Head Search Committee, Member, 2006 – 2007<br>College of Architecture Facilities Management Certificate Council, Member, 2007 -   |

College of Engineering Tenure and Promotion Advisory Committee, 2011 – 2014  
TEES Research Professors Advisory Committee, Member, 8/14 –  
Architectural Engineering Program Development Committee, Chair, Jan., 2014 -

Department: Graduate Advisory Committee, 1987-89.  
Graduate Heat Transfer Ph.D. Qualifying Exam Committee, Member, 1991-98, Chair,  
1995-98, 2002 - 2003  
Post-Tenure Review Implementation Committee, Chair, 1997  
Departmental Guidelines Committee, 1997  
Ad hoc Student Grade Appeal Committee, Chair, 1998  
Post Tenure Review Committee, Member, 1998 – 2002, 2010 -12  
Faculty Search Committee, Member, 1998-99.  
Thermal-Fluids Faculty Search Committee, Member, 1999-2000  
Advisory Committee, Member, 2000-2006  
HVAC Faculty Search Committee, Chair, 2005  
Graduate Thermodynamics Ph.D. Qualifying Exam Committee, Member, 2005-07,  
Chair, 2007, Member 2008 – 2010, Chair, 2013-2014, Member, 2014 - 2016  
Tenure and Promotion Committee, Member, 2004 – 2007, 2010 - 2012  
Chair 2007  
Graduate Committee, Member, 2007 – 2009  
Dietz Developmental Professorship Committee, Chair, 2007  
Honors and Awards Committee, Chair, 10/14 – 9/15, Member 9/12-9/14  
Climate Committee, Chair, 9/18 – 8/21  
Mentoring Committee, Member, 9/23 - present

### **Professional Outreach**

“Workshop on Commissioning and Performance Contracting in Schools,” State Energy Conservation Office of Texas, San Antonio, Texas, February 20, 1998 (with M. Liu).

“Workshop on Commissioning for State Agencies,” State Energy Conservation Office of Texas, Houston, Texas, May 28-29, 1998 (with M. Liu).

“Workshop on Commissioning Campus Facilities,” Pennsylvania State University, July 22-24, 1998, (with M. Liu).

“Workshop on Commissioning for State Agencies,” State Energy Conservation Office of Texas, Austin, Texas, July 30-31, 1998, (with M. Liu).

“Workshop on Commissioning Campus Facilities,” University of Minnesota Fairview Medical Center, March 16-17, 1999, (with M. Liu).

“Workshop on Commissioning for State Agencies,” College Station, Texas, August 11-12, 1999, (with M. Liu).

“Workshop on Commissioning and Performance Contracting in Schools,” State Energy Conservation Office of Texas, Harlingen, January 11, 2000 (with M. Liu).

“Workshop on Continuous Commissioning for State Agencies,” Northern States Power and Minnesota Dept. of Administration, Minneapolis, MN, March 21-22, 2000, (with M. Liu and W.D. Turner).

“Workshop on Continuous Commissioning for State Agencies,” Northern States Power and Minnesota Dept. of Administration, Minneapolis, MN, March 23-24, 2000, (with M. Liu and W.D. Turner).

"A Workshop on Energy Measurement, Verification, and Analysis Technology," Federal Reserve Bank of Dallas, Dallas, Texas, April 17-18, 2000, (with J. Haberl).

"Workshop on Commissioning Campus Facilities," Terrell State Hospital, May 11-12, 2000, (with G. Wei).

"Workshop on Commissioning and Performance Contracting for School Facilities," State Energy Conservation Office of Texas, San Antonio, Texas, May 17, 2000, (with M. Liu).

"Building Commissioning Workshop for Texas School Facilities," McAllen, Texas, May 17, 2001, (with W.D. Turner).

"Workshop on Continuous Commissioning for State Agencies," State Energy Conservation Office of Texas, Austin, Texas, July 19, 2001 (with M. Liu and W.D. Turner).

"Workshop on Continuous Commissioning for State Agencies," Arlington, Texas, August 8-9, 2001 (with M. Liu and W.D. Turner).

"Workshop on Continuous Commissioning<sup>SM</sup>," Tyler, Texas, March 7, 2002 (with W.D. Turner and S. Deng).

"Workshop on Continuous Commissioning<sup>SM</sup>," Houston, Texas, May 22-23, 2002 (with W.D. Turner and S. Deng).

"Workshop on Continuous Commissioning<sup>SM</sup>," El Paso, Texas, July 10, 2002 (with W.D. Turner and S. Deng).

"Workshop on Continuous Commissioning<sup>SM</sup>," Richardson, Texas, October 14-15, 2002 (with W.D. Turner and S. Deng).

"Workshop on Continuous Commissioning<sup>SM</sup>," Galveston, Texas, June 6, 2003 (with W.D. Turner and S. Deng).

"Workshop on Continuous Commissioning<sup>SM</sup>," Corpus Christi, Texas, July 18, 2003 (with W.D. Turner and S. Deng).

"Workshop on Continuous Commissioning<sup>®</sup>," Atlanta, GA, November 11, 2003 (with W.D. Turner).

"Workshop on Continuous Commissioning<sup>®</sup>," Austin, TX, Sept. 17, 2004 (with S. Deng and M. Verdict).

"Commissioning New and Existing Buildings," Kuwait City, Kuwait, October 23, 2010 (with J. Hatcher).

"Continuous Commissioning<sup>®</sup> (CC<sup>®</sup>) Workshop," Doha, Qatar, October 17, 2012

"Continuous Commissioning<sup>®</sup> (CC<sup>®</sup>) Workshop," Manchester, UK, October 23, 2012 (with J. Martinez and J. Watt)

## **Consulting**

Northwest Missouri State University, energy management consultant, 1984 –1993.

Korea Institute of Energy and Resources - consultant to review projects in the Passive Solar Branch, June, 1987.

Battelle Pacific Northwest Laboratory, HVAC Systems Research Needs Advisory Board, December, 1987.



Solar Energy Research Institute, Member, Review Committee, PSTAR Project, 1989.

North Carolina Alternative Energy Corporation, Member, Advisory Committee, Residential Energy Code - 1989.

Steven Winter Associates, Research Consultant, 1991- 1993.

Energy Systems Associates, 1995-1996.

Entergy, energy management consultant, 1996.

Houston Lighting & Power through Energy Systems Associates, 1996.

Enershop through Energy Systems Associates 1996.

Enershop through Brazos Energy Systems & Technologies, 1997-2001.

Pacific Energy Center, 1998.

Global Energy Partners, 2003